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Tree Medicine

a guide to understanding trees & forests
as natural pharmacies

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Preface

Imagine if you will, a forest that was planted with a specific intention other than timber. Imagine also that each tree is carefully selected through research and study as each will hold a cure for at least one disease afflicting humans and animals alike. Perhaps you will have the choice of entering such a forest alone, or you can be led through the forest with a guide, a forester who knows each tree and its application, and who can lead you to a tree for your specific health needs. A new breed of environmentalism, a new type of pharmacy if you will.

Within this forest, park or garden will be trees to alleviate pain, manage chronic illnesses such as diabetes, or provide food. Such a forest has not been planted yet, but it could be, soon. All the trees are with us today. All the research has been done. We simply have not yet joined the obvious links. We have not yet planted these trees to create a Medical Forest.

Such medicinal forest may support isolated communities, inform mainstream health systems, supply unique drugs to hospitals, provide incomes for rural communities, and aid in empower women in their communities and the wider work force.

Once a tree or forest has more value standing and flourishing, it could safely be assumed that it will be protected by the people that it serves.

In this reference book there are many trees providing remarkable and effective results in treating illnesses and diseases.

Take for example the tree Ficus religiosa, the Bodhi tree of Southeast Asia, which is protected by the Hindu and Buddhist people due to the medicinal value of its leaves as well as its religious importance. Aesculus hippocastanum would be another tree, because it can protect people from cardiovascular disease, or yet another tree, Cochlospermum religiosum, that can be effective in liver disease management. These benefits will surely ensure that the local people will protect them.

The research will continue for many years as we rediscover the lost knowledge of our ancestors. It will also test, with further analysis, previously unknown uses of known species.

Many reports and papers note that over 50% of all modern medicines are derived from natural sources, such as plants. If this is so, why do so many people have little or no access to beneficial medicine? When we realize that processing these effective medicines into balms, extracts or oils is not technically challenging in most cases it becomes clear that what is missing is knowledge and the dissemination of it through education. The World Health Organization (WHO) has long been advocating Alternative and Complementary Medicine as a solution to the developing world's health issues. Therefore, it is not a matter of effectiveness but rather of enhancing awareness of the possibilities.

The human family must learn to live more harmoniously with the earth's ecosystems – especially forests. We need to integrate modern urban infrastructure with green ecosystems for our species to survive. The more rapid this integration, the more chance we have of moving into a more certain future.

The measure of an ethical society is the ability to deliver healthcare to all its people regardless of race, social status or location. Growing pharmacies near villages, towns and cities and the education necessary to access effective use of them, will enable a powerful change to occur.

Imagining such a forest after reading this book will not be hard. Furthermore, after reading this book you will not be able to imagine anyone cutting down such trees.

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Content

How to use this book

This reference book is written in a conversational tone to reach the general public, to inspire readers to curiosity and discovery. The book provides an overview of everyday trees and their medicinal properties and usages that often date back thousands of years. It summarizes how their leaves, bark, roots, and flowers are uniquely potent and beneficial to humans and animals when prepared as a tisane (tea), extract, balm, powder or essential oil.

One page per tree provides the common names, origin, genus, soil requirements, timber use, often extraordinary history, and the scientific research that has proved and sometimes disproved their potency. And, as with nature's balances, the book also summarizes several trees that are actually poisonous.

Providing all the details on identification, chemistry and medicinal applications as well as methods of preparation into one book is impossible, hence further research is recommended.

The links to quoted research are all actual at time of publishing, however with the quick changing digital world more research papers are constantly made available for the reader to access and learn from.

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Introduction

Today, more than at any period in our planet's history, forests are a critical part of a successful future. A future that mankind is finding highly precarious due to such challenges as over-population, climate change and deforestation. Currently there are various proposed and even applied solutions that aim to protect the remaining untouched ecosystems, such as the REDD program (Reducing Emissions from Deforestation and Forest Degradation).* Yet, the world has not exhausted the need for more unified solutions for these problems facing the world's forests. Deforestation today is still rampant due to the fatal combination of ignorance and unethical profiteering. Forests are vital for the health and happiness of every one of us, yet sadly the person cutting down the forest is tragically the person living within it.

Many of the world's poor are forced to sell their forest resources to the rich developed world for a fraction of the true worth that they are actually worth, merely to put food on their tables. It is true that more and more traditional people are refusing to allow loggers and timber companies onto their lands, however the majority are forced to relocate. In many cases it is their only chance of lifting their family out of poverty. In most instances it is a short-term solution only, and they endure a devastating future in often unhygienic slums, without their traditional trees.

Fortunately, for decades well-intentioned people from non-government groups and environmental organizations have developed programs to prevent or restrict deforestation and the subsequent exploitation. Yet, the pull of significant financial reward defeats many of these excellent projects. Regardless, the poor in remote areas as well as in denser populated areas remain without high living standards including health benefits.

More solutions must be found. Simple and effective solutions with multiple rewards benefiting a multitude of people. Such as the R.E.D.D, solutions that ensure that the value of a standing forest far outweighs the value of its timber or the land it occupies for use in agriculture. A very tangible solution lies with medicinal trees.

This reference book has been designed on the simple premise of offering a solution. A solution that delivers the most effective benefits at the highest value to the forest owners, and that culminates in the long-term protection of the trees itself. As a reference book, it is to share knowledge and scientific expertise so that there may be a paradigm shift in health and in eco-system protection.

As is the current situation with the world's wealth, the access to medicine remains inequitable. Too many people cannot benefit from breakthroughs in modern medicine. For instance, in an age where scientific research has greatly increased the life expectancy of the developed world, the World Health Organization (WHO) informs that over a half a million children under five die of dysentery annually. This easily treatable disease has such a large impact on remote communities due to the difficulty of getting trained medical staff and appropriate drugs and medicines into their geographic areas. It would be more advantageous to manufacture the drugs and medicines at the locations where a disease is most prevalent.

An example of existing and readily available research is the study by a school group in England that conducted trials of a common garden herb. They found that enteritis (inflammation of your small intestine) causing pathogens were killed in a few minutes with a solution containing thyme oil of less than 1% potency. Research showed that Thymol, one of the active principles of Thyme, degrades the protein outer shells of gram (+) and gram (-) bacteria, making it difficult for them to survive in the same environment as Thyme oil. Therefore, the essential oil of Thyme is a highly effective treatment for dysentery. This book is however about trees. A tree with similar benefits is

The tree *Acacia Nilotica* has been referred to in early Egyptian texts and was used as a medicine for centuries. It may be due to its historical importance that it has been transported across the globe where it is now often considered an invasive species. If its significance as a topical antibiotic, antidiarrhea, antimalarial, antihypertensive, and anthelmintic were rediscovered, it would no longer be considered a weed in many parts of the world.

The trees described in this book have been shown to be effective in the treatment of a variety of medical disorders. The science is complete, ensuring a significant level of confidence. It is the expectation that with this information a tree with verified medical effectiveness will be more valuable for its health benefits and will therefore be protected by those using it. Two major outcomes will then be achieved: the delivery of health benefits to remote and poor populations and the protection of forested areas.

In truth, it may be counter-productive for national quarantine agencies to restrict the introduction of some tree species into certain regions. For centuries, the international transport of our agriculturally important plants reached all corners of the globe without restrictions. Yet, today it is common for trees with significant medical properties to be restricted due to the fear of them becoming invasive. If a more informed position were taken then it would be possible to create forests with proven medical properties in the many regions where these trees are not yet found, but are needed, alike access to food is needed.

Our ancestors achieved their medical lore and knowledge through trial and error. Much of this medical lore was of no use to the patient and in some cases these herbal treatments may even have resulted in the eventual death or crippling of patients. This need not be the case today as we are now protected by scientific research whereby every herbal medicine is rigorously studied in laboratories and either discarded or supported by proper scientific method. Only those scientifically approved have been included in this book. Also included in this book is a list of trees too dangerous to be used.

Scientific research will never cease. Today more medical researchers are in un-explored sections of forests seeking new and unidentified species. Some researchers hope to find a new drug while others seek alternative uses of known remedies. This field of medical forestry research will continue for many decades and the development of specialized Medical/Medicinal Forests may take much longer. With an estimated 100,000 different tree species on the planet there is a clear need for continued research and analysis.

* REDD in short. Program whereby traditional forest owners or governments are paid to *not* cut down a designated area of valuable forest. The payments are in lieu of the revenue that would have been derived if the timber had been processed and sold. Additionally, the price paid includes the value of carbon stored within the forest. There is a mixture of merit and sacrifice in this strategy, however very few REDD projects have been realized due to national government bureaucracy and vested commercial interests.

Emergence of acceptance

The pendulum of arrogance has swung throughout history where the new is accepted and the old is discarded, yet after time the old may be accepted once more when its wisdom is re-discovered. This has been the history of traditional, alternative medicines in the developed world. However, in the developing world or poor regions of the earth as much as 80% of the health needs of populations are still being treated by traditional medical practitioners. Sadly, much of the traditional medicines in use have either not been verified as effective or have been found to be ineffective and, in some cases, are dangerous to the patient.

In recent decades, a new appreciation of Traditional and Complementary Medicines has been emerging. One such indication of this is seen when the World Health Organization (WHO) began a global push to promote such complementary practice in 2000. So successful were these campaigns that the WHO in 2014 embarked on a decade of promoting them in developing and developed communities alike. A report from the WHO revealed that in 2013 the global herbal medicine market had surpassed US $60 billion dollars in annual sales. More recent reports indicate that the market is expected to surpass US $100 billion dollar annually. It is this rapid and powerful demand around the world that has brought about many new challenges requiring urgent solutions, such as population pressure, ecosystem degradation and adulteration of products.

These issues are both amusing and distressing. Amusing, because the critics of these traditional herbal medicines do so as they drink their coffee (*Coffea arabica*) or swallow their aspirin (*Salix chinensis*). Distressing, because details of hundreds of botanical medicines, tested, analyzed and documented arrive in the libraries throughout the world, outlining the most effective botanical sources, but these reports are frequently ignored. Indeed, it was in the library of the WHO herbal monographs, that the herb Mugwort or also known as Sweet Wormwood (*Artemisia annua*) was promoted as an antimalarial agent, beginning decades in which malaria was kept under control by a simple weed. It is important to note that Chinese herbal medicine had been using this plant for centuries before western scientists even knew of it.

The failure of governments and non-profit agencies to deliver affordable health care in remote and impoverished communities may be partially resolved by promoting a renewed and reliable complementary health system. Research has found that the traditional people living in such regions readily accepted such practices and solutions because they had never really discarded their own similar ways of managing health and they therefore readily welcomed the improved yet similar methods of health.

A study conducted in 2012, estimated that as much as 50% of the drugs in use today have been derived from plant sources. Therefore, the bias against traditional systems and the refusal to allow access to them, continuing for as long as half a century, was simply not false but possibly fraudulent. Excuses for such refusal might just be the greed of pharmaceutical companies that make deliberate attempts to secure markets and increase profits by preventing people from accessing freely available herbal remedies. Thankfully today pharmaceutical companies are embracing these alternative remedies.

Around this amazing planet, people from as far away as in the Amazon forests to the Kalahari deserts have been and are still using highly complex traditional systems for cures and to maintain good health. This existing knowledge makes the assimilation of new and more effective herbal drugs easier.

Medicinal forestry - divergence

The title Forester has been used since medieval times when forests and the resources contained within them were protected by forest workers employed by lords and rich landowners. Foresters at those times dealt with the sale of timber, protection of wildlife and in some cases patrolling the forests for any criminals hiding within them.

Today, the profession of forestry requires men and women to employ science and technology, engaging in many different objectives and goals to manage our forests – not simply for timber but also for ecological stability, carbon sequestration and environmental rehabilitation. The term Medical Forestry refers to a specialization of forestry management whereby the integrity of the forest is maintained and enhanced specifically for the production of medicines.

A single tree may deliver two or three medicinal products from different parts of the tree structure. For example, the Fijian tree known as Dilo (*Calophyllum inophyllum)* has been used to produce a valuable oil from its nut kernels which is powerful as a skin application, and its bark is used to make a solution effective in pain management. This tree is known throughout the tropics of Asia and the pacific Therefore, the Medical Forester, planning the management of Dilo trees would assume that the tree's trunk must be kept growing low by budding the sapling when young. This is counter-intuitive to mainstream forestry practice of growing tall, clear trunks for maximum timber volume. Further, the flowers of the Golden Shower (*Cassia fistula)* for instance are required to make an herbal extract. Therefore, the forester would aim for a specific plant spacing grid whereby the crown of the tree receives enough sunlight to achieve maximum flowering potential.

Further considerations would be given to sustainable harvesting practices. With reference to Red Stinkwood (*Prunus africana)* which has been heavily over harvested in the wild to a point where it is on the C.I.T.E.S (Convention on International Trade in Endangered Species of Wild Fauna and Flora) list of endangered species. The bark of this tree however continues to be in significant demand for the treatment of male prostate disorders (benign prostate hyperplasia). Medical forestry management would require planning which would include calculations of production from estimated tree volumes on a hectare-by-hectare basis. Also, the correct harvesting process that would prevent irreparable damage to the tree would also have to be learned and applied. Currently many foresters are actively managing the restoration of this tree species, returning it to its natural ecosystems and developing plantations. The development of strategies, both to save *Prunus africana* and to support the market demand are not mutually exclusive. Both may be achieved, and in fact this may increase support for both goals, due to the value of the commodity, which in this case is the trees powdered bark.

Other trees such as Gingko *(Gingko biloba)* and Witch-hazel (*Hamamelis virginiana)* are all being cultivated on massive scales, only because the demand is equal to, and often larger than, the wild resource can supply. It can be argued that, when the global market is balanced with adequate supply, then the discussion will evolve into an argument comparing 'wild harvested' with 'plantation derived', and which is superior. Therefore, this will require both mono-species forestry and mixed or multi-species forestry each needing differing skills. The largest plantation (approximately 1200 acres) of one species, Gingko, is reported not to be grown for timber, but for its leaves. Naturally, developing single species forests is relatively straight forward due to complex ecosystems being avoided in a commercially driven enterprises producing medicinal products. Whereas in a holistic, integrated model the planning and planting of a forest with many species combined to produce various medicine, would require complex and detailed thought and execution. Such integrated forest development has the potential to deliver a broad range of drugs for the adjacent communities. Yet the correct methods of harvest and production of the various medicinal types would also have to be fully understood.

The traditional use of Agarwood (*Aquilaria crassna)* is as an infusion derived from its leaves. It has now been shown that the extract retards absorption of fats from the gut to the bloodstream, proving useful for the control of non-communicable diseases, such as stroke and obesity. Further testing showed the ability of the aqueous extract to reduce the production of ammonia and putrefaction in the gut. Yet, the oil from this tree is one of the most valuable in the global market and as such has seen Agarwood almost classified as critically endangered.

Traditional claims about the uses of various herbs have often been extraordinary, in some cases unbelievable, as the curative powers of herbal medicine became exaggerated over time. Yet in many cases, scientific research can unravel these wild and outrageous claims. A case in point is the plant, Gum Arabic tree (*Acacia nilotica),* whose historical reputation claimed cures for coughs, colds, chest pains, stomach pain, dysentery, diarrhea, toothache, malaria, skin inflammation, male in-fertility, bleeding piles, leukoderma, antiviral, and even cancer. However, research has shown that the extract of *Acacia nilotica* has shown its effectiveness against gram(+) bacteria such as *Staphylococcus aureus* responsible for skin infections; *Escherichia coli* responsible for intestinal disorders such as diarrhea, and *Pseudomonas aeruginosa* responsible for respiratory and intestinal disorders, and more. Therefore, research has substantiated a number of these claims, yet for fertility and cancer these claims have not been substantiated.

The production method of desiccation, the crushing into fine powder, presents little challenge to a professional forester or a member of a community. However, the production of tinctures and extracts is more complex. The medical foresters would have to give advice and support to the recommended process to the local communities.

The knowledge of the environment and its capacity to create a living pharmacy for (remote) communities may be well intentioned, however it will be ineffective unless the forester also provides educational extension services and on-going support to the community.

Today, the humble forester must be much more knowledgeable and further trained than previously thought necessary.

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The lack of

Since the middle of the 20th century a resurgence has been occurring in the developed world of consumers returning to alternative therapies. This has had an effect not only on the acceptance of the veracity of their claims, but also on their price, and this has stimulated the increasing demand for the product. It has been reported that over 30% of people in the United States of America used alternative medicine in 2017 Furthermore, the World Health Organization has reported that up to 50% of all medical products in China rely on alternative health preparations. As a result, science has begun taking a valuable role in verifying medicines derived from traditional sources, determining their benefits. Alternative medicine is a recent trend in many parts of our modern world whereas in the developing world this has been the main provision of health care for centuries.

In Africa up to 80% of the population relies on alternative medicine due to price and ease of access. Preparations made by traditional healers are much cheaper when compared with industrialized pharmaceuticals. The severe lack of healthcare workers also contributes to the continued reliance of traditional therapies because in some cases there are only 2.3 healthcare workers per 1000 members of the population in Africa.

The resulting pressure on the global resources of medicinal plants far exceeds the supply. Indeed, the growth of the global population within the last 100 years has made this a critical concern for governments and communities to the point where many nations now regulate by policies and laws in regard the harvesting and preparations of alternative medications.

In South Africa, the department of 'Water & Forests' has conducted research, indicating that in excess of 20,000 tons of medicinal plants are traded annually within this nation alone with an estimated value of 2 billion Rand. This volume of material is to supply the demand of an estimated 28 million users within South Africa itself. South Africa is instituting the licensing of harvesters, predominantly women, and regulating unlicensed gatherers with jail sentences and fines, resulting in the foresters of South Africa already being allocated new roles and responsibilities in the alternative medicine industry.

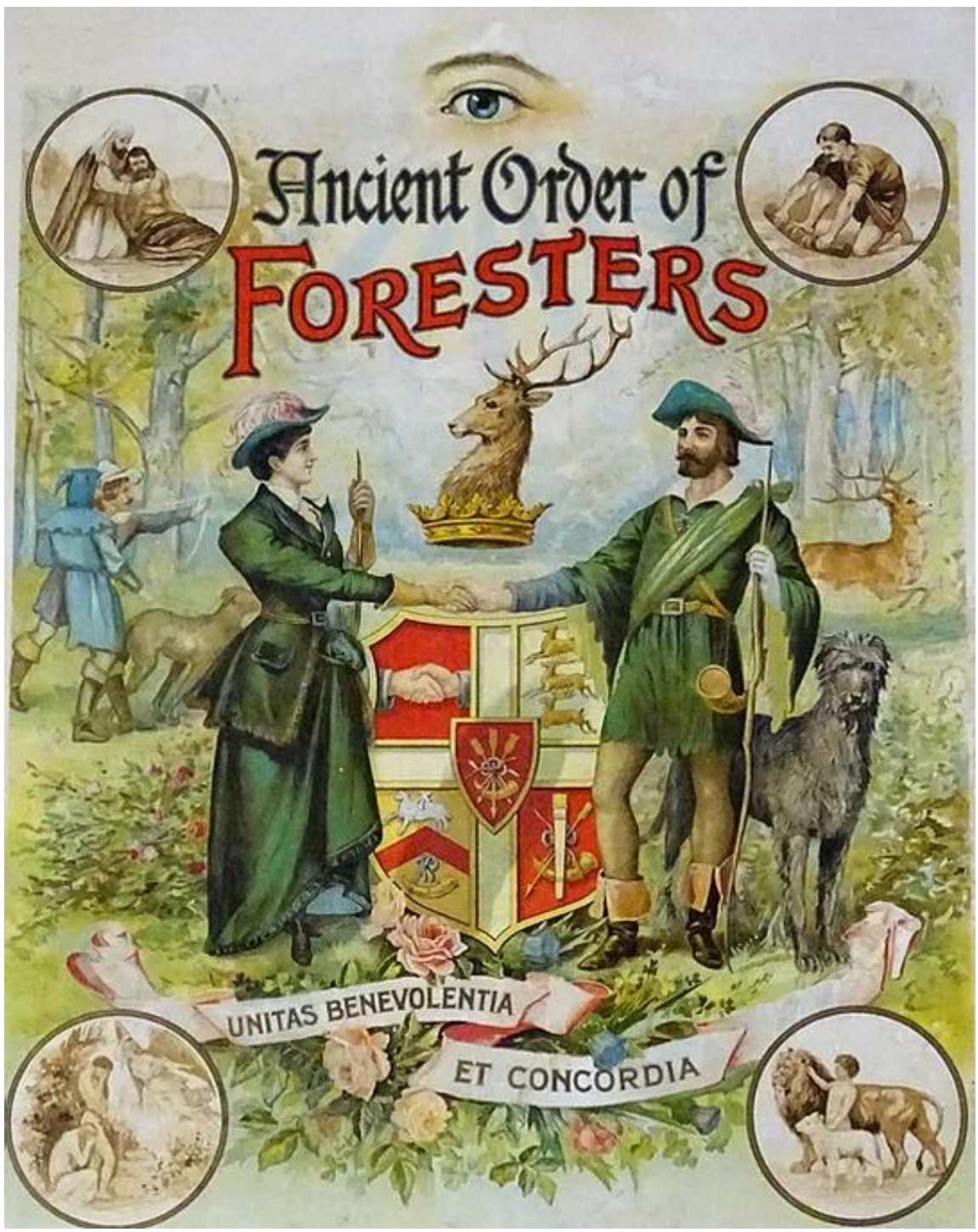
In India, recent claims state that up to 93% of all Ayurvedic medicinal plants are endangered. As a result, the Indian government is attempting to protect these plants and trees by imposing penalties for illegal harvesting and even relocating species to government controlled growing areas. Currently 95% of medicinal plants are harvested predominately from wild forests. India has a National Medicinal Plants Board with oversight of the harvesting, preparation and marketing of all traditional medicines.

Many other nations have commenced regulation of wild harvesting and the trade of alternative medicines. Of note is the International Union for Conservation Networks (IUCN) which has been highlighting the growing problem of overharvesting and the lack of control in the medicinal plant industries worldwide. A group Medicinal Plant Specialist Group (MPSG) within the IUCN is actively working to save Red Alert listed medicinal species.

A resulting dynamic from the overharvesting of medicinal plants and trees is the growing trend of fraudulent claims by healers, traders and even multinational corporations. With global trade estimated to be in excess of US $60 billion annually the herbal medicine market is driven by profits, leading to recent examples of companies selling supplements that contain little or no active ingredients. In 2013 The New York Times reported that DNA tests revealed that of 44 supplements tested, over one third did not contain any of the plant advertised on the labels. Many supplements had been intentionally adulterated with rice, soybean or wheat being used as fillers. In America it is estimated that there are 29,000 herbal products on sale. If one third of these contain no active ingredient, then a vast deception is occurring. But why would respected firms sell products not containing the plants advertised? One clear reason may be the severe shortage of the medicinal

plants. A more recent story was reported on CBS news America in which it was revealed that supplements from four major retailers were tested (2015) and results showed that only 21% had evidence of the advertised plant material in them, the lowest from one major retailer where only 4% of the products tested showed the DNA from the plants listed on the labels.

There is clear evidence that the current medicinal resources of the earth must be protected by regulations and laws. Yet even more pressing for the developing world is the need to establish forests to increase the herbal reserves and the access to badly needed health solutions.



Orchestra of organic chemistry

Why are there so many claims for health benefits given to just one herb or tree? Surely one tree, or herbal medicine, cannot cure multiple diseases. The short answer is “Yes they can!” However, the complete answer to this question is much more detailed.

Prior to the current scientific period, many of the herbal medicines were not studied in great depth. This may be due to the elevation of science to an exalted position in the early 20th century, when any question from a layman or less well scientifically educated person was dismissed out of hand. Folklore about herbal or traditional medicine was not based in science, but rather in tradition, and was therefore dismissed as ineffective and irrelevant, even though most drugs throughout medical history have been plant based in origin.

It was this period of scientific arrogance when chemistry, empowered by new industrial processes, was thought to be the only future, and where synthetic drugs were discovered, derived and mass produced to finally cure all the diseases of mankind. During this period of scientific advance huge gains were made in medical science and treatment; however, all manner of ineffective treatments and procedures were also employed for extended periods of time. Procedures which were not just ineffective, but detrimental to the patient and in some cases fatal.

Even today, research conducted at Johns Hopkins University in 2016 found that the third highest cause of mortality in the United States of America is thought to be iatrogenic deaths which means deaths associated with or caused by medical treatment. This is not a claim that the current science of medicine is evil; on the contrary, lives are saved every day by doctors and nurses, but rather that, as in all evolutionary progress, mistakes will be made, and accidents happen.

Medical researchers and scientists have begun to acknowledge that they had ignored an enormous body of knowledge when they dismissed traditional medicine. From the early 1980’s and currently, there is enormous research and emerging respect for traditional medicine around the world. There have been some remarkable situations, when for example researchers found that a tree from Africa, the Pincushion tree, (*Nauclea latifolia)* possesses exactly the same chemical structure of one of the most popular pain management drugs today, known as ‘Tramadol’. What is unique about this story is that this drug was first derived synthetically and only when science-based research reviewed African health practices was it discovered that traditional African people have been using that drug for centuries.

With this newfound respect, we are now discovering exactly how plant-based medicine works, or in many cases, do not work. As a result, traditional systems are becoming more and more effective in the treatment of diseases, resulting in a gradual and universal movement of modern medicine researchers re-examining traditional medication. In North America, consumers are moving more toward traditional, alternative medicine because they believe them to be more effective, less harmful and more affordable. Yet for 80% of the world’s population traditional preparations are all they have.

Herbal medicines may produce synergistic results due to the complex phytoconstituents found in plants. Phytoconstituents are organic chemical compounds that may be unique to each plant and one of their roles is to help plants fight off insect or disease attack. One plant may contain many phytoconstituents and may produce multiple reactions when taken as an herbal medicine. Conversely, modern medicines strive to deliver precise and effective drug dosage whereby a measured and expected improvement is achieved in the patient. As a result, modern medical drugs are produced from only one chemical or compound, consequently rarely resulting in more than one health benefit.

An herbal or plant derived medicine may contain proteins, carbohydrates, lipids, alkaloids, saponins,

tetraterpenoids, minerals, acids and more. The fat reducing chemical found in Crepe Myrtle *(Lagerstroemia speciosa)* is corosolic acid, yet this is only one compound of many found in this tree. When folklore remembers that medicine from certain plants can cure inflammation, dysentery, wounds, food poisoning, bladder infections, eye infections and more then that plant is probably rich in antibacterial phytoconstituents. Hence the plant-based medicine may indeed cure or aid in the management of multiple illnesses caused by bacteria or other pathogens.

As a result, herbal medicines may be considered combination therapies.

Image by Seksak Kerdkanno from Pixabay

The aliens surrounding us

Throughout our history on this planet, men and women have always looked upwards to the stars and wondered about possible alien species, whilst all the while we have many examples of what alien life may well look like right here on this world. Our seas give many examples due to the extra dimension that water allows aquatic species to develop within. The octopus continues to amaze us. The eyes of a dolphin are full of intelligence and a simple jellyfish defies our basic rules of what life is. On land the only species that has this freedom are the birds as the rest of us, it appears, are confined to one simple plane, the earth. As science continues to travel down its eternal highway of knowledge, we are however finding this may not be the case. And, in the case of trees, the pioneers of scientific endeavor are finding a whole new universe beneath our feet in the roots and soils of our forests.

Over the past decades a vast network has been found of mycelia or fungus that live in a mutually beneficial relationship with trees and plants. This relationship between trees and fungus or mycelia has been called mycorrhiza. At its most basic, the network exists where the mycelia receive carbohydrates and or sugars from the trees and the trees receive more minerals from the soils due to the mycelia aiding in the uptake of these essential nutrients. At the other end of the scale, researchers are finding that a single tree can communicate with trees kilometers away from it. Not only is a tree able to communicate over vast distances, but it can do so selectively! A tree can choose who receives its message. For example, if a tree on the edge of the forest is attacked by leaf eating insects, not only will the tree make more chemical defenses reactions, but it will also warn the other trees around it who have been found to make additional chemical defense reactions without any sign of the insects being on their leaves. In other words, the surrounding trees were getting ready because they had been warned.

In the book from 2015 titled, “The hidden life of trees: what they feel, how they communicate: discoveries from a secret world”, Peter Wollheben wrote of this vast network that he named the “Wood Wide Web”. The pioneering work of Professor Suzanne Simard’s heralded a breakthrough in the understanding of this network and her work from the 1990’s opened the door for other researchers to follow. Our understanding of the network has been further expanded by the writings from Paul Stamet’s, who made the comparison that the mycelia network is the earth’s natural internet. As a result, we begin to realize that a forest is nothing that we previously assumed. Even the basic assumption that trees stand on the earth and grow up maybe wrong, as what we see may only be the legs and lungs of the tree whilst the true nature of the tree grows downward.

Within the human body we also have chemical networks that use compounds that we call hormones to relay messages to and from the brain. However, each one of us have the same chemistry. This is not so for trees where each species has its own unique chemical cocktail, and therefore a tree may be used to treat one such disease and be ineffective in the treatment of another differing disease. Additional research from Michaela Achatz and her colleagues, of the Berlin Free University of Germany, have found that not only can trees use the mycelial networks for food and communication but also for defense. In the case of the *Juglans nigra* (Black walnut) it is well known that this species produces a natural weedicide called juglone. However, the tree is able to send this chemical out through the mycelial network to stop competing vegetation from using the nutrients in the soil on which it relies. Without the presence of the mycelia, it was found in the same research that the tree has a far smaller reach and therefore can defend a far smaller parcel of ground.

As life has evolved and developed on earth, trees and plants reigned supreme during the carboniferous period. During this time insects and bacterial infections were their main threat. However, once the giant herbivores arrived the trees and plants had to develop new strategies of defense, such as bitter compounds in their leaves making them unpalatable. Yet, when man arrived trees found they had no defense against our intellect. We developed newer and newer methods for

clearing land for planting and removing timber from the forest. As a result, we are only now coming to realize that a forest is not just an ecosystem but a population of individuals. So, when we cut down a tree for its timber or its land, perhaps we are unable to hear its death when the chainsaw or axe strike it, as perhaps it cries underground.

Once millions of years ago trees reigned supreme and then along came man. Perhaps it is us who are the aliens.

Image by Adege from Pixabay

Harvest time and folklore

Throughout the herbal lore of traditional medicine there is one topic that is both romantic and logical, two words not usually associated with each other.

It is well known that plant material may differ in potency from one tree to the other and even if it is harvested at different times of the year. Therefore, the claims in ancient books and texts that state when and how to harvest plant material is to be taken in a serious manner. It is romantic to read that the Druids of Northern Europe only harvested mistletoe six days after the new moon as it was thought the ideal time due to the plant's energy level. Whilst this is fanciful, it is actually quite logical. When considering whether to harvest stembark, it would be sensible to do so when the tree was not in a nascent (emerging) phase. For example, a tree in the winter months would be dormant and therefore the bark would not have high levels of the active compounds required to make a medicinal extract. A better time to harvest bark is after the spring period when the tree is full of leaf. Likewise harvesting the leaves would be ideal just before the tree flowers as this would indicate the tree placing more emphasis on the development of flowers and not leaves. Naturally harvesting the flowers would be when they are in full bloom. Hence we find the logical aspects of the ancient folklore.

In modern times where science is the primary measure, little work has been done on this aspect of herbal medicine, however a great deal of unscientific literature exists. As an example, a reference work was cited on the tree *Lagerstroemia speciosa* where the author states that the leaves should be collected when they turn red prior to the tree entering a dormant phase, as the red of the leaf indicates high levels of corosolic acid, the active principle of this tree. Yet no other supporting material was found to strengthen this argument. In this example both science and assumption may exist together until such time as research is conducted on the ideal time to harvest the leaves according to the levels of the active compound.

Trees and plants, like all living organisms, have clearly defined cycles. One aspect of forestry is aging or dating a tree by the number of growth rings found when the stem or trunk is cut open. Thus, a year is counted for each ring, indicating cycles or periods of time. It would therefore be logical that in order to produce the most effective medicinal extract these cycles are taken into consideration and the periods of harvest are modified to suit such periods.

In regard the harvesting of trees outside their native range or origin, the forester or medicinal practitioner would be well advised to know the growing conditions and environment that the species first evolved in. In this way logical assumptions may be made as to the potency of the material harvested. Should a tree or species of tree originate from a region of deep loam soils with high rainfall, and now be found in an environment of poor soils with less rainfall, than it should be assumed that the tree would not be growing at its genetic optimum and have less of the active principle for which it is known medicinally. Hence, in this situation more plant material may be required for processing in order to achieve the same or equivalent effect on a patient.

How the trees are selected

When is a tree not at tree? Such a question at first seems irrational, yet this has been debated at the highest levels during the last several decades with a special emphasis on carbon sequestration and forestry offsets. In original carbon sequestration programs forestry was assumed to be well understood, however, to the surprise of many this was not true. One argument from Australia, proposed that small bushes should be included in the definition of which plants constitute a forest, because that country has millions of acres of bushland which the Australians wanted included as potential carbon offsets. Therefore, the criteria used in this book defining a tree are as follows.

"Though no scientific definition exists to separate trees and shrubs, a useful definition for a tree is a woody plant having one erect perennial stem (trunk) at least three inches in diameter at a point 4-1/2 feet above the ground, a definitely formed crown of foliage, and a mature height of at least 13 feet". Source: Utah State University–Forestry

This then becomes the first condition before a plant is included as a tree in our considerations. Naturally within a forest there are many other plants such as bushes, vines and ferns. These may also be investigated according to any ongoing desire for medical purposes; however, such investigation will be for future research.

The second criterion for selection in this book is that the tree must have been studied in-depth for its medical benefit and that there must have been no fewer than four academic papers from respected universities or institutions for each tree. From these research papers the main benefit or primary application can be derived, which will begin to define the core use of the tree. As with all the trees selected, each may have other applications which may be of more value, however these will be graded as to relevance in our present discussion.

The toxicity of the complementary medicines derived from the trees has also been used to screen unwanted trees such as Sea Poison tree, *Barringtonia asiatica*. As far as possible only those trees that are safe have been included in the selection process.

The resulting criteria for tree selection may be listed thus:

- size and shape
- current and previous research
- toxicity level

Trees that have multiple uses such as timber and food will have a higher ranking than those that simply possess medicinal value.

Shennong, the God-King of Chinese Medicine and Agriculture, by Guo Xu ((1456-c. 1529)

Tree identification

It is of critical importance that a correct and thorough identification procedure is employed when selecting a tree that is appropriate for medical use. The selection of a wrong tree and any medicine produced from it may have no health benefits to the patient, and in some cases a far more dangerous result due to poisoning may ensue.

A case in point, is the selection of a tree from the Lecythidaceae family, Fresh Water mangrove, (*Barringtonia acutangular)*. This tree has been used for centuries as a medicinal source in Asia. However, a close relative, Fish Poison tree (*Barringtonia asiatica)*, is highly toxic. Therefore, great care must be exercised. Should the wrong tree be identified, and used in a medicinal preparation, death may result.

There are several aspects of the identification process which must be used in combination.

The images below are those of flowers from three distinctly different trees and the identification of each tree may be difficult by the flowers alone.



The identification process must utilize comparison and analysis of the above aspects of each tree. In most cases, a clear identification of the flowers and leaves may be enough. However, in circumstances when the flowers are not in bloom or the tree not in fruit, a reliance on the other aspects (leaves, bark and shape of the tree) may have to be relied on to identify a tree.

The below graphic indicates that the flowers and fruit are most important to correctly identify a tree, followed by its leaves and then bark and shape. Due to this you might have to review a tree over several seasons to ensure its correct identification.

Levels of importance of the aspects used in tree identification:

Timber

Globally, vast tracks of pristine forests have been felled for timber. In addition to this, there is increasing need for agricultural land for food production, so it is no surprise that the forests of the world are still diminishing. It is true that re-forestation is increasing in some areas, however much of this forestry development is creating mono-species forest ecosystems for the sole purpose of growing trees for timber. It can be argued that mono-species developments protect the remaining natural forests, and that timber production forestry must expand to meet the global demand for lumber so that untouched forests may be left in peace. However, this monoculture methodology will not reflect the vast diversity of the different timbers and their properties.

For example, Balsa Wood tree (Ochroma pyramidale) is the source of Balsa timber which is a uniquely light weight timber with a smooth uniform grain that has been used in boat building, airplane manufacture and insulation. At the other end of this spectrum may be the iron woods of which Guaiacum (Lignum vitae) is still renowned as a material suitable for machine bearings and clockwork.

Colour, texture, grain, durability and density are the major factors when selecting a timber for a specific purpose. Lightweight, evenly textured timbers are chosen for cabinetry in Japan. Darker timbers, such a Mahogany, were the preference of the European markets of the 19th Century. Teak (Tectona grandis) is still the first choice for marine industries. There are wide disparities in different species and their timbers, from the jet black of Ebony (Diospyros crassiflora), which has been used since the Egyptian period, to the White Ash (Fraxinus americana) from which a white timber is sourced. One form of Ebony from the family Diospyros is black and heavy enough to sink in water. White Ash is also a timber of high density, making it strong, but it is however susceptible to rot and termite infestation. Therefore, White Ash is not suitable for construction, but is used for interior cabinetry and Ebony, highly resistant to rot and termite, is far too expensive to be used in construction and is usually found on the keys of a piano.Each timber is therefore unique. Yet the ability to choose between one timber and another is becoming a luxury only for the developed world and emerging middle classes. The poor of this world were previously living in rural areas where dense forests once stood. These people are now being forced to use inferior timbers for construction and even worse, burning dangerous timber for cooking, if they can find it. Trees of little commercial value have lower density and therefore less calorific value as firewood. The health issue arising from continually inhaling smoke from these fires is a major issue. There are reports that approximately 67% of the Indian population still cook with firewood (India Ministry of Statistics 2015) and 10% still cook with dung cakes because they have no access to timber at all. A fire made with the timber of the Teak tree (Tectona grandis) has little smoke residue and is preferred for a fuel, but its high price has made it rare in its normal rural setting. One extreme example of death from burning dangerous timber is the Oleander, (Nerium oleander) which has toxic smoke and deaths have been reported of people using this timber for cooking as no other timber was available.

In a controlled multi-species forest comprised of medicinal trees, a so-called Medicinal Forest, it would be possible for the surrounding population to select timbers on a case-by-case basis. Should timber for farm implements be required then the timber from Acacia nilotica may be far more suitable than that from the African Tulip tree (Spathodea campanulate). Similarly, the timber from the European Ash (Fraxinus excelsior) would be unsuitable for house construction. Yet Monkey Pod (Samanea saman) would make a better choice due to its natural rot and insect resistance. Further, should a managed medicinal forest become overstocked with one or two species then the over-stock may be utilized by selected felling following sustainable forestry practices and the timber may then be used in the adjacent community or traded in the general timber markets.

Making medicines

Image by Seksak Kerdkanno from Pixabay

Small scale processing of medications

There are various methods by which a person can produce medical preparations from the trees in the forest. This section will deal with the various methods whereby medicinal products may be manufactured with minimal impact on the trees themselves.

The processing of medical plant material into beneficial products, by the isolation of the medically active parts is known as Galenicals, so named after the 2nd century physician Galen of Pergamon, Greece who is considered the Father of Pharmacy.

Medical history has many products having aphrodisiac claims attributed to them through to anticancer properties and many diseases in between, yet there is only a relatively small number of universal preparations. These are:

- Powder
- Infusion/Tea
- Decoction
- Percolation
- Maceration – Extract and Tincture
- Poultice
- Salve
- Essential Oil

This list is in order from easiest to the most difficult process methods, yet it is possible for all methods to be used in a forest, farm, village or town if the information and training is available. There remains some level of confusion on the productions due to vague descriptions of the preparations. For example, a maceration may be similar to a tincture or extract, depending on the amount of fluid and time that the process requires.

Powders

This is the simplest of all methods, requiring the collection of the plant material and drying it, ensuring no moisture remains. If any moisture does remain, mold and fungus will pose a serious threat to its longevity and in some cases may even make the plant material toxic. Therefore, while this is the simplest form of preparation it requires some understanding of the key principles.

Once the plant material is dry it is then powered to a point where it can be ingested easily. Naturally, this process does not increase the benefits of the material but rather makes larger doses easier to swallow. In the developed world various botanic medicines are powdered and delivered in gelatin capsules for ease of use. One example is the leaf of the Ginkgo tree (*Ginkgo biloba)*, which is readily available in alternative health outlets around the world, yet when the amount of material in the purchase is analyzed, it is more than apparent that the price of *Ginkgo biloba* in the developed world puts it out of the reach of most people in the developing world. *Ginkgo biloba* has been shown to be effective in treating degenerative cognitive disorders such as memory loss, Alzheimer's and senility. These health benefits would be eagerly sought in developing communities, so the logical solution would be to grow the Ginkgo trees where they are most needed allowing people in remote and impoverished communities to access the medicinal attributes of this tree at no cost.

Traditionally, the plant material is ground between two stones into a fine powder. A mortar and pestle are a simple refined tool for such processes and easily made from either stone or dense timber.

Basic manufacture

Herbal medicinal preparation will require a base or menstruum by which the active ingredients of the tree may be separated and increased. The simplest base is water, yet one of the most popular is ethyl alcohol, because the alcohol more easily dissolves the chemistry that is locked in the cellulose of the tree. Other menstruum's are methyl alcohol, petroleum, ether and vinegar, to name a few.

Manufacture of an alcohol base is not technically difficult, however it may be open to abuse by the broader community, so knowledge of distillation would require development of professional ethics in medical forestry.

Ethyl alcohol is the most recommended of the main chemical components of herbal medicine production due to its ease of manufacture, but also because it is a relatively safe agent unlike methyl alcohol which can cause serious health problems.

Alcohol or ethyl alcohol is easily made from either sugars or starches. The easiest sugar to obtain is cane sugar, sucrose, however it may also be made using fructose from fruit and glucose. The easiest starch source for alcohol production is potato or cassava. The mash, a paste made from potato or other starch vegetable is mixed with water and yeast is added. The yeast reacts with the sugars and starches converting them to alcohol. This process takes several days and finishes when no more pressure or bubbling is produced.

After approximately 14 days this first fermenting process will stop. Then distilling will be needed to separate the ethyl alcohol from the wash. In many countries it is possible to purchase a still off the shelf. However, in other countries this is against the law. Yet a still is a simple piece of equipment that can be made from easily obtained materials. In a rural setting all that is required is heat, a pot to heat the wash in, tubing to collect the steam, a condenser to reduce the steam back into a fluid and a collection pot.

In all methods of producing ethyl alcohol, it must be understood that the first fluid to come out of the condenser in this process will be methyl alcohol and this must be discarded due to health risks. A simple rule is to discard the first 10% of the distilled spirit. This may be difficult to judge due to differing volumes of ethyl alcohol in the wash. Therefore, methyl alcohol turns to steam at approximately 148 degrees Fahrenheit (64.4 Celsius). Once the temperature of the wash in the still passes this temperature and reaches 173 Fahrenheit (78.8 Celsius) the ethyl alcohol will begin to steam and pass through the condenser. Before the temperature reaches approximately 200 Fahrenheit (93.3 Celsius) all the ethyl alcohol should have been passed from the wash to the condenser. At this point no more alcohol will be produced, and the process is finished.

Image by Matthias Böckel from Pixabay

Infusions, decoctions and percolations

This category uses water as the solvent or base material as a general rule. However, in percolation other solvents like alcohol may be used. For the purposes of this text, it will be assumed that only water is used as the solvent or base. For the technically minded another term for a solvent is menstruum as discussed prior.

The processes infusion, decoction and percolation are the most basic forms of medicinal production. Yet, in remote and isolated communities they represent the easiest and most effective methods of preparation. Medicines produced by these processes must however be used immediately as they have little preservative qualities and may degrade rapidly once made.

The most common form of infusion is simply a tisane. This is where the material is ground coarsely, after which boiling water is poured over it and the preparation is left to stand for some time, usually 15-30 minutes. The water is then strained off and consumed by the patient. One of the most common infusions or tisanes is made from Tea (*Camellia sinensis) and* is known simply as tea. However, there are many herbal infusions, mistakenly called tea. A recent scientific paper concerning an archaeological dig in China found that tea (*Camellia sinensis)* has been grown and used for over 2,150 years. The name tea comes from the Tang dynasty and is almost directly taken from Northern Chinese language. The terms ‘Cha’; and ‘Chai’ belong to the Southern Chinese languages, and all refer to hot water infusion of the plant *Camellia sinensis*. Therefore, the more appropriate terminology for any botanical infusion is tisane or simply an herbal infusion, and the only tisane that may be called tea is that made from the Camellia plant.

Image by StockSnap from Pixabay

A decoction is the name of the process whereby the botanical material is heated in a solvent, in most cases, water. The decoction process calls for the plant material to be mashed or coarsely chopped and then boiled in water for a time. This process extracts a greater proportion of the active ingredient from the plant material than would be extracted by infusion. Decoctions are used when woody or thicker parts of plants are used and infusions for finer and more delicate parts. It is strongly recommended that the process takes place in a pot or container that is inert or stable when heated, such as glass or enamel coated metal. If a plain aluminum or metal pot is used, the metal may react under heat and release unwanted minerals such as iron or aluminum into the decoction.

Percolation is the process whereby water is continuously poured over the material. This continuous flow of water takes with it the active ingredient of the plant. The most common form of this process is known in the preparation of coffee from the ground beans of *Coffea arabica*. Again, alcohol or other solvents can be used in the percolation process thus producing a greater concentration of active ingredient.

Macerations – extracts and tinctures

The process of maceration is also quite simply soaking the material in a solvent, menstruum, long enough for the essential ingredients of the material to be transferred into the solvent. Possible solvents are water, alcohol, petroleum and oil. This is the basic technique for making either an extract or a tincture.

The time required for the process to extract all the active parts of a plant material will change depending on the type of plant and the different parts of the plant used. For example, the bark of a tree will need more time to macerate than the flowers. The process requires the plant material be immersed in the solvent until it is exhausted or until nothing further can be extracted. Normally, for simple macerations three days will be suitable, however others may take several weeks.

Once the maceration is finished the solvent is passed through fine sieves to strain all the remaining solid plant material. These solids are called the marc and are usually discarded after further pressing to remove any remaining solvent.

While water may be used as a solvent it is recommended that ethyl alcohol be used when available as it has a greater effect on the chemistry of the plant material and therefore extracts much more of the active compounds. Ethyl alcohol is also an extremely effective preservative and will keep herbal preparations in a usable state for a long time. If the patient cannot consume alcohol for religious or health reasons, then it is a simple process for the herbal extract to be heated to approximately 80C. degrees for a reasonable period during which the alcohol will evaporate. This alcohol removal process can be done so that the alcohol is recaptured and is able to be reused. However, heat can damage the benefits in the tincture or extract and reduce the effectiveness of the medicine.

Digestion, or hot maceration is a variation of the normal maceration process with the addition of gentle heat, especially if hard, woody or thick material is being treated. There are possible negative effects on the chemistry of the material if the heat is more than approximately 40-45C. degrees.

A tincture is not as strong as an extract as it will normally have a 1:5 ratio; that is, only 1 part plant material by weight to 5 parts of solvent by volume. However, tinctures may vary with ratios up to 1:10 with differing ratios of ethanol allowed for in the process, depending on the nature of the plant material and its reaction to ethanol.

In fact, there is a significant level of confusion when discussing extracts and tinctures. Often, they are interchangeable, and in some cases even the regulatory body will not differentiate between them (Therapeutic Goods Administration Australia 2011) For the purposes of this discussion, it will be assumed that an extract is a medicinal herbal preparation using the maceration process whereby a ratio of 1:1 is achieved, that is equal weight of plant material to equal volume of solvent.

The production of an extract normally requires a double maceration process or more treatment because the volume of plant material cannot, in most cases, be totally immersed in the corresponding volume of solvent. Only the material that can be totally soaked in the solvent is used; after it is fully processed it is removed from the solvent by filtering and pressing. The used marc is then discarded, and the entire process is repeated with the remaining plant material being placed in the already used solvent. In this way a ratio of 1:1 can be achieved.

Alcohol percentages may vary greatly depending on plant material and personal choice. As in any other industry the Complementary Health profession has many recipes frequently claimed as intellectual property by practitioners and corporations alike. Most extracts and tinctures will use between 20% and 90% alcohol. The more delicate the plant material, the less alcohol percentage is required. Also, the more oils and resins in the plant material the higher the alcohol percentage required. Most preparations have an alcohol content of between 50 – 60%.

Syrups and elixirs

Syrups and elixirs are generally simple preparations using sweeteners and other thickeners. A syrup normally for bitter tasting material, uses water, sugar and plant material. The most common process is making a decoction or infusion as the first step, the sugar is then dissolved in the preparation, at a ratio of up to 85% both sweetening and preserving the product.

An elixir is different from a syrup due to the inclusion of alcohol in the process. Therefore, the simplest method of production is to take a tincture and add sugar to it. As can be understood the elixir process uses alcohol to draw out active principles of the plant material. Naturally, an elixir will have better preservative aspects.

Salves and topical ointments

Salves and ointments are applied to the skin for itchiness, wounds, infections and other irritations. Salves, balms and ointments have no water content but are developed from wax, like fats and oils with a small quantity of extract, tincture, essential oil or dried fresh herb added. Beeswax, cocoa butter (*Theobroma cocoa*), shea butter (*Vitellaria paradoxa*), Carnauba palm (*Copernicia prunifera*), are all plant sources of these fats. Recipes may be more complex if they call for a selection of essential oils.

Image by Bee-naturalles from Unsplash

The Dilo tree (*Calophyllum inophyllum*) is notable as a great deal of research has proved extremely effective when applied to skin irritations, like dermatitis, sunburn etc. The oil derived from the nut is combined with a solid waxy product from (*Vitellaria paradoxa*) or beeswax, to create a superior topical ointment. The trees required to make such a salve, *Inophyllum* and *V.paradoxa,* will grow in close proximity.

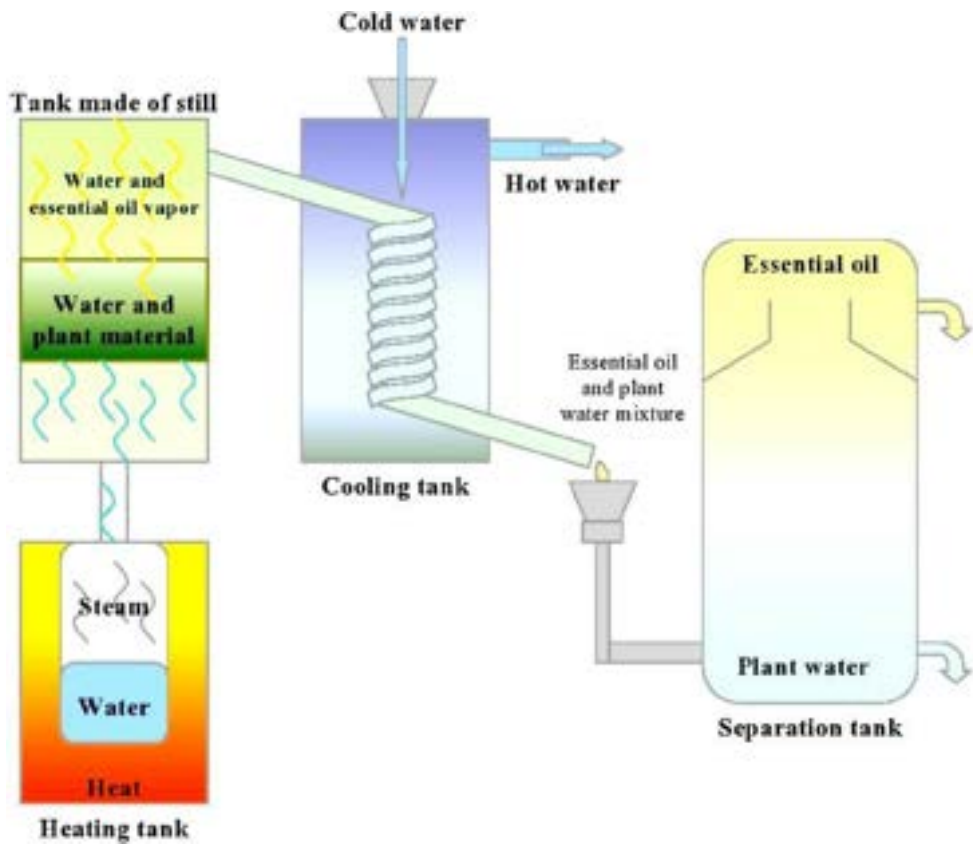

125
100
75
50

Essential oils

An essential oil is the pure volatile product of a specific plant derived by distillation, or other processes.

The most common method is cold pressing. For example, olives from *Olea europaea* used in the olive oil industry, or steam distillation for many medicinal and perfume oils such as those from the lemon tree *Citrus limonum*.

In the alternative, complementary health industry, tinctures, extracts and essential oils are considered the most effective preparations from plant sources. These essential oils are volatile, indicating rapid evaporation and do react badly with some containers such as plastics. One great benefit from using essential oils in treating particular health issues is the ability of some to dissolve bacteria. For example, thyme oil (*Thymus vulgaris)* and its active ingredient thymol have been shown to degrade the protein coats of both gram(+) and gram(-) bacteria. In another study a solution of 1% of thyme oil proved fatal to the *Escherichia coli* that causes dysentery. When the world's poor have an estimated 800,000 children dying of diarrhea annually *(who.int/mediaceter/factsheets/fs330/en/)* it is obvious that such simple treatments are urgently needed. These oils are easily used as they only require simple application to the skin.



This diagram demonstrates that the process of distillation is straight forward and can be made available in remote areas as no electricity is required. This valuable equipment not only rewards the community with medical products, but it also increases their income as oil is easily traded. Oil derived from the Agarwood tree (*Aquilaria crassna)* has a retail price of $5 per milliliter, making it one of the most expensive oils known. However, it is the application of these oils to health challenges which demonstrates the true value of them.

Deciphering dosage

To decipher the scientific research in order to arrive at a useful daily dose treatment is relatively simple and of critical importance. In a great majority of the published research papers the researchers refer to the dry weight of the plant material. As an example, a research paper on *Butea monosperma* (2016) showed that a dose of 300 mg to 1 kilo body weight of the stembark from the tree had slightly lower results in the control of epileptic convulsions as that of the standard drug chlorpromazine. Therefore, as cited from the paper, the correct dose for the treatment of epilepsy would be determined by the weight of the patient multiplied by 300 milligrams. Hence, the correct dose for a person with a body weight of 75 kilograms would be 75 x 300 mg resulting in a dose of 22,500 milligrams dry weight equivalent.

Furthermore, the type and strength of the liquid extract would also have to be taken into consideration. As discussed, prior, a plant extract may have differing strengths. When the pure, or what may be considered prime extract is be used of 1:1 (1 part or the plant material to 1 part of the solvent) the calculations are relatively straight forward. A standard ratio for a 1:1 plant extract would be 1 kilogram of plant material to 1 liter of solvent. At this stage it would be necessary to convert the dose of 22,500 milligrams dose into a fluid extract dose. So, 1 milliliter of the extract is equal to 1 gram of the plant material resulting in the need to convert milligrams to grams. This would result in 22.5 grams or 22.5 milliliters of the extract to be considered equal to the dosage found in the research paper. In a household or village context this is slightly more than 4.5 standard teaspoons.

As discussed in the section on extracts and tinctures, the strength of the medicine must also be taken into consideration when deciding on the optimal dose. It has been discussed above in relation to a 1:1 extract ratio, yet in relation to a 1:2 extract ratio the dose would have to be doubled as this extract has 1 part of plant material to 2 parts solvent and is therefore only half as strong as the 1:1 extract ratio.

Again, an extract with a strength of 1:3 has 1 part of the plant material to 3 parts of the solvent and is therefore three times weaker than a 1:1 extract.

As an example, researchers have found that a leaf extract from a tree has a therapeutic dose at 400 mg/kg bodyweight. It is being given to a patient with a bodyweight of 82 kg. Therefore, the correct dose when using a 1:1 extract would be:

82 x 400 = 32,800 milligrams

Converting 32,800 milligrams = 32.8 grams

Converting 32.8 grams = 32.8 milliliters

The correct dose as derived from the research would be 32.8 ml.

Conversely the extract may be strengthened or concentrated further by repeating the extraction process with additional plant material in the same solvent or menstruum used before. In this way an extract may be made with twice or three times the plant material to arrive at a 2:1 or 3:1 extract and as a result reduce the amount of extract required in each dose. When applying this to the previous example, a dose from a 1:1 extract is shown to be 32.8 ml, yet in an extract ratio of 2:1 this is reduced to 16.4 ml, and a 3:1 extract even further to 8.2 ml dose.

List of Health Conditions and Corresponding Trees

By Badagnani - Own work commons.wikimedia.org

ADDICTION

Mitragyna speciosa

ALZHEIMER'S DISEASE

Butea monosperma

Magnolia officinalis

Terminalia catappa

ANALGESIC (PAIN MANAGEMENY)

Adansonia digitate

Adenanthera pavonina

Barringtonia acutangular

Bolusanthus speciosus

Butea monosperma

Calophyllum inophyllum

Cananga odorata

Castanospermum austral

Copaifera Langsdorfii

Gmelina arborea

Handroanthus impetiginosus

Jacaranda mimosifolia

Madhuca indica

Magnolia officinalis

Mayodendron igneum

Michelia champaca

Monodora Myristica

Nauclea latifolia

Oroxylum indicum

Tamarindus indica

Tectona grandis

Terminalia bellirica

Salix alba

Sclerocarya birrea

Syzigium aromaticum

ANEMIA

Terminalia catappa

ANTIBACTERIAL

Acacia catechu

Acacia nilotica

Adenanthera pavonina

Aegle marmelos

Aesculus hippocastanum

Albizia lebbeck

Albizia odoratissima

Artocarpus altilis

Averrhoa carambola

Azadirachta indica

Backhousia citriodora

Balanites aegyptiaca

Barringtonia acutangular

Bixa orellana

Bolusanthus speciosus

Bridelia micrantha

Calophyllum inophyllum

Camellia sinensis

Cassia fistula

Cinnamomum tamala

Clusia rosea

Commiphora Myrrha

Copaifera spp

Delonix regia

Elaeocarpus ganitrus

Erythrina variegata

Eugenia uniflora

Fagus sylvatica

Faidherbia albida

Fraxinus excelsior

Genipa americana

Handroanthus impetiginosus

Holarrhena antidysenterica

Hydnocarpus pentandrus

Jacaranda mimosifolia

Kigelia Africana

Lawsonia inermis

Liquidambar styraciflua

Madhuca indica

Mimusops elengi

Nauclea latifolia

Oncoba spinosa

Peltophorum pterocarpum

Salix alba

Sandoricum koetjape

Sclerocarya birrea

Swietenia macrophylla

Tectona grandis

Terminalia catappa

Terminalia chebula

Vitex agnus castus

ANTICANCER

Betula pendula

Bombax ceiba

Boswellia sacra

Bixa orellana

Caesalpinia sappan

Clusia rosea

Cochlospermum religiosum

Couroupita guianensis

Cynometra cauliflora

Genipa americana

Ginkgo biloba

Handroanthus impetiginosus

Hernandia nymphaeifolia

Hibiscus tiliaceus

Illicium verum

Jacaranda mimosifolia

Lawsonia inermis

Magnolia officinalis

Mallotus phillipensis

Mayodendron igneum

Michelia champaca

Morinda citrifolia

Oroxylum indicum

Prunus africana

Saman Samanea

Sandoricum koetjape

Swietenia macrophylla

ANTIDEPRESSANT

Artocarpus altilis

Barringtonia acutangular

Cananga odorata

Commiphora wightii

Copaifera langsdorffii

Eugenia Oojeinensi

Ficus religiosa

Hibiscus tiliaceus

Magnolia officinalis

Mitragyna speciosa

Ougeinia oojeinensi

Terminalia bellirica

ANTIFUNGAL

Acacia nilotica

Aegle marmelos

Cassia fistula

Cinnamomum tamala

Erythrina variegata

Hydnocarpus pentandrus

Kigelia Africana

Limonia acidissima

Peltophorum pterocarpum

Swietenia macrophylla

Syzigium malaccense

Tectona grandis

Vitex agnus castus

ANTIHISTAMINE

Betula pendula

Carapa guianensis

ANTI-INFLAMMATORY

Acacia catechu

Adansonia digitate

Aegle marmelos

Aesculus hippocastanum

Albizia lebbeck

Averrhoa carambola

Backhousia citriodora

Balanites aegyptiaca

Bischofia javanica

Bixa orellana

Bombax ceiba

Boswellia sacra

Calophyllum inophyllum

Camellia sinensis

Carapa guianensis

Castanospermum austral

Ceiba pentandra

Commiphora Myrrha

Copaifera langsdorffii

Couroupita guianensis

Crateva religiosa

Delonix regia

Dombeya rotundifolia

Elaeocarpus ganitrus

Erythrina variegata

Faidherbia albida

Ficus religiosa

Flacourtia indica

Fraxinus excelsior

Guaiacum officinale

Handroanthus impetiginosus

Hernandia nymphaeifolia

Hibiscus tiliaceus

Holarrhena antidysenterica

Hydnocarpus pentandrus

Hymenaea courbaril

Ilex paraguariensis

Illicium verum

Jacaranda mimosifolia

Kigelia Africana

Lawsonia inermis

Liquidambar styraciflua

Madhuca indica

Magnolia officinalis

Mayodendron igneum

Michelia champaca

Moringa oleifera

Oroxylum indicum

Saman Samanea

Salix alba

Sandoricum koetjape

Tamarindus indica

Tectona grandis

Terminalia catappa

Thespesia populnea

ANTIOXIDANT

Acacia catechu

Ailanthus altissima

Adansonia digitate

Aesculus hippocastanum

Balanites aegyptiaca

Barringtonia acutangular

Bridelia micrantha

Caesalpinia sappan

Camellia sinensis

Castanea sativa

Cynometra cauliflora

Delonix regia

Eugenia uniflora

Hibiscus tiliaceus

Ilex paraguariensis

Mimosa elengi

Mayodendron igneum

Morinda citrifolia

Parkia biglobosa

Quercus robur

Sclerocarya birrea

Terminalia bellirica

Terminalia chebula

Terminalia ferdinandiana

ANTHELMINTIC (WORMS)

Acacia nilotica

Albizia odoratissima

Artocarpus altilis

Azadirachta indica

Balanites aegyptiaca

Barringtonia acutangular

Carapa guianensis

Eugenia uniflora

Madhuca indica

Mallotus phillipensis

Mimusops elengi

Morinda citrifolia

Ougeinia oojeinensi

Sandoricum koetjape

Terminalia belirica

Zanthoxylum armatum

ANTIPLATELET

Hernandia nymphaeifolia

ANTIPSYCHOTIC

Terminalia bellirica

ANTIPYRETIC

Adansonia digitate

Aegle marmelos

Faidherbia albida

Gmelina arborea

Madhuca indica

Mayodendron igneum

Nauclea latifolia

Tamarindus indica

Terminalia bellirica

ANTIVIRAL

Adansonia digitate

Aegle marmelos

Aesculus hippocastanum

Allianthus altissima

Azadirachta indica

Castanea sativa

Castanospermum austral

Clusia rosea

Fraxinus excelsior

Genipa americana

Guaiacum officinale

Handroanthus impetiginosus

Hymenaea courbaril

Illicium verum

Liquidambar styraciflua

Morinda citrifolia

Nauclea latifolia

Oncoba spinosa

Salix alba

Sandoricum koetjape

Terminalia chebula

APHRODISIAC

Ginkgo biloba (female)

ARTHRITIS

Betula pendula

Calophyllum inophyllum

Salix alba

ASTHMA

Bischofia javanica

Ficus religiosa

Flacourtia indica

Ginkgo biloba

Hymenaea courbaril

BEAUTY

Bischofia javanica

Bixa orellana

Calophyllum inophyllum

Kigelia africana

Tectona Grandis

CARDIOVASCULAR SYSTEM/ BLOOD/HEART

Aesculus hippocastanum

Artocarpus altilis

Averrhoa carambola

Balanites aegyptiaca

Bombax ceiba

Bridelia micrantha

Cananga odorata

Castanea sativa

Commiphora wightii

Crataegus monogyna

Dombeya rotundifolia

Fraxinus excelsior

Ginkgo biloba

Guaiacum officinale

Ligustrum lucidium

Liquidambar styraciflua

Mallotus phillipensis

Pausinystalia johimbe

Quercus robur

Sclerocarya birrea

CELIAC DISEASE

Thespesia populnea

Ulmus rubra

CENTRAL NERVOUS SYSTEM

Adenanthera pavonina

(depressant)

Barringtonia acutangular (depressant)

Butea monosperma

Cananga odorata

Commiphora wightii

Copaifera langsdorffii

Ginkgo biloba

Liquidambar styraciflua

Magnolia officinalis

Terminalia bellirica

CHRONIC FATIGUE

Backhousia citriodora

Mitragyna speciosa

CONSTIPATION

Allianthus altissima

Aquilaria crassna

Cochlospermum religiosum

Crateva religiosa

Holarrhena antidysenterica

Tamarindus indica

CONVULSIONS

Bolusanthus speciosus

Ficus religiosa

Spathodea campanulata

CROHN'S DISEASE

Thespesia populnea

Ulmus rubra

DERMATITIS

Allianthus altissima

Thespesia populnea

DIABETES

Acacia catechu

Albizia odoratissima

Bombax ceiba

Butea monosperma

Cassia fistula

Castanea sativa

Cinnamomum tamala

Elaeocarpus ganitrus

Ficus religiosa

Fraxinus excelsior

Ginkgo biloba

Gmelina arborea

Holarrhena antidysenterica

Lagerstroemia speciosa

Moringa oleifera

Nauclea latifolia

Oncoba spinosa

Ougeinia oojeinensi

Spathodea campanulata

Tectona grandis

Terminalia chebula

DIARRHEA / DYSENTERY

Acacia Nilotica

Ceiba pentandra

Oncoba spinose

Nauclea latifolia

DIURETIC

Flacourtia indica

Gmelina arborea

EMETIC

Bolusanthus speciosus

Tamarindus indica

ENDOCRINE SYSTEM

Vitex agnus castus

Clusia rosea

ENDOMETRIOSIS

Copaifera langsdorffii

FEVER REDUCTION

Adansonia digitate

Lawsonia inermis

Tamarindus indica

GASTRIC ULCERS

Averrhoa carambola

Betula pendula

Bischofia javanica

Bombax ceiba

Bridelia micrantha

Ceiba pentandra

Ficus religiosa

Gmelina arborea

Michelia champaca

Quercus robur

Sesbania grandiflora

Ulmus rubra

GOUT

Stelechocarpus burahol

HAIR LOSS

Tectona grandis

HEPATOPROTECTIVE/LIVER

Azadirachta indica

Barringtonia acutangular

Caesalpinia sappan

Cassia fistula

Castanea sativa

Cochlospermum religiosum

Crataegus monogyna

Elaeocarpus ganitrus

Ficus religiosa

Flacourtia indica

Fraxinus excelsior

Lagerstroemia speciose

Liquidambar styraciflua

Magnolia officinalis

Mayodendron igneum

Moringa oleifera

Peltophorum pterocarpum

Syzigium malaccense

Tamarindus indica

Terminalia catappa

HYPERTENSION / HIGH BLOOD PRESSURE

Acacia nilotica

Adenanthera pavonina

Averrhoa carambola

Crataegus monogyna

Eugenia uniflora

Flacourtia indica

Nauclea latifolia

Pausinystalia johimbe

Swietenia macrophylla

IMMUNE SYSTEM

Bauhinia variegata

Ficus religiosa

Gmelina arborea

Ligustrum lucidium

INSECTICIDE

Artocarpus altilis

Carapa guianensis

INSOMNIA

Barringtonia acutangula

Magnolia officinalis

IRRITABLE BOWEL SYNDROME

Ulmus rubra

LEISHMANIA DISEASE

Bixa orellana

LEPROSY

Hydnocarpus pentandrus

MALARIA

Acacia nilotica

Azadirachta indica

Carapa guianensis

Flacourtia indica

Kigelia africana

Mitragyna speciosa

Nauclea latifolia

Parkia biglobosa

Sclerocarya birrea

Spathodea campanulata

MALNUTRITION

Moringa oleifera

MASTALGIA (BREAST PAIN)

Vitex agnus castus

MENSTRUAL CYCLE

Vitex agnus castus

OBESITY/WEIGHT LOSS

Aquilaria crassna

Averrhoa carambola

Backhousia citriodora

Bombax ceiba

Cynometra cauliflora

Ilex paraguariensis

Lagerstroemia speciosa

Morinda citrifolia

Ougeinia oojeinensi

Pausinystalia johimbe

ORAL HEALTH

Acacia catechu

OSTEOPOROSIS

Ligustrum lucidium

PREMENSTRUAL SYNDROME

Vitex agnus castus

PROSTATE

Crateva religiosa

Prunus africana

PSORIASIS

Allianthus altissima

Thespesia populnea

RENAL SYSTEM / KIDNEYS, BLADDER, URETHRA

Adansonia digitata

Bauhinia variegata

Cananga odorata

Crateva religiosa

Peltophorum pterocarpum

Stelechocarpus burahol

REPRODUCTIVE SYSTEM

Acacia nilotica (spermicide)

Aegle marmelos (spermicide)

Albizia lebbeck (spermicide)

Azadirachta indica (spermicide)

Bombax ceiba

Butea monosperma

Commiphora wightii

Hibiscus tiliaceus

Limonia acidissima

Pausinystalia johimbe

Vitex agnus castus

RHEUMATOID ARTHRITIS

Oroxylum indicum

Stelechocarpus burahol

SKIN IRRITATION

Ailanthus altissima

Bischofia javanica

Bixa orellana

Michelia champaca

Thespesia populnea

Ulmus rubra

Zanthoxylum armatum

TESTOSTERONE

Vitex agnus castus

THROMBOSIS

Albizia lebbeck

Guaiacum officinale

THYROID

Bauhinia variegata

Commiphora wightii

URINARY SYSTEM

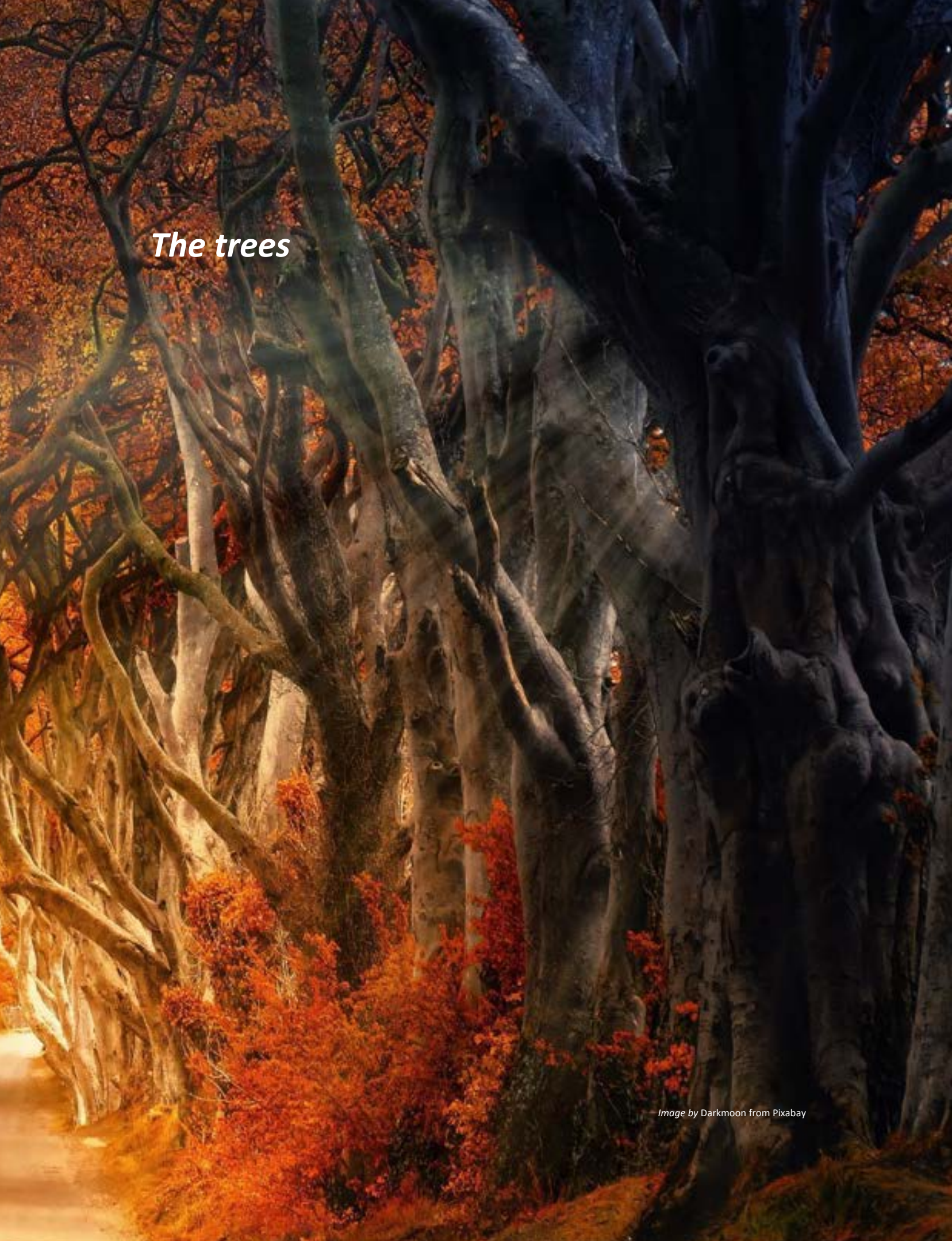
Acacia nilotica

Lagerstroemia speciose

Oncoba spinose

Prunus Africana

Image by Markusspiske from Pixabay



The trees

Image by Darkmoon from Pixabay

Acacia catechu by Btcpg from commons.wikimedia.org

Acacia catechu

Primary Functions:	Oral health, Antibacterial
Secondary Functions:	Antimicrobial, Anti-inflammatory, Antidiabetic
Other Functions:	Cancer management
Common Names:	Kher, Catechu, Cachou, Cutchtree, Black cutch, Black catechu, Khair
Description:	*Acacia catechu* is a small or medium-sized, thorny tree up to 15 m tall, bark dark grey or grayish-brown, peeling off in long strips, or sometimes in narrow rectangular plates, brown or red inside; branches slender. Leaves bipinnately compound, with 9-30 pairs of pinnae and a glandular rachis cent.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Senegalia
Origin:	The tree is widely distributed throughout the Asian continent and the plant is found in abundance in Pakistan, India, Thailand and Bangladesh.
Soil Requirements:	It grows naturally on a wide range of soils, preferring well-drained, coarse, gravelly alluvial soils, but it also tolerates heavy clay and calcareous soils.
Timber Quality:	The wood is very strong, durable and resistant to white ants. The timber is used for house posts, agricultural implements and wheels. Spent chips leftover can be used for the manufacture of hard boards. The timber has a reported density ranging between 880 kg/cubic meter to 1,000 kg/cubic meter. The heart wood is more commonly used as a dye and tanning material and is therefore more commonly sold as chips or powder.

Medical Overview:

Commonly called Acacia catechu it is now referred to as Senegalia catechu. The seeds of the tree have been found to be high in protein and as such has been used in South Asian cuisine.

This tree is a good example of being utilized for both its commercial timber as well as its medicinal attributes. It is reported that the industrial market for cutch, the tanning and dying application of the heartwood is between 6,000 and 9,000 tons per annum.

Acacia catechu has long been utilized as a traditional oral hygiene medicinal agent. The mouth possesses a unique environment where acid tolerant and acid producing bacteria exist. Bacterial species such as Streptococcus mitis, Streptococcus sanguinis and Lactobacillus acidophilus have all been controlled by Acacia catechu treatment. Research has shown that a dose level of 5 mg/ml of the bark extract is significantly effective in halting the growth of these organisms in vitro. Therefore, this tree is a powerful adjunct in oral hygiene.

Acacia catechu is the source of unique chemical constituents namely catechin and epicatechin, as well as epigallocatechin, epicatechin gallate, phloroglucinol, protocatechuic acid, poriferasterol glucosides, poriferasterol Acy glucosides, lupenone, kaempferol, dihydrokaempferol, quercetin and taxifolin.

Further studies with Acacia catechu in the control of other bacterial infectious agents also showed promise. The ethanol extract of the bark was highly effective in controlling Staphylococcus aureus with a zone of inhibition of approximately 22.1 mm. As a result, these tests have validated the traditional use of the bark extract in treating wounds. In this application the astringent qualities of the bark extract enhance the wound healing properties by tightening the skin and aiding in the slowing of blood loss.

The antioxidant qualities of Acacia catechu have been reported to be similar to that of ascorbic acid (vitamin C). Therefore, the tree may play an important role in cancer management. Research has shown that the bark extract of the tree may retard and even reduce tumor growth.

The traditional use of the leaves in the making of an infusion that is gargled to cure sore throat is also well supported by research. It is thought that the high levels of tannic acid play a role in the action as well as the antibacterial properties of the tree. Other researchers have shown that the extract from all parts of the tree have shown antipyretic (fever reducing) anti-inflammatory and antidiabetic attributes.

Its heartwood extract is used in dyeing and leather tanning, as a preservative for fishing nets, and as a viscosity regulator for oil drilling.

Acacia nilotica by Bishnu Sarangi from Pixabay

Acacia nilotica

Primary Functions:	Antidiarrhea, Antibacterial, Antifungal, Antimalarial, Antihypertensive, Anthelmintic
Secondary Functions:	Urinary tract infection
Other Functions:	Anticancer, Male contraceptive
Common Names:	Kutaja, Kurchi, Conessi bark, Inderjo Tulkh
Description:	*Acacia nilotica* is a tree 5–20 m high with a dense spheric crown, stems and branches usually dark to black colored, fissured bark. The leaves are bipinnate, with 3–6 pairs of pinnula and 10–30 pairs of leaflets each, tomentose, rachis with a gland at the bottom of the last pair of pinnula. Flowers in globulous heads 1.2–1.5 cm in diameter of a bright golden-yellow color.
Classification:	| Order: Fabales | Family: Fabaceae - Mimosoideae| Genus: Acacia (1380 approx)
Origin:	The tree is found throughout subtropical and tropical Africa and Asia. It has been introduced to many other countries and in some such as Australia it is considered an invasive pest.
Soil Requirements:	Grows best on cracking clay soils that have high water holding capacity but can also grow on sandy soil in areas of high rainfall. In short, this tree can survive in harsh as well as wet tropical conditions and is therefore highly adaptive to environments.
Timber Quality:	Its wood is very durable if water-seasoned, and its uses include tool handles for boats and lumber. Since ancient Egyptian times until the current time, the timber is used for house beams and other construction uses as the timber is considered impervious to insects and fungus.

Medical Overview:

Several biologically active compounds include umbelliferone, gallic acid, niloticane, catechin, kaempferol, rutin, apigenin and two steroids include androstene and β-sitosterol were isolated from different parts of *A.nilotica.*

Research has shown, and therefore supported the traditional use of *Acacia nilotica* in the treatment of diarrhea due to the antibiotic properties of its bark. This research has shown that the ethanol bark extract is significantly effective against *Salmonella paratyphi*, (28 mm) *Escherichia coli* (36 mm) and *Proteus vulgaris* (30 mm). Other tested organisms that *Acacia nilotica* is effective against are *Staphylococcus aureus* (22 mm), *Proteus mirabilis* (28 mm), *Klebsiella pneumoniae* (24 mm). As a result, *Acacia nilotica* may be considered to be a broad-spectrum antibiotic agent with special effect on urinary tract infections and gastrointestinal infections.

As well as being effective in the treatment of various bacterial infections *Acacia nilotica* bark extract has also proved effective in the treatment of fungal infections such as *Candida albicans*.

Claims that *Acacia nilotica* can reduce the fertility of men have also been supported in clinical trials. However, it was found that ceasing the treatment after 16 weeks did not see are return to normal sperm motility. Therefore, the use of *A. nilotica* as a spermicidal treatment should not be recommended as the treatment appears to have negative and permanent effects. Further studies on the abortifacient actions in women did confirm that the plant extract did cause pregnancy to abort. However, the animals were found to possess deformed fetuses in the clinical trials that did not terminate pregnancy, and this then supports the claim that women and men should not use *Acacia nilotica* as a family planning medication, and that it should be avoided at all costs by pregnant women.

Studies did show that doses up to 2000 mg/kg displayed minimal or no toxic side effects other than the above information on fertility management. It is then confirmed that the use of *Acacia nilotica* in the treatment of infections is safe in all other aspects

The most promising research on *Acacia nilotica* was conducted to ascertain it effectiveness in the management of solid tumor cancers such as Dalton's ascitic lymphoma when the bark extract of a daily dose of 10 mg/kg was applied to mice with this disease in the laboratory. After 14 days it found that the extract treated mice had a reduction in tumor size slightly lower than the mice treated with the anticancer drug methotrexate. Also, the mice treated with the bark extract had a significantly greater survival rate than the untreated mice by approximately 56%. The resulting findings support the potential use of *Acacia nilotica* to treat solid tumors of the breast, neck and torso.

The tender twig of this plant is used as a toothbrush in south-east Africa and India.

Adansonia digitata from Wikiwand

Adansonia digitata

Primary Functions:	Antioxidant, Antiviral
Secondary Functions:	Anti-inflammatory, Antipyretic (fever reducing)
Other Functions:	Antimicrobial, Analgesic (pain management)
Common Names:	Baobab, Dead-rat tree, Monkey-bread tree, Upside-down tree, Cream of tartar tree
Description:	It can grow to between 5–25 m in height. Many consider the tree to be upside-down due to the trunk likeness to a taproot and the branches akin to finer capillary roots. The flowers have 5 petals that are leathery and hairy on the inside.
Classification:	| Order: Malvales | Family: Malvaceae | Genus: Adansonia
Origin:	The tree is native to the African continent, Madagascar and Australia.
Soil Requirements:	It is not found in areas where sand is deep. It is sensitive to water logging and frost.
Timber Quality:	The wood is light and of poor quality (320 kg per cubic meter) and is therefore seldom used, however reports inform of it being used for light products and even canoes.

Medical Overview:

Adansonia digitata is from a group of trees named after the French Philosopher and explorer Michel Adison (1727-1806). *Adansonia digitate* is from Africa whilst six of the other species are native to the island Madagascar, and one is found in Australia. The trees are reported to be some of the largest trees known to man and some are thought to be many thousands of years in age. Due to the fruit hanging in long drupes from the branches, appearing as if dead rats have been hung, the name Dead Rat tree has become a common name for the *Adansonia digitate*.

Research has shown that the methanolic extract made from the rootbark possesses antiviral attributes. The research has shown that at doses of 200–250 mg/ml the extract completely inhibited the growth of Newcastle disease, which is a viral disease of birds, specifically chickens. Whist this disease is not a threat to humans the research has proved the antiviral attributes of the tree, and further research may show the extracts derived from the tree to be effective against other viral strains. Traditional use of the tree extract has been reported for smallpox and measles and further establishing the antiviral aspects of the tree.

The fruit pulp taken from the tree has remarkably high ascorbic acid levels (vitamin C) as well as containing tocopherol (vitamin E). Reports have stated that the fruit pulp has 300 mg of vitamin C per 100 grams as a result the pulp is considered to have significant antioxidant properties. Added to this is the high levels of protein and minerals also found in the pulp. Therefore, the pulp may be considered to be a complete food. Indeed, the leaves, fruit, seeds and young roots are all reported to be taken as food by the local people. In some areas the pulp is used as a milk substitute for babies when it is pounded and mixed with water. It has been shown that this milk contains almost double the calcium levels of cow milk. Both the oil derived from the seeds as well as the dried fruit pulp are increasingly in demand in the international marketplace.

Claims that the leaf extract has diuretic actions have also been supported in research. Where 100 mg/kg of the methanolic leaf extract induced diuretic responses in test animals.

The anti-inflammatory actions of the leaf extract and antipyretic (fever reducing) actions of the fruit pulp has also been supported in other research, and which has validated the traditional use of these parts of the tree for malaria management.

The fruit pulp has also been shown to possess analgesic (pain management) actions which may or may not be desirable in the baby milk formulas derived from them.

Adenanthera by Forestowlet from commons.wikimedia.org

Adenanthera pavonina

Primary Functions:	Blood pressure, Antibiotic, Antihypertensive
Secondary Functions:	Immune system support, Respiratory infections
Other Functions:	Analgesic, Central nervous system (CNS) depressant
Common Names:	Red Lucky Seed, Bead tree, Coral wood, Red wood, Circassian Seed, Corail Végétale, Coralitos, Curly Bean, Deleite, Delicia, Dilmawi, Graine-réglisse, Jumbi-Bead, L'Église, Peronías, Peonía, Peonía extranjera, Red Bead tree, Red Sandalwood, Saga
Description:	It is a medium sized tree with a height ranging from 6 to 15 m and up to 45 cm diameter. Leaves are binate compounds with oval oblong leaflets. Flowers borne narrow spike like pyramidal branch end.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Adenanthera
Origin:	It is endemic to Southeast China & India but now grows in various tropical countries.
Soil Requirements:	Found on a variety of soils from deep, well-drained to shallow and rocky.
Timber Quality:	Its wood is very hard, durable and strong used for bridge construction as well as household construction. The heart wood is a pale yellow when freshly cut and over time it will turn to a deep red. It is a heavy timber and may have a density between 590 kg/m³ up to 1100 kg/ m³. The timber works well and can be sanded to a fine sheen.

Medical Overview:

Adenanthera pavonina seed has been shown to reduce the arterial blood pressure in rabbits by as much as 50%. In a recent study the seed extract displayed a lowering of arteria blood pressure from 60 mm Hg down to 30 mm Hg. This is believed to be due to the cardiac glycoside found in the plant material. The extract showed no signs of toxicity.

Another benefit of the seed extract was the increase in total protein in the blood by a factor of 30%. Which indicates its potential in immune response and cell integrity.

Further studies have shown that both the ethanol and aqueous extracts of the bark of the tree display significant antibiotic properties. In one study the bark extract compared favorably to a range of commercial anti-biotic medications and in some results indicating that the bark extract outperformed these drugs against a range of bacteria. Most notably was its limiting effect against gram(+) and gram(-) bacterial strains by observing the zone of inhibition. The bacteria used in the study were *Pseudomonas aeruginosa* (urinary tract infection, skin infection), *Bacillus subtilis* (gastro-intestinal infection), *Klebsiella aerogenes* (nosocomial infection, gastro-intestinal infection), *Staphylococcus epidermis* (skin infection), and *Salmonella typhimurium* (intestinal infection). Ethanolic and aqueous extracts showed the highest activity against all the tested bacteria. The leaves and bark of the plant both have the anti-microbial properties.

The seeds of the *Adenanthera pavonina* tree have also been shown to have an anticonvulsive action as it suppresses the central nervous system. The control pharmaceutical was phenobarbital to which the seed extract compared very favorably. As a result, the seed extract may also be used as an analgesic and pain relief preparation. The methanol extract was used in this study however the ethanol extract may be considered to possess the same results.

Adenanthera pavonina seeds have been a symbol of love in China. The attractive seeds have been used as beads in jewelry. Also, the seeds have been used for centuries as a unit of measurement in India in the precious metal trade (gold and silver) as each seed is considered to have the same uniform weight.

Aegle marmelos by Mochammad Fadli from commons.wikimedia.org

Aegle marmelos

Primary Functions:	Fungicide, Antibacterial
Secondary Functions:	Antiviral
Other Functions:	Anti-inflammatory, Anticancer, Radiation therapy, Antipyretic, Male fertility, Diuretic
Common Names:	Bael, Bengal quince, Golden apple, Japanese bitter orange, Stone apple
Description:	It is a medium sized tree, up to 12-15 m tall with short trunk, thick and spreading crown. The deciduous, alternate leaves, borne singly or in 2's or 3's, are composed of 3 to 5 oval, pointed, shallowly toothed leaflets. Fragrant flowers in clusters of 4 to 7 along the branchlets. The fruit, round or oval may have a thin, hard, woody shell with a semi-soft rind, gray-green until the fruit is fully ripe when it turns yellowish.
Classification:	| Order: Sapindales | Family: Rosaceae | Genus: Aegle
Origin:	The tree is native to Northern India, but widely found throughout the Indian Peninsula and in Ceylon, Burma, Bangladesh, Thailand and Fiji.
Soil Requirements:	The tree grows best on rich, well-drained soil, but also grows reasonably well in swampy, alkaline or stony soils.
Timber Quality:	The timber is highly aromatic when first cut. The wood is dense and strong, however it is not considered to be durable. It is used for tool handles and cabinetry.

Medical Overview:

A. marmelos leaves are offered in temples to Shiva as they represent Shiva's trident and three eyes. This tree is one of the five most sacred trees of India as it is believed that the trees can grant the grace of Shiva and Lakshmi.

The root extract has been shown to be effective against cholera as well as *Escherichia coli* infections, and hence is highly useful in the control and treatment of cholera and other gastrointestinal disorders caused by these pathogens. It compared favorably against ciprofloxacin as a control in the in vitro studies.

The leaf oil and ethanol extract of the leaves display potent antifungal properties. In recent research these derivatives of the tree showed effective control of the following fungi; *Trichophyton mentagrophytes*, *Trichophyton rubrum*, *Microsporum gypseum, Microsporum audounii, Microsporum cookei, Epidermophyton floccosum, Aspergillus niger*, *Aspergillus flavus* and *Histoplasma capsulatum*. Therefore, this tree shows great promise in treating dermal fungal infections.

The antiviral ability of the effects of the ethanol extract from the seeds displayed effective inhibition of the coxsackie virus, however it must be stressed that the extract was more effective in the early stages of viral onset and not so effective in the later stages. This research used the control pharmaceutical ribavirin. The active principle believed to be responsible is marmelosin.

Aegle marmelos has been used as a moderating agent in the control of radiation sickness caused by radiation therapy. It has been shown that it reduces or delays the onset of radiation sickness and also mortality in white mice, and therefore it may be a powerful adjunct to radiation therapy. It has also been found that *Aegle marmelos* acts as a highly effective antioxidant.

Research into the possible anticancer properties of *Aegle marmelos* found various positive outcomes where the leaf extract retards the growth of leukemia cell lines as well as lymphatic cancer and breast cancers in clinical trials. The extract of the fruit from the tree was also effective in stopping tumor growth.

Further studies have shown that the ethanol extract compared favorably to paracetamol in the reduction of fever (antipyretic) when taken in a dose range from 200 -400 mg per kilo body weight.

Its leaf, seed and fruit are known to affect male fertility in reversible manner. Its bark extract is a rich source of marmin and fagarine known for reducing male fertility. It has been shown to have complete effectiveness in reducing the viability of sperm via reduction in serum testosterone and reproductive organ weight.

The tree has also been shown to be a diuretic (increase production of urine) with doses between 300- 500 mg/kg. It is most effective in sodium removal via the renal system.

Lastly other studies have shown that the ethanol extract of the leaves display potent anti-inflammatory action.

Aesculus hippcastanum by Flowerishness from tumgir.com

Aesculus hippocastanum

Primary Functions:	Cardiovascular support, Venotonic, Vasoconstrictor, Anti-inflammatory
Other Functions:	Antioxidant, Astringent, Antibacterial, Antiviral Diarrhea
Common Names:	Horse Chestnut, Buckeye, Conker, Spanish chestnut
Description:	It is a large tree, growing to about 40 metres tall with a uniform rounded crown. The leaves are opposite and palmately compound, with 5-7 leaflets; each leaflet is 13-30 cm long, making the whole leaf up to 60 cm across, with a 7-20 cm petiole. The flowers are usually white with a yellow to pink blotch at the base of the petals. The fruits have a shell that is green and spiky encapsulating a glossy brown nut with a white stripe on their base, called a conker.
Classification:	| Order: Sapindales | Family: Sapindaceae | Genus: Aesculus
Origin:	The tree originates from a small region in the Pindus mountains of Greece and the Balkan Forests of Southeastern Europe.
Soil Requirements:	The tree grows on a range of soils and climates and as such has been planted around the world in parks and gardens in the temperate regions.
Timber Quality:	Its timber is a creamy white trending to a yellowish brown and is considered to be non-durable and is prone to insect attack. It is used in veneer manufacture, furniture and wood turning.

Medical Overview:

Aesculus hippocastanum is a fascinating tree due to its multiple health applications. Extracts from the tree are used in medicine, cosmetics, and the food industry. Various claims have been made as to the potential uses of extracts made from the tree and, other than the possible ultra-violet protection, all have been supported by scientific research.

It is believed that the main compounds from the tree are a group known as escin or aescin, within which proanthocyanidin A2 and esculin are the main active principles for anti-inflammatory, vasoconstrictor and vasoprotective effects. It is thought that this compound and derivatives are responsible for causing sickness in horses that eat the nuts and leaves. Strangely other animals such as wild deer and wild boar include the nuts in their diets. Aesculin has been thought of as a potentially dangerous compound, however research has found that it is relatively harmless. It only begins to show potential risk at doses above 1,900 mg/kg body weight via the L50 route.

The primary use of the tree extract, made either from the leaves bark or fruit, have a tonifying effect on the venous system by improving the integrity (elasticity and strength) of the veins and other minor capillaries. It is thought that aesculin stops the degradation of collagen and hyaluronic acid. There is a measurable increase in blood pressure shortly after a few days use of the extract and indicating less leakage from the venous system. The extract from the tree is used in the management of oedema, varicose veins, hemorrhoids, and leaky gut. Due to the extracts having proven anti-inflammatory actions *Aesculus hippocastanum* has long been used for arthritis and rheumatism.

The extracts from the leaf, bark and fruit of the tree have been shown to have a surprisingly high antioxidant actions in the body and on the skin. The tree has been shown to be 20 times more effective than vitamin C as an antioxidant and it is also significantly superior to vitamin E. As a result, *Aesculus hippocastanum* is used in many cosmetics and skin lotions. Add to this the ability of the extract to improve skin integrity and elasticity and it comes as no surprise that the tree is used in this industry.

The extracts do have antibacterial properties however these are mild and not a major aspect of the tree, yet this does enhance the trees importance.

The antiviral aspects of the tree have been supported due to the presence of several organic acids, mainly in the bark of the tree. There is shikimic acid and quinic acid in the bark and both of these are primary building blocks for one of the world's major antiviral drugs used in the treatment of influenza.

Another interesting use of the tree is in the management of diarrhea as it has been substantiated that the extract from the tree significantly reduces discharge from the bowel, however exactly how this works is still being debated.

It has also been shown that the extracts from the tree are useful in the management of cancer.

Albizia lebbeck by Forest & Kim Starr from commons.wikimedia.org

Albizia lebbeck

Primary Functions:	Antibacterial, Thrombosis
Secondary Functions:	Anti-inflammatory (asthma and arthritis)
Other Functions:	Spermicidal
Common Names:	Lebbeck, Lebbeck tree, Flea tree, Fry wood, Koko, Vaagei, Woman's tongue tree, Siris, Vaivai
Description:	It is a tree growing to a height of 18–30 m tall with a trunk 50 cm to 1 m in diameter. The leaves are bipinnate, 7.5–15 cm long, with one to four pairs of pinnae, each pinna with 6–18 leaflets. The flowers are white, with numerous 2.5–3.8 cm long stamens, and very fragrant. The fruit is a pod 15–30 cm long and 2.5-5.0 cm broad, containing six to twelve seeds.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Albizzia
Origin:	The main origin of this plant is Pakistan, India, Thailand and Bangladesh.
Soil Requirements:	Grows well on fertile, well-drained loamy soils but poorly on heavy clays.
Timber Quality:	The heartwood is a golden to coffee brown with the sapwood being a pale yellow in colour. The timber may split easily when drying due to the grain being non-linear. It is used in wood turning as well as furniture. It is not durable to the weather and is not considered resistant to insect attack.

Medical Overview:

In ancient Tamil culture, the flowers of the *Albizia lebbeck* tree were woven into crowns which were then used to decorate and welcome victorious soldiers.

Albizia lebbeck is a very important plant traditionally in India. Many Ayurvedic preparations contain *Albizzia lebbeck* such as, antiasthma, astringent, analgesic, and antibiotic preparations which are available within the Indian traditional medicine market.

The tree has been shown to possess antiasthma activity. Clinical trials with the bark have shown significant relief in cases of bronchial asthma, and this may be due to both the anti-inflammatory as well as the antibacterial properties found in the extracts. *Albizia lebbeck* displays considerable potency in anti-inflammatory actions and has prominent positive effects on adjuvant arthritis. Doses of 400 mg/kg bodyweight of the bark extract displayed the highest levels of anti-inflammatory response in clinical trials. When compared against the standard drug indomethacin the ethanol extract had comparable anti-inflammatory results.

The saponins from *Albizia lebbeck* bark were tested in regard, the feeding rats significantly reduced sperm concentration of testes and epididymitis ($P<0.001$). The motility of the cauda epididymal sperm was also reduced significantly ($P<0.001$). The saponins reduced the fertility of male rats by 100%.

The antibacterial activities of *Albizia lebbeck* leaves were assessed. Phytochemical screening of successive extract of its leaves show presence of alkaloids, glycoside, tannins, saponins, flavonoids, and carbohydrates. The successive ethyl acetate extract of *Albizia lebbeck* leaves are found to have inhibitory effect against *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa* and *Bacillus cereus*. The extract shows sensitivity for both gram(+) and gram(-) bacteria with maximum against *Pseudomonas aeruginosa* and minimum against *Escherichia coli*. The results of the above study revealed that the hydro-alcoholic extract of *Albizia lebbeck* was highest in antibacterial activity which might be helpful in preventing the progress of various diseases and can be used in alternative systems of medicine. This research compared the extract against the standard antibiotic ciprofloxacin. *Albizzia lebbeck* possess antibacterial activity against infections diarrhea.

In 2014, a study found that the methanol extract derived from *Albizia lebbeck* showed significant thrombolytic lysis which means the extract is effective in breaking down blood clots. The study compared the methanol extract from the tree against the standard drug known as streptokinase with results slightly lower that the drug in clinical trials. As a result, the methanol extract from *Albizia lebbeck* may be used in the treatment of thrombosis, stroke, and other medical conditions that require blood thinners.

Albizia odoratissima by Forestowlet from commons.wikimedia.org

Albizia odoratissima

Primary Functions:	Diabetes management
Secondary Functions:	Antibacterial (oral health)
Other Functions:	Anthelmintic (de-worming)
Common Names:	Kali Siris, Ceylon Rosewood, Black Siris, Nitrogen-fixing-tree, Suriyamara
Description:	The tree is a fast-growing, deciduous tree reaching 15 to 25 m. The fragrant flowers are white withering to a pale orange, appearing in large terminal clusters. Mature pods are reddish-brown, thin and flat, brown seeds, each weighing about 0.05 gram. Leaves are bipinnately compound, downy, with 3-9 pairs of pinnae and 10-30 pairs of pinnules.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Albizzia
Origin:	It is native to large parts of India.
Soil Requirements:	Growth of this tree is best on deep, well-drained sandy soils, with large amounts of organic matter. It is found in Sri Lanka on intermediate dry zones.
Timber Quality:	The timber is a rich dark red to burgundy in colour. It is a dense timber with broad interlocked grain. Considered a structural timber it is used in both construction as well as for flooring and furniture.

Medical Overview:

Albizia odoratissima is commonly known as Black Siris. In traditional Indian medicine its bark is used in the treatment of leprosy, ulcers and cough.

Research has shown that the claims of *Albizia odoratissima* possessing antibiotic potentials is partially correct as the research has shown that the bark extract is only effective against gram(+) bacteria, and as a result is specific in the bacterial infections it may be used for. The ethnomedicinal claims of the extract curing ulcers is therefore incorrect as the bacteria responsible for ulcers is a gram(+) bacteria known as *Helicobacter pylori*. Yet the claims for its use in the management of leprosy may indeed have merit as the bacteria responsible for this condition is a *Mycobacterium leprae* which falls into neither the positive or negative bacterial categories. The extracts showed good antibacterial activity only against gram(+) bacteria with zone of inhibition ranging from 12 mm to 21 mm. Maximum zone of inhibition of 21 mm at 80µg/ml concentration was observed against *Streptococcus mutans*. The extract did not show any inhibitory activity against gram(-) bacterium *Pseudomonas aeruginosa*. The test antibiotic ciprofloxacin showed activity with zone of inhibition ranging from 29 mm to 34 mm while the antifungal medication ketoconazole showed zone of inhibition of 28 mm against *Candida albicans* whereas the methanol extract of the tree achieved an 18 mm zone of inhibition. The resulting measures showed *Albizia odoratissima* to be a mildly effective antibacterial and antifungal.

Protective attributes of the ethanol bark extract of *Albizia odoratissima* in the management of type 2 diabetes, by reducing the blood sugar levels of test subjects, has been substantiated in research conducted in 2011. It was found that doses in the ranges of 250 mg/kg to 500 mg/kg did indeed reduce blood sugar levels whilst increasing serum levels of insulin. This research compared the methanol bark extract to the standard drugs metformin and gliclazide. It was shown in this research that the blood sugar levels were reduced by 49-50%. Further research in 2012 seeking to verify the previous research also found the bark extract to be significantly effective in diabetes management. In this research the bark extract was compared to the control standard drug glibenclamide. *Albizia odoratissima* in experiments showed significant decrease in the blood glucose level and increase the antioxidant efficacy in alloxan induced diabetes. It was demonstrated that the oral administration of alcoholic extract tablet of *Albizia odoratissima* to alloxan induce diabetic rats is useful in controlling diabetes due to the significant positive changes in the biochemical and physiological parameter related to protein, carbohydrates and lipid metabolism.

Allianthus altissima by Marina Torres from commons.wikimedia.org

Allianthus altissima

Primary Functions:	Psoriasis, Dermatitis
Secondary Functions:	Antioxidant, Antibacterial
Other Functions:	Antiviral, Anticancer
Common Names:	Tree of heaven, Stink tree, Chouchun, Ghetto palm, Copal tree, Paradise tree, Chinese sumac
Description:	It is a medium sized tree that grows between 17–27 m in height with a diameter at breast of about 1 meter. The bark is smooth and light grey and becomes rough with light tan fissures as the tree ages. The leaves are large even-pinnately compound and arranged alternately on the stem and contain 10–41 leaflets organized in pairs. Flowers are small and appear in large panicles up to 50 cm in length. The male plants give out a foul-smelling odour while flowering to attract pollinating insects. The females produce huge amounts of seeds, of around 30,000 seeds per kilogram of tree.
Classification:	| Order: Sapindales | Family: Simaroubaceae | Genus: Ailanthus
Origin:	The tree was first brought from China to Europe in the 1740s and to the United States in 1784. Now the plant has been spread to many other areas beyond its native range.
Soil Requirements:	Prefers moist and loamy soils but is adaptable to a very wide range of soil conditions.
Timber Quality:	It has low load bearing and structural qualities. It is recommended for light cabinetry or matchmaking. It has no specific markets but is used for various purposes and considered highly attractive.

Medical Overview:

In China, the tree of heaven has a long and rich history. It was mentioned in the oldest surviving Chinese dictionary and listed in countless Chinese medical texts for its purported ability to cure ailments ranging from mental illness to baldness. It was one of the first trees brought west during a time when chinoiserie was dominating European art and was initially hailed as a beautiful garden specimen. However today *Allianthus altissima* is a much-maligned tree due to its superior ability to thrive in almost all climates. As a result, it has become listed as an invasive plant in much of Europe America and Australia, yet the tree has been used for hundreds of years in China as powerful herbal medicine. Its Chinese name is Çhouchon which translates as foul-smelling tree. This smell is probably due to the high levels of phenolic compounds found in the leaves and bark and more specifically due to the high levels of ferulic acid.

There have been many claims of the poisonous nature of this tree, yet no deaths directly related to the tree have been documented. It is highly probably that due to the high phenolic content the sap and dust from cutting may cause irritation which has given rise to the assumption that the tree is poisonous.

One of the unique compounds found in *Allianthus altissima* is 2-dihydroailanthone which has been shown in research to have significant anti-tumour properties. Indeed, the research focused on the effects of this compounds on glioma tumours with significant positive results.

Allianthus altissima has been tested for its antibiotic properties and showed impressive results on various pathogens such as *Listeria monocytogenes*, *Staphylococcus aureus* and *Bacillus subtilis*. Further research has also demonstrated that its leaves inhibited the growth of two, gram(-), bacteria *Pseudomonas aeruginosa* and *Escherichia coli*. This report then supports the traditional use of the tree for gastrointestinal upsets as well as dysentery. The antibacterial effects of the tree have been shown to be similar to streptomycin and tetracycline.

Further research has shown that the extract of *Allianthus altissima* demonstrated strong antioxidant properties in line with both vitamin C and quercetin, which may further support its use as an adjunct to cancer treatment. The research into the protective properties of the leaf extract in regard gentamycin induced kidney damage has supported its use as a very efficient antioxidant, and therefore may be an important adjunct in anti-aging as well as liver, heart and kidney protection. It is thought this is due to the high levels of ferulic acid.

The antidiabetic effects of the tree to increase in insulin production have been shown in other reports, and therefore has promise as a diabetic treatment. Stem bark was used in the research on diabetic properties.

In relation to *Allianthus altissima* being used as an antiviral treatment, a report has shown it to be highly effective against the herpes strain due to the presence of quassinoids. However, the chloroform extract of the leaves showed markedly higher efficacy when compared to the methanol extract of the leaves. Therefore, the plant can be used for skin eruptions, and other infections.

Aquilaria crassna by Chong Fa
from commons.wikimedia.org

Aquilaria crassna

Primary Functions:	Laxative, Digestive detoxifier
Secondary Functions:	Anticancer
Other Functions:	Anti-obesity
Common Names:	Agarwood, Eaglewood, Gaharu. Lignum Aquila, Cham Heong, Agaru, Sashi, Aloe wood, Mai Krishna, Akil, Mai Ketsana
Description:	It is a medium-sized evergreen tree growing to a height of 15-20 m and a diameter at breast height of 40-50 cm. The trees start flowering at an age of 6-8 years, between the months of March and April. Fruiting takes place between June and July in the same year. It is a light-demanding species, which can regenerate under the forest canopy but requires canopy openings for subsequent growth.
Classification:	| Order: Malvales (600 species and 9 families) | Family: Thymelaeaceae | Genus: Aquilaria (15 members)
Origin:	It is native to Southeast Asia.
Soil Requirements:	The tree is found as an understory tree in the tropical forests of Southeast Asia and prefers wet tropical loam and clays.
Timber Quality:	The wood, from which the oil is derived, is considered far too valuable to be used for anything other than oil production. It has been reported that one kilo of the oil can reach as high as US$ 100,000. Therefore, *A.crassna* may be considered both a medicinal tree and a poverty alleviation tree.

Medical Overview:

Due to the compounds mangiferin and genkuwanin research has shown that the leaf extract of *A.crassna* stimulated the contractual activity of the jejunum and ileum in diets low in fiber. Also due to the high content of polyphenols in the extract it is also attributed to the antimicrobial action of the plant. Therefore, the use of *A.crassna* as a laxative is well supported.

The leaf extract has been shown to significantly reduce intestinal putrefaction which is a by-product from ammonium producing bacteria such as *Bacteroides fragilis, Proteus vulgaris, Eubacterium aerofaciens, Clostridium difficile, Clostridium perfringens, Peptostreptococcus prevotii*, and *Lactobacillus fermentum*.

As a result, the use of the leaf extract as a simple tea is well supported. In the research paper from Japan the benefits of regular use of the tea infusion helps reduce the risk of developing hepatic encephalopathy, Alzheimer's disease and autoimmune disorders. The researchers modeled a Western type of diet rich in fats and proteins. During the research it was established that *Aquilaria crassna* had a significant role in detoxification and reduced fat uptake from the small intestine. This finding of the reduction in fat uptake from a diet rich in fats is a welcome finding and can be applied to people suffering from obesity and weight reduction.

It is of interest that the ethanol extract of the leaves did not elicit a positive result, but rather the aqueous (water) extract was the only method that had these positive results.

The claims that *Aquilaria crassna* possesses anti-inflammatory activity has been shown to be incorrect and no anti-inflammatory actions have been observed in testing. This is also the case for the claims that *Aquilaria crassna* has been claimed to be useful in the management of diabetes, however no supporting results support this claim at this stage.

Much research attempted to understand the cytotoxic properties of *A.crassna* which resulted in support for the claims that the tree is a useful tool in the management of various cancers. Positive results have been found in the study of *A.crassna* and pancreatic cancer (MIAPaCa-2cells) via the use of the essential oil. Other research showed high antiproliferation properties against, prostate, colon and breast cancer, respectively.

A study suggested the possibility of using *Aquilaria crassna* leaves and a formulation thereof as an analgesic and antipyretic. Research has found that doses of 800 mg/kg had similar results as the control pharmaceutical aspirin and paracetamol.

Artocarpus altilis by Hans Hillewaert from commons.wikimedia.org

Artocarpus altilis

Primary Functions:	Antibacterial, Cardiac tonic
Secondary Functions:	Anticancer, Melanoma management
Other Functions:	Insecticide
Common Names:	Is named in approximately 60 languages, an indication of its spread and importance. Some common names are Breadfruit, Uto, Ulu, Amo, Sirapay, Kapiak, Mahi, Sinhala Del, Uru, Sa Ke, Mei, Nimbalo, Nek nem
Description:	Breadfruit trees grow to a height of 25 m (82 ft). The large and thick leaves are deeply cut into pinnate lobes. The ovoid fruit has a rough surface, and each fruit is divided into many achenes, each achene (small seed) surrounded by a fleshy perianth and growing on a fleshy receptacle.
Classification:	| Order: Rosales | Family: Moraceae | Genus: Artocarpus
Origin:	The tree can now be found in all tropical regions, yet it is thought to have originated in northwest New Guinea and spread by the early Polynesians as they explored the Pacific.
Soil Requirements:	The tree grows in a variety of soils, thrives on alluvial and coastal soils, but does best in deep, fertile, well-drained sandy or clay loam. Some cultivars, especially interspecific hybrids, have adapted to shallow, calcareous soils and appear to tolerate high saline conditions.
Timber Quality:	Its timber is pale gold in colour and very light weight. It was once one of the prized timbers in Samoan architecture. It was also used in boat building as it is resistant to termite and ship borer, with a long history in traditional canoe building in the Pacific.

Medical Overview:

Artocarpus altilis may be considered one of the most important trees in the tropical region other than coconut and pandanus trees. Its main benefit is the prodigious food crop one tree produces each year. However, it has hidden, until recently, other unique attributes.

Believed to have been found by Polynesian sailors in northwestern New Guinea approximately 3,500 years ago, they took it, by canoe, across the pacific region. In the 18th and 19th century european sailors repeated the distribution of the tree for its nutritional and life- saving properties. It is interesting to note that *Artocarpus altilis* is seedless so these early pioneers would have had to take cuttings from the trees to enable propagation in new environments.

Many pacific island cultures have woven the tree into their unique folklore, myth and traditions over the ages further reinforcing the importance of the tree. As would be expected with such a tree, a great deal of research has been undertaken to analyze its other attributes.

One such attribute is the antibiotic properties of the fruit and stem bark. The ethanol extract of the fruit has proved effective against *Enterocarpus faecalis*, a bacterium causing septicemia, meningitis, urinary tract infections and endocarditis. The extract of the stem bark has been shown to be more effective than tetracycline (antibiotic) in the control of *Escherichia coli*, which causes urinary tract infections, gastro enteritis, mastitis, peritonitis and neonatal meningitis. One study has shown the stem bark extract to display a zone of inhibition of 7.49 mm whilst tetracycline had only 6.78 mm. Studies on *A. altilis* in the management of cancer showed the leaf extract effective against pancreatic cancer as well as melanoma (B16F1 melanoma cells), and that *Artocarpus altilis* reduced the production of melanin allowing a beneficial result in melanoma research. The leaf extract is also considered to be a skin whitener, because of this attribute.

In the Fijian islands the traditional name for *Artocarpus altilis* is 'Uto', which has a direct translation as heart. In research from 2017 it was found that the leaf extract from the tree displayed significant myocardia protection attributes. The research found that the leaf extract aided in repair and protection of the heart. Further studies have also shown the tree to be useful in the treatment of tuberculosis due to various compounds such as cycloartcarpin, artocarpin, artonin and others.

The male efflorescence of the flower is more effective as a mosquito and insect repellent than DEET and is therefore useful in controlling malaria carrying mosquitos. The leaves contain anthraquinone which has long been known to repel birds and is used in agriculture for this purpose. It is interesting to note that the active principle in the insecticide is the presence of serotonin in the flower (male). The extract has shown lethality in the control of the dwarf tapeworm (*Hymenolepisnana*) and other parasitic worms.

Averrhoa carambola by Public Domain from commons.wikimedia.org

Averrhoa carambola

Primary Functions:	Cholesterol lowering
Secondary Functions:	Anti-hypertensive, Anti-ulcer
Other Functions:	Hypoglycemic, Obesity, Analgesic
Common Names:	Star fruit, Foreign peach, Kamrakh, Carambola apple, Wi-ni-Idia
Description:	It is a small tree or shrub that grows 5–12 meters tall, with rose to red–purple flowers. The flowers are small and bell-shaped, with five petals that have whitish edges. In tropical conditions the flowers are often produced year-round. The fruits have a thin, waxy skin that is orange-yellow colored. The juicy fruits are yellow inside when ripe and have a crisp texture and when cut in cross-section are star shaped.
Classification:	| Order: Geraniales | Family: Oxalidaceae | Genus: Averrhoa
Origin:	It is native to Southeast Asia and the Indian Subcontinent.
Soil Requirements:	varied.
Timber Quality:	The tree has a soft whitish timber that is not often utilized yet it may be used for minor cabinetry.

Medical Overview:

Averrhoa carambola, commonly known as star fruit, has a great significance in traditional medicine. Traditionally it was used in ailments for all manner of infections as well as in the treatment of diabetes. Pharmacological investigations on *Averrhoa carambola* have demonstrated anti-inflammatory, antimicrobial, antifungal, antitumor and anti-ulcer activities. In addition, the plant possesses hypocholesterolemic, hypoglycemic, hypotensive, nephrotoxic, neurotoxic, negative inotropic and chrono tropic. A unique compound is found in the fruit from the tree which is called caramboxin. It is this compound that is responsible for the neurotoxic effects of the fruit and tree. The compound affects kidney function in a significantly negative manner. Added to this is the high levels of oxalic acid in the fruit which is also bad for kidney function, and it is recommended that this tree be avoided as the potential risks are well researched and documented.

In research conducted in 2004 it was shown that the fruit pomace (solid material) significantly lowered both cholesterol and fat levels in test animals (hamsters). Further research in 2009 enhanced the previous research and found that the fruit extract reduced cholesterol levels by approximately 15%. The actions of the extract are due to the insoluble fiber found in the fruit pulp which binds with the cholesterol and fats whereby they can be removed from the blood and passed out in the feces. In conjunction with these findings is the added attribute of the extract to reduce blood sugar levels and therefore the tree shows great promise in managing obesity and weight loss.

Further research in 2009 sought to verify the hypotensive claims of the leaf extract. This research did indeed support the claims that the extract showed significant blood pressure lowering actions. Yet, allied research showed that the extract interfered in both the electrical and mechanical actions of the heart muscle and this caused concern that the extract may exacerbate weaknesses or medical conditions associated with the heart and as a result the extract is NOT recommended for patients who may have heart conditions.

Whilst the tree and its fruit are used worldwide, additional concerns highlighted by other researchers have found that extracts derived from the tree may cause kidney disease as well as nerve damage. Therefore, whilst *Averrhoa carambola* shows great promise in a wide variety of areas, especially weight control and obesity, it should be used with caution for people who may have kidney, nerve and heart conditions.

The claims that the leaf and fruit extract protect against ulcerative colitis has also been confirmed, however the actions are not completely understood. It is currently thought that the extract coats the ulcers and thereby protects the damaged tissue from further aggravation by digestive enzymes and acids.

The anti-inflammatory claims of the bark extract of the tree have also shown to be dose dependent and at doses of 300 mg/kg body weight the resulting inflammatory reduction was similar to that of acetylsalicylic acid and became stronger over time. Further research showed that the alcohol extract may be applied topically (to the skin), and that it had similar anti-inflammatory actions when compared to the standard drug dexamethasone. It is therefore recommended that should *Averrhoa carambola* extract be used to manage inflammation that it is primarily used externally whereby the other complication in its use may be avoided.

Analgesic (pain relief) actions of the tree extract have been supported in research at doses of between 200 mg/kg–400 mg/kg body weight.

Azadirachta indica by Bishnu Sarangi from Pixabay

Azadirachta indica

Primary Functions:	Spermicidal, Antiviral, Anti-microbial
Secondary Functions:	Parasite control, Antimalarial, Female contraceptive
Other Functions:	Hepatoprotective, Antibacterial, Oral mouthwash
Common Names:	Neem, Nimtree, Indian Lilac
Description:	It is a fast-growing tree that can reach a height of 15–20 meters. It is an evergreen, but in severe drought it may shed most or nearly all of its leaves. The branches are wide and spreading. The opposite, pinnate leaves are dark green. The fruit is a smooth (glabrous), olive-like drupe which varies in shape from elongate oval to nearly roundish, and when ripe.
Classification	| Order: Sapindales | Family: Maliaceae | Genus: Azadirachta
Origin:	It is native to India and also grows throughout the sub-tropical and tropical regions.
Soil Requirements:	Neem can grow in many different types of soil, but it thrives best on well drained deep and sandy soils.
Timber Quality:	As a member of the Mahogany family the timber has similar attributes, however due to the azadirachtin of the tree it is highly borer and termite resistant.

Medical Overview:

Azadirachta Indica has proven useful on many fronts, and with the most notable attribute its insect repellent properties. In the true sense Neem is not a repellent as it is not fatal to insects. It rather interferes with the reproductive cycle of many insects and in so doing makes its environment intolerable for insect survival. The aqueous, ethanol and oil derivatives of the tree can be used to expel intestinal parasites. In this regard, it is most effective as an infusion on a daily timetable for intestinal worms.

Another proven aspect of *Azadirachta indica* is the antimicrobial aspect of the leaves and bark. Research has shown the extract to be highly effective against oral pathogens which support the use of Neem as an oral mouthwash or as an ingredient in toothpaste. In studies it was also shown to be comparable to the anti-biotic streptomycin. The traditional use of Neem twigs as teeth cleaners has therefore been validated.

In one study, its extract was shown to be most effective against the pathogen *Proteus vulgaris* which is responsible for urinary tract and intestinal infections as well as some skin infections. It has also been shown to be effective in the management of *Vibrio cholerae* the organism underlying cholera.

An exciting research study found that *A. indica* reduced sperm motility and count to a point of being an effective family planning adjunct. It was found that a suitable dose of its extract had a 100% spermicidal result in 20 seconds. Additionally, the oral intake of Neem in male rats resulted in total infertility in 14 days. Once ceased, the sperm production returned to normal. Furthermore, the use of Neem in situations directly after pregnancy implant (fertilization) in the female resulted in a desired contraceptive response. In all cases once the treatment with Neem extract ceased fertility returned to normal. As a vaginal pessary its oil was found to be highly effective, however it is recommended to be combined with other contraceptive methods such as diaphragm and condoms.

Azadirachta indica also displayed potent activity as an antiviral, used in controlling and protecting from HIV virus as well as polio. In in vitro studies the bark extract showed that it protected up to 75% of the cells from HIV adhesion.

A.Indica has displayed promising results in malaria management. In a study on its antioxidant properties in inducing apoptosis of cervical cancer cells, Neem demonstrated to be a potent inducer of apoptosis in biopsies of cervical cancer patients.

Neem leaf and bark aqueous extracts produce highly potent anti-acid secretory and antiulcer activity.

Phytochemical leaf extracts of *Azadirachta indica* exhibited significant hepatoprotective activity. Ethanolic and aqueous leaf extracts of *Azadirachta indica* exhibited moderate activity over carbon tetrachloride treated animals. Results confirm the traditional medicinal use of *Azadirachta indica* as a potential source of hepatoprotective agent.

Backhousia citriodora by Allthingsnative – from commons.wikimedia.org

Backhousia citriodora

Primary Functions:	Antibacterial, Anti-inflammatory
Secondary Functions:	Anti-obesity, Adaptogen
Other Functions:	Insecticide
Common Names:	Lemon Myrtle, Lemon Scented Iron wood
Description:	The tree can reach 6 m in height but is often smaller. The leaves are evergreen, opposite, lanceolate, 5–12 cm long and 1.5–2.5 cm broad, glossy green, with an entire margin. The flowers are creamy-white, 5–7 mm in diameter, produced in clusters at the ends of the branches from summer through to autumn, after petal fall the calyx is persistent.
Classification:	| Order: Myrtales | Family: Myrtaceae | Genus: Backhousia
Origin:	Tropical eastern Australia.
Soil Requirements:	Varied.
Timber Quality:	As one of its common names suggest the timber from the tree is very hard and very durable. In testing it has been shown to be durable both above ground (building, furniture as well as in ground (posts, railway ties) the heart wood is reported to be a pinkish gray in colour.

Medical Overview:

Backhousia citriodora is one of the highest sources of the compound citral which is also found in lesser concentrations in lemon grass *(Cymbopogon)*, May chang *(Litsea cubeba)* Lemon verbena (*Aloysia citriodora*) and the common lemon. To give some idea of the differences, the lemon tree has 2-5% of citral whilst *Backhousia citriodora* has 90-98% citral content.

The first people of Australia have been using Lemon Myrtle for centuries as a food as well as medicine. In the Australian vernacular it is considered a bush food, however over the past decade the tree and its products are considered as a health product in equal measure. It is named after the English botanist James Backhouse circa 1853.

The main compound citral has been considered an irritant, however less than 1.5% of subjects tested had an adverse reaction to the essential oil of the tree. Yet, these negative effects have been shown to be negated if the adverse reaction is quenched via the inclusion of pinene and limonene compounds found in pine trees, juniper and cannabis. Hence, by mixing equal amounts of citral and limonene/pinene the allergic reactions were significantly reduced.

Backhousia citriodora has been shown to be a significant antibacterial and antifungal. In clinical trials it was shown that the oil of the tree had positive impacts on the management of MRSA (methicillin resistant *Staphylococcus aureus).* The essential oil from the tree has been shown to be insecticidal and a report from South Africa in 2017 is one confirmation of its insecticidal properties specifically against mites and ticks. However, the tree is also considered to be ideal for bees and honey production and, hence creating some contradictions.

The citral found in the tree has been shown to be an effective anti-obesity agent. In a detailed report from 2011 it was shown that citral not only reduced body weight but also increased metabolic rates, glucose tolerance and increased energy levels.

Backhousia citriodora has also been shown to be an effective anti-inflammatory, diuretic and calmative (which is once again contrary to some findings that report increased metabolic rates). It has also been reported to be an effective antidepressant, yet this may be due to the calmative aspects only.

Balanites aegyptiaca by A. J. T. Johnsingh, WWF-India and NCF from commons.wikimedia.org

Balanites aegyptiaca

Primary Functions:	Antibacterial (typhoid)
Secondary Functions:	Anti-inflammatory, Cardiac tonic
Other Functions:	Antioxidant, Anthelmintic, Hepatoprotective
Common Names:	Hingot, Desert Date, Ingudi, Bedena, Lalob, Heglig, Soapberry tree, Thron tree, Egyptian balsam, Zachumoil tree; Hidjihi, Inteishit, Aduwa, Taboraq, and Mchunju
Description:	The tree reaches 10 meters in height with a generally narrow form. The branches have long, straight green spines arranged in spirals. The dark green compound leaves grow out of the base of the spines and are made up of two leaflets which are variable in size and shape. The fluted trunk has greyish-brown, ragged bark with yellow-green patches where it is shed.
Classification:	| Order: Zygophyllales | Family: Zygophyllaceae | Genus: Balanites
Origin:	It is native to much of Africa and parts of the Middle East.
Soil Requirements:	The soils in its range tend to be deep sands, sandy clay loams, sandy loams or clays.
Timber Quality:	The wood is pale yellow or yellowish-brown. Heartwood and sapwood are not clearly differentiated. The wood is hard, durable, worked easily and made into yokes, wooden spoons, pestles, mortars, handles, stools and combs. The timber has traditionally been a minor product. The generally small log size and the prevalence of stem fluting makes sawmill processing difficult.

Medical Overview:

Balanites aegyptiaca has been used traditionally in the treatment of skin disease and remedy for stomach-ache and jaundice, treatment of cough, treatment of diarrhea and syphilis and typhoid fever. The root was also reported to be used in the treatment of inflammation, antidote for snake bite, malaria, and epilepsy and venereal disease.

At doses of between 300 mg/kg and 600 mg/kg body weight have shown significant anti-inflammatory and analgesic properties in research that compared the standard drug diclofenac, which is used in many anti-inflammatory preparations such as Voltaren. The leave extract may therefore be considered useful in the management of arthritic conditions and muscular cramps. Further research shows that the extract may be considered to be antinociceptive (long term pain relief) indicating the value of this tree.

As an anthelmintic and larvicide research from 2009 proved the use of the extract as a possible alternative to the standard drug albendazole. In allied research into claims that the extract made from the fruit's mesocarp proved that dose levels as low as 0.1% extract displayed 100% mortality to the larvae of the *Culex pipiens* mosquito, supporting its use in the control of mosquito borne diseases. The extract derived from the root bark displayed the strongest result in this research.

Research into claims that the tree extract displays liver protection (hepatoprotective) actions were substantiated in the middle of the twentieth century. In doses ranging from 250 mg/kg and 500 mg/kg body weight proved that the extract was effective in positive liver function tests when compared against the standard drug silymarin of doses of 10 mg/kg body weight.

Research papers from 1999, 2001 and 2007 compared the ethanol and aqueous extract of the tree as an antibacterial agent compared to the standard drugs ciprofloxacin, cotrimoxazole and chloramphenicol. In this research it was revealed that the tree extract was more effective (zone of inhibition) at doses of 100 mg/kg body weight that the control drugs at doses of 10 mg/kg body weight. Special emphasis was placed on the extracts ability to control *S. typhi*, the bacteria responsible for typhoid.

Various cardiac glycosides have been identified in the plant extracts derived from the tree. These glycosides have found to be present in the leaves of *Balanites aegyptiaca*. A cardiac glycoside is a compound that has been shown to aid in the treatment of congestive heart failure and cardiac arrhythmia. This inhibition increases the amount of Ca2+ions available for contraction of the heart muscle, improves cardiac output and reduces distension of the heart.

This cardiac action combined with the anti-inflammatory actions of the tree may result in management of anxiety which has symptoms of raised blood pressure.

It must be noted that a decoction of the leaves is used as an abortifacient (termination of pregnancy) in certain tribes in Africa. Therefore, the extract from the tree should not be taken by pregnant women.

Barringtonia acutangula by Rupak73 from commons.wikimedia.org

Barringtonia acutangula

Primary Functions:	Antibacterial
Secondary Functions:	Central nervous system (CNS) depressant, Analgesic
Other Functions:	Anthelmintic
Common Names:	Freshwater Mangrove, Itchy tree, Mango-pine, Indian Putat, Red Barringtonia, Stream Barringtonia, Wild Almond, Kandu Almond, Indian Oak, Samudraphal
Description:	It is a small to medium evergreen tree, with spreading crown. Leaves are about 12.5 cm long, cuneate-elliptic, minutely denticulate-crenate. Flowers are small, fragrant, dark scarlet, in slender pendulous many-flowered racemes, up to 30 cm long. Fruit is bluntly quadrangular, broadest in the middle.
Classification:	| Order: Ericales | Family: Lecythidaceae | Genus: Barringtonia:
Origin:	The tree is native to southern Asia, Afghanistan, New Guinea and east to the Philippines and to tropical Australia.
Soil Requirements:	It often grows in mountainous tropical conditions. The tree can grow in a variety of soils and tolerates waterlogging.
Timber Quality:	The timber is white when first cut and changes to golden over time. It is reported to be durable and of even grain. It is used in boat building and cabinetry.

Medical Overview:

Barringtonia acutangula has over time been dispersed over a wide geographic area with reports that it is found in the eastern region of Afghanistan and down to the northern areas of Australia. In all these areas it is utilized as a medicinal plant for various applications. It is indeed a tree of significant medicinal importance due to its varied and specialized uses. It has been shown that *Barringtonia racemosa* has similar properties to *Barringtonia acutangula*. The tree should not be confused with one of its cousins named *Barringtonia asiatica* as this tree, whilst used in some regions as an herbal medicine, is toxic to mammals and is used by coastal communities to poison fish. The trees are easily differentiated by their flowers which are large pink and white tessellated, and its fruit is a large drupe with squared ridges.

Its leaf is found to contain steroids, flavanols and phenolic acids. Alkaloids were absent. The steroids located were barringtogenic, tangulic and acutangulic acids. The flavanols located are 3', 4'-diOMequercetin, and 8-methoxy flavanols like gossypetin and 3'-O Megossypetin. Vanillic, syringic, gallic, melilotic and p-coumaric acids were the phenolic acids present. The bark possessed only 8-oxygenated flavanols, gossypetin and 3'-methylether and only two phenolic acids i.e., vanillic and syringic acids. The bark contained gossypetin and myricetin along with vanillic and syringic acids. Quinones were found in all the three parts of the plant.

One of the most useful attributes of the tree is the central nervous system (CNS) depressant actions studied from the leaf ethanol extract. It has been shown that doses of 400 mg/kg body weight had similar or better actions than sodium pentobarbitone (40 mg/kg dose). This research from India in 2012 has supported the use of the leaf extract in anxiety, stress, insomnia and other nervous system disorders.

Further research from 2011, also from India, showed that the leaf extract also possessed significant anthelmintic (parasite, worm) control similar or equal to the standard drug piperazine citrate at doses of 100 ml/l, and complete death of the earth worm *Pheretima postuma* occurred in 36 minutes, thereby supporting the use of the tree in the control of intestinal parasite in both humans and animals.

The use of the tree in traditional medicine to control and manage infectious diseases and conditions was tested in various research papers in the last decade or so. In one such paper (2008) the extract derived from the seeds via ethanol extraction had slightly less effect than the standard drugs ciprofloxacin and amoxycillin on the bacteria *Staphylococcus aureus; Pseudomonas eruginosa; Klebsiella pneumoniae; Enterococcus faecalis; Escherichia coli*. Other research has further supported its antibacterial actions and as a result supported the traditional claims of using its extract for skin irritations, intestinal complaints and other bacterial infections on the body. The tree's roots, bark, seeds and leaves possess this antibacterial potential.

Claims that its leaf extract is a liver tonic (hepatoprotective) was found correct in research from 2011 in which the leaf extract of doses up to 400 mg/kg body weight showed significant liver tonic properties.

Allied with the CNS depressant actions of the tree extract is also the antinociceptive or pain suppression properties. It has been found that doses of the root extract, ranging from 250 mg/kg to 500 mg/kg body weight showed significant pain suppression potential as well as anti-inflammatory results. Testing of the tree has found that doses up to 2000 mg/kg was safe and nontoxic.

Bauhinia variegata by DEZALB from Pixabay

Bauhinia variegata

Primary Functions:	Immune system support
Secondary Functions:	Thyroid function, Kidney tonic
Other Functions:	Anticancer
Common Names:	Orchid tree, Camel's foot tree, Kachnar, Mountain-ebony
Description:	It is a small to medium-sized tree growing to 10–12 meters tall, deciduous in the dry season. The leaves are 10–20 centimeters, rounded, and bilobed at the base and apex. The flowers are conspicuous, bright pink or white, with five petals. The fruit is a pod, containing several seeds.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Bauhinia
Origin:	It is native to South Asia and Southeast Asia, from southern China, Burma, India, Nepal, Pakistan and Sri-Lanka.
Soil Requirements:	Capable of growing on a wide range of soils from gravelly, shallow, rocky soil on hill slopes to sandy loam and loamy soil in the valley.
Timber Quality:	The timber is brown and moderately hard and is reported to be used in making Agricultural tools.

Medical Overview:

Bauhinia variegata is widely used in folklore medicine. Its bark, root, leaves, seeds and flowers are used for their medicinal properties. It has been used in dyspepsia, bronchitis, leprosy, ulcers, obesity, astringent, tonic and anthelmintic.

Root bark of *Bauhinia variegata* is reported to contain polyphenolics (flavonoids and tannins), steroids, saponins and triterpenes. *Bauhinia variegata* has been reported to contain quercetin, rutin, apigenin and apigenin 7-O-glucoside. Quercetin from the tree has been shown to decrease the lipid peroxide formation and restoration of glutathione status and the activities of antioxidant enzymes during gentamicin-induced nephrotoxicity. As a result, the use of *Bauhinia variegata* as a kidney treatment have been substantiated and further research has shown that the extract limits damage to kidneys due to gentamicin overdose.

The antimicrobial effect of its leaf and bark extract was evaluated on microbial strains such as gram(+) species *Staphylococcus aureus* and *Bacillus subtilis* and gram(-) species *Escherichia coli* and *Pseudomonas aeruginosa*. The solvent used for extraction of plant were petroleum ether, chloroform, and alcohol. The alcoholic extract of its leaves showed maximum antimicrobial activity. The significant antibacterial activity of the extract was compared with standard antibiotic ampicillin. The research displayed antimicrobial activity, however not as effective as ampicillin. Further research identified that the bark extract from the tree elevated the immune response in test animals and this may explain the claims that the tree has antibacterial properties. Therefore, the extract from the tree is less than favorable as an antibacterial medicine and more so as a stimulant for the immune system.

The ethanolic extract of its stem displayed chemo prevention and cytotoxic effect against induced experimental liver tumour in rats and human cancer lines at a dose of 200 mg/kg. Oral administration of its ethanolic extract effectively suppressed liver tumour as well as melanomas at doses of between 500 mg/kg–1000 mg/kg body weight. Ethanolic extract was found to be cytotoxic against human epithelial larynx cancer and human breast cancer cells in research conducted in 2009.

Research from 1987 supported claims that its leaf extract reduced blood sugar levels in test animals and this in some way supported the claims that the tree may be used in the treatment of Type 2 Diabetes, yet it is recommended that new and additional research be sought to verify these claims.

Another attribute of the tree is the extract derived from its leaves and bark in regard to thyroid function. This research showed significant increase in thyroid function at daily doses of 200 mg/kg body weight. As a result, the extract may be useful in the treatment of goiter and other conditions resulting from thyroid malfunction. *Bauhinia variegata* has been shown to be safe at levels up to 2000 mg/kg body weight. Therefore, it is considered as safe herbal medicine.

Betula pendula by Liga Dzene from Pixabay

Betula pendula

Primary Functions:	Anticancer
Secondary Functions:	Anti-allergic, Antiviral
Other Functions:	Rheumatoid arthritis, Gout, Ulcers
Common Names:	Silver Birch, Warty Birch, European White Birch, East Asian, White Birch
Description:	The tree is a tall slender tree that may reach heights of 25 meters or more, yet the trunk will only reach 40 cm in diameter. The bark is white with dark irregular patterning. The species is monoecious with male and female catkins found on the same tree. The leaves have short, slender stalks and are 3 to 7 cm long, triangular with broad, untoothed, wedge-shaped bases, slender pointed tips, and coarsely double-toothed, serrated margins. The foliage is a pale to medium green and turns yellow early in the autumn before the leaves fall. The small, 1 to 2 mm winged seeds ripen in late summer on hanging, cylindrical catkins 2 to 4 cm long and 7 mm wide.
Classification:	| Order: Fagales | Family: Betulaceae | Genus: Betula
Origin:	Its range extends from Europe across to China and Siberia.
Soil Requirements:	Prefers dry acidic soils.
Timber Quality:	The timber is a creamy pale uniform colour with hints of pink. It is not durable as it rots easily and is prone to insect attacks. The primary use of the tree is for veneers and pulp however it is also used in snow skis, roofing shingles and furniture.

Medical Overview:

Betula pendula is the national tree of Finland and the small branches with their leaves still on are used to beat oneself when taking a sauna. The Silver Birch has been woven into many spiritual ceremonies of the European and Slavic people. The Celts used Birch as brooms to sweep out evil spirits and welcome the new year. The legendary May pole was made from the tree. It also considered to be the first choice of witches when making their flying brooms.

The tree can be tapped for its sap, used for beverages and also in cooking. It has a sweet taste.

The leaves have been traditionally used as a tisane that acts like a diuretic, increasing urine flow. As such it has been found that birch leaf extract aids in the management of gout and rheumatoid arthritis due to the salicylates found in its extracts. Further, the Birch extract was studied for its influence on lymphocyte reduction, and it was found the extract reduced the lymphocyte activity and thereby reduces symptoms associated with rheumatoid arthritis. It was found that the Birch extract was comparable to the standard drug methotrexate. The leaves contain germacrene (antimicrobial), copaene (insect attractant), cadinene (aromatic oil), quercetin (anticancer especially for prostate cancer), kaempferol (anti-inflammatory, antioxidant and anticancer at high doses), and myricetin (anti-inflammatory, anticancer, antioxidant and antiviral).

The bark of the tree contains up to 30% betulin as well as betulinic acid. Both of these compounds have been rigorously researched for their antitumor and anticancer properties. Whilst the tree has additional compounds that have been associated and studied in regard to cancer management, its betulin and betulinic acid are considered the main compounds for the anticancer results found in testing. Its bark extract has been shown to be beneficial in the management of cervical, lung, breast, and skin cancers. The extract has also been shown to useful in the treatment of leukemia.

The ethanol extract made from the leaves is used in cosmetics as a skin whitener and toner. It has been found that the leaf extract is useful in treating actinic keratosis which is the blotching brown patches that develop on skin after years of sun exposure.

A study from 2012 established that Birch extract reduced ulceration in the gut. Additional studies have shown its extracts useful in the management of various viruses therefore the use of the tree as an antiviral is supported. However, whilst the extracts do inhibit HIV virus, they do not do so to a beneficial level.

The antiallergy claims made about Birch have also been studied in depth and it was found that the bark extract was comparable to the standard antiallergy drugs known as chloropyramine and loratadine. The birch bark extract significantly reduces the histamine levels in the body and reduces systemic anaphylactic response to allergic material.

Bischofia javanica by Dinesh Valke from commons.wikimedia.org

Bischofia javanica

Primary Functions:	Anti-inflammatory, Anti-asthmatic
Secondary Functions:	Antileukemic, Anti-ulcerative
Other Functions:	Skin health
Common Names:	Bishop wood, Java cedar, Uriam
Description:	The tree is a medium to fairly large, usually deciduous tree, 30-50 m tall. Leaves arranged spirally, pinnately 3-foliate, glabrous; petiole 8-20 cm long. Flowers unisexual, actinomorphic, numerous, small, greenish, apetalous.
Classification:	| Order: Euphorbiales | Family: Euphorbiaceae | Genus: Bischofia
Origin:	It is widely distributed throughout southern and Southeast Asia to Australia and Polynesia also in North America.
Soil Requirements:	The tree prefers deep, loose soils such as sandy, rocky or loamy soils with sufficient water content, occasionally it is found on limestone.
Timber Quality:	The timber is straight grained and moderately durable. It has a well-established place in tropical timber markets. It is also reported to be durable in fresh water. It is recommended to use preservative treatment on the timber however the heartwood is strongly non-absorbent and as a result treatment should be pressurized.

Medical Overview:

Research conducted in Japan in 2010 showed that the leaf extract from *Bischofia javanica* displayed potent retardation of the decay of hyaluronic acid which proved beneficial in the suppression of the histamine response due to allergies and resultant asthma. Compared to the control drug disodium cromoglycate the leaf, bark and fruit extract derived from the tree were comparable or better. As a result, these extracts are useful anti-inflammatory agents and can be used in the treatment of asthma and throat inflammation in both adults and children. Interestingly the traditional claims that its extracts aid in hair growth are also supported due to the verification of the association with hyaluronic acid support.

Within the same research it was further substantiated that the extracts reduced urease production and therefore are useful in the treatment of gastric ulcers and the control of the bacteria *H. pylori* which is the main cause of gastric ulcers.

Additionally, the extracts derived from the tree enhance collagen synthesis and therefore prove their use not only in wound healing but overall skin health. Clinical research has shown that the use of the extract improves skin moisture content, elasticity and blemish removal.

Due to the high content of tannins found in the bark and leaves (+/-16%) it is used as a dye for clothes and tapa in the Southern Pacific islands. The dye is black.

When research compared the effect on the tree extract on leukemic cells it was found that the methanol extract was more effective than the standard drug cytarabine at doses of 15 ug/ml. However, the research showed that whilst the extract was effective against leukemia cell lines it was not effective at controlling all variants of the leukemia condition. Yet sufficient results were obtained to support its use in the treatment of leukemia in conjunction with standard drug therapies.

It should be noted that in some traditional cultures there are claims that the extract from the tree is useful in aborting unwanted pregnancies. Research into these claims is not known at this time, and as such the tree should not be used by expectant mothers.

In Southern China, and also Taiwan, the aboriginal people consider it a sacred tree.

Bixa orellana by Joan Simonfrom commons.wikimedia.org

Bixa orellana

Primary Functions:	Skin protection
Secondary Functions:	Anticancer
Other Functions:	Antimicrobial
Common Names:	Anatto, Sinduri, Achiote
Description:	The tree is a small understory tree that grows no more than 10 meters. It is evergreen and has spirally arranged oval leaves with a deep green top surface and pale green beneath. The flowers are approximately 5-7 cm in diameter and may display in either pink, white or purple colours. The fruit is ovoid and elongated of approximately 5 cm in length with two halves that open when ripe. The fruit or pods are covered entirely in long red bristles that dry to a dark tan. Within the fruits are numerous red seeds approximately 5 mm in size.
Classification:	| Order: Malvales | Family: Bixaceae | Genus: Bixa
Origin:	The tree is native to the South American continent yet has been spread throughout tropical zones due to its commercial applications.
Soil Requirements:	Is easy to grow from seed and or cuttings. It prefers fertile dark loams however may tolerate less fertile sites. As a true tropical tree, it prefers year-round rain fall.
Timber Quality:	The trunk and branches have no use as a timber source, however the softwood and bark has traditionally been made into ropes and cordage.

Medical Overview:

Bixa orellana has been utilized for centuries by the indigenous peoples of south America, specifically Brazil, as a body paint and hair colorant. Today, the dye derived from the oily seeds is one of the most used food coloring today called bixin. It is reported that approximately 10,000 tons of bixin is consumed annually in the world market.

The skin protection attributes of this small tree are confirmed in the research on bixin. Not only applied to the skin but also taken orally, it has been proven to protect the skin from ultraviolet damage. Furthermore, the red/orange paste made from the seed pulp has displayed UV damage repair. Added to this are the other research papers that show its ethanol extract is an effective antitumor agent or antineoplastic. As a result, *Bixa orellana* may be one of the most effective botanical sources for skin protection and health.

There have been claims that *Bixa orellana* has antibacterial attributes, yet in research it has shown mild antibacterial attributes when compared with the standard antibiotic streptomycin. With this, the mild antibacterial ability of *Bixa orellana* only amplifies its use as a skin product.

In a paper from 2012 its extract proved effective in the control of Leishmania disease which can manifest as lesions, rashes and wounds on the skin. A dose of 0.25 mg/ml had significant results in controlling and curing this condition. Therefore, *Bixa orellana* has been proven to be an effective antimicrobial agent.

Added to the above is the noticeable anti-inflammatory results on UV damaged skin manifesting as possible sunburns or other inflammatory response from skin damage.

Scientific research has supported *Bixa orellana* as a unique source of skin protection and support, primarily due to the bixin and norbixin two carotenoids derived from the tree. The accepted daily intake of bixin is recommended to be not more than 12 mg per day however most people have far less than this, possibly 0.5 mg per day.

Testing on the potential of *B. Orellana* to be cytotoxic found no evidence that the plant is dangerous to humans.

Bolusanthus speciosus by Forest & Kim Starr from commons.wikimedia.org

Bolusanthus speciosus

Primary Functions:	Emetic (anti vomiting), Anticonvulsant
Secondary Functions:	Anti-anxiety
Other Functions:	Analgesic
Common Names:	Tree wisteria, Mogaba, umHolo
Description:	The tree is one of the most beautiful trees in Southern Africa. It is 7-12 m tall with leaves having a smooth-edged margin and slightly and irregularly scalloped, the flowers are a beautiful pea-shape, pale blue to violet in colour arranged in long dropping branches. The fruit is a flat narrow pod about 7-10 cm long with a light brown or straw colour and they may sometimes be grey or black due to age.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Bolusanthus
Origin:	It has wide distribution that extends from South Africa, Botswana, Zimbabwe and Zambia.
Soil Requirements:	A good soil mixture would be equal parts of river sand, loam and compost.
Timber Quality:	The wood is much sought after for fine furniture and wood turning. The timber is dense and strong with a high durability rating and is resistant to termite and borer. However due to the small log size it does not have a large commercial presence in the international timber markets. The heart wood is a reddish-brown and the sapwood is a pale white.

Medical Overview:

Bolusanthus speciosus commences its life as a vine, and over time the main trunk of the vine thickens into a tree form. Due to its beauty the tree is normally used as an ornament in gardens and parks around the world. In its native range it has been used for millennia in the traditional Sangoma's (traditional healers/witch doctors) pharmacopeia. As such in Southern Africa the inner bark is used to treat abdominal pains, emetic and tuberculosis, and its roots have been used as emetic.

In a study into the major compounds found in *Bolusanthus speciosus* conducted in 2013 found that the compound dimethylbenzene made up approximately 39% of a sample of the bark. This chemical is associated with skin and throat irritation and may be further linked to colitis. As a result, this compound may be the active principle in the use of the bark extract as an emetic.

Another major compound isolated from the bark extract is caryophyllene (16%). This compound is also found in high levels in *Copaifera*, *Cannabis sativa*, clove family as well as black pepper. Caryophyllene is known as an anticonvulsant, anti-anxiety and anticancer. It is one of the quirks of nature where dimethylbenzene may cause colitis, caryophyllene is known to reduce colitis.

Claims that the leaves, bark and roots from the tree have antibacterial properties was studied in 2001. The researchers found that the root bark in a methanol extract did display moderate antibacterial and antifungal actions. However, when compared to the standard antibiotic chloramphenicol and antifungal agent miconazole, it was found that the extract was not as effective in the control of pathogens. As a result, there are better trees to be used as antibacterial and antifungal. However, in a thesis paper from 2012 it was found that the extracts derived from the bark and leaves showed significant antibacterial activity in the treatment of gonorrhea. Therefore, more research should be undertaken to ascertain if this is indeed credible as other research has shown the bark extract to be less than optimal in the control of other bacterium.

The major constituents were found to be 1,3-dimethylbenzene (39.15%), caryophyllene (16.25%), para-Xylene (9.12%), 2-Naphthalene methanol, decahydro-alpha, alpha-4a-trimethyl-8-methylene-, [2R-(2.alpha.,4a.alpha., 8a.beta.] (8.46%) and ethylbenzene (8.25%). Caryophyllene is a sesquiterpene. Sesquiterpenes are used as an esthetics, antifungal, antiseptic and antibacterial. The documented health benefits of Caryophyllene are anti-inflammatory, antidepressant and pain relief (analgesic).

Much of the research conducted into the health claims of this tree has been done with one or more other species. As a result, there is a shortage of research dedicated to *Bolusanthus speciosus* alone. It is this lack of specific research that has created a lack of verification of the use of the tree in the traditional medicinal systems of southern Africa. The traditional use of the tree ranges from venereal disease, tuberculosis, emetic, analgesic and abdominal pain relief to name a few.

Bombax ceiba by Saad Faruque from commons.wikimedia.org

Bombax ceiba

Primary Functions:	Anti-inflammatory, Anticancer
Secondary Functions:	Anti-ulcerative, Diabetes
Other Functions:	Cardiac tonic
Common Names:	Unani, Cotton tree, Semal, Silk cotton tree, Kapok tree, Red silk cotton tree
Description:	A large deciduous tree with a tall trunk and spreading crown. Trunk and bunches, particularly of young trees covered with large woody conical prickles. Large leaves, pinnately arrangement appearing before the new leaves appear.
Classification:	| Order: Malvales | Family: Bombacaceae | Genus: Bombax ceiba L.
Origin:	It is found widely in temperate tropical and sub-tropical around the world.
Soil Requirements:	It grows best in deep sandy loams and well-drained soil.
Timber Quality:	Its wood is light weight and porous; suitable for making carvings, coffins and dugout canoes.

Medical Overview:

Bombax ceiba is commonly known as Silk cotton tree and it is one of the important medicinal plants due to its long medicinal usage in the traditional health systems of Asia, such as in Ayurvedic medicine. According to Ayurveda, it has stimulant, astringent, hemostatic, aphrodisiac, diuretic, antidiarrheal, cardiotonic, emetic, demulcent, antidysentery, alterative, and antipyretic properties.

Previous research has revealed that this plant has been used extensively for treatment of some diseases like anti-inflammatory, anti-HIV, hepatoprotective, hypotensive, antiangiogenic, antioxidant activities and toxicity. In the late 1990's it was thought that the tree possessed a unique chemical compound that was named shamimin. However, several years later researchers reexamined this compound and found it to be identical to mangiferin, a compound found in high levels in the Mango tree. It is this compound that is thought to be the main active compound from *Bombax ceiba* responsible for much of the health claims associated with the tree. Mangiferin is anti-inflammatory, anticancer, antibacterial, modulates the immune system, cardiac tonic and aids in the management of diabetes.

The extract of stem bark has been experimentally proven to have significant anti-obesity efficacy, possibly due to the presence of flavonoids and lupeol compounds. Oxidative stress is greatly increased on the treatment with high fat diet in the form of enhanced lipid peroxidation reactions and depletion of tissue antioxidant. The anti-oxidative efficacy of *Bombax ceiba* may contribute for the amelioration of obesity and hepatic insufficiencies. Its extract significantly reduced oxidative stress and this effect was more pronounced that that achieved from the standard drug gemfibrozil.

Recent studies have thus provided a scientific support for the traditional use of this plant in the management of diabetes. A dose of its extract had a significant hypoglycemic and hypolipidemic effect on streptozotocin-induced diabetic. The dose also significantly lowered the total cholesterol and triglyceride level in severely diabetic cells.

The extracts have also been found to be effective on the tested organisms, *Salmonella typhi* and *Klebsiella pneumoniae*. It can be a promising antibacterial activity against typhoid and oral pathogens.

The dry cores of the *Bombax ceiba* flower are an essential ingredient of the Namngiao spicy noodle soup of the cuisine of Shan State in Thailand, as well as the kaeng khae curry.

The silky fibers that disperse the seeds are too small for weaving but make organic stuffing for bedding and life preservers. Soaps can be made from the oil derived from the seeds.

Boswellia sacra by Goettertraene from commons.wikimedia.org

Boswellia sacra

Primary Functions:	Anticancer
Secondary Functions:	Anti-inflammatory
Common Names:	Frankincense, Olibanum tree
Description:	The tree is a small transitory tree with a height of 2 to 8 m with one or more trunks. Its bark has the texture of paper which can be removed easily. It has compound leaves and an odd number of leaflets which grow opposite to one another along its branches. The fruits are condensed about 1 cm long.
Classification:	| Family: Burseraceae | Genus: Boswellia | Order: Sapindales
Origin:	It is native to Arabian Peninsula (Oman, Yemen) and North-east Africa (Somalia).
Soil Requirements:	It often grows on rocky slopes and ravines mostly in calcareous soil.
Timber Quality:	The timber of the tree is not used as a commercial product due to the poor size of the branching and trunk. Also allied with this is the high value associated with the resin exuded from the limbs of the tree precludes the cutting of the limbs for timber use. It is noted however that indigenous peoples from its native ranges use the timber as a firewood for cooking.

Medical Overview:

The trade in the resin derived from the tree known as *Boswellia sacra* has been recorded for almost 5,000 years. Pictographs of it can be found in Egyptian hieroglyphs. The resin was also well-known to the Greeks and the Chinese indicated that the valuable resin had a pan global marketplace at the time of Christ. Indeed, it is well-known that there are many references to the resin from the tree (Myrrh) in both the Old and New Testaments of the Bible. The name Frankincense is a European title for the resin due to the fact that the resin or Myrrh, was brought back to Europe by Frankish Crusaders.

There is some confusion as to the separation of *Boswellia sacra* (Oman) from another species called *Boswellia carteri* (Yemen). However, for this research they are considered one and the same. *Boswellia serrata* is the Indian cousin of *Boswellia sacra* and has similar properties.

It is interesting to note that a great deal of the research into the medicinal attributes of *B. sacra* focus on the gum resin derived from the trunk of the tree as an exudate. Whilst this is understandable due to the long history of the trade in the resin, few research papers focus on extracts derived from the leaves, stem bark or roots of the tree.

In research conducted in 2013 a team sought to understand the antioxidant and anti-glycation actions of the resin. In this research it was shown that the extract derived from the tree resin showed significant antioxidant and anti-glycation attributes. Glycation is when a sugar molecule binds to a protein or lipid molecule and therefore becomes unstable. Glycation is believed to be a process that contributes to stroke and or heart issues, and therefore the anti-glycation aspects in this research show a valuable attribute of the extract in reducing these conditions.

Anti-inflammatory actions reported from the use of the resin have been supported in research conducted in 2013. The inflammation suppression actions of the extracts are thought to be involved in the reduction of the leukotriene process. As a result, the extract derived from the tree is useful in the management of inflammatory conditions such as bronchial asthma, rheumatoid arthritis and bowel inflammatory disorders such as irritable bowel syndrome.

The main thrust of a great deal of research into this tree has focused on the cancer prevention and cancer management claims. Research from 2005 to the present have found that the extract derived from the resin does show great promise in the management of various forms of cancer conditions, such as leukemia, colon cancer, melanoma and breast cancer. One of the active principles found within the extract is lupeol, a triterpenoid that has been studied for its anticancer benefits by many other research scientists. Other actions from lupeol are the anti-inflammatory actions as well as antimicrobial. Additional research has shown that within the resin as much as 30% of it may be made up of boswellic acid, another triterpenoid unique to *Boswellia sacra*. It is this acid as well as lupeol that are believed to be the most effective agents in tumour reductions and control. The essential oil is the most often used application method for breast cancers.

Frankincense (Myrrh) was used during the plague years in Europe to help control the spread of the disease. More research is required in this area. Claims that resin is also a liver tonic require more substantiation.

Bridelia micrantha by JMK from commons.wikimedia.org

Bridelia micrantha

Primary Functions:	Anti-ulcerative
Secondary Functions:	Antiplatelet (arterial circulation)
Common Names:	Mitzeeri, Coastal Golden-leaf, Mhlalamagwababa
Description:	It is a tall tree, up to 20 meters in height. The trunks are usually clear and straight holding up a dense cylindrical crown of green glossy oval leaves that average 15 cm long and 7 cm wide. Flowers are small and pale greenish to yellow in color. Micrantha means small and is attributed to the small size of the flowers. The fruits are small rounded black drupes.
Classification:	| Order: Malpighiales | Family: Phyllanthaceae | Genus: Bridelia
Origin:	Native to the tropical coastal forests of Southern Africa and found on the Indian ocean island of Reunion. The tree prefers wet forest regions and even swampy conditions. The range of the tree indicates that it has some tolerance to colder conditions and frost.
Soil Requirements:	Deep loam and poorly drained soils.
Timber Quality:	The sapwood is a yellowish white with the heartwood having a deep red color. The timber is heavy and can be approximately 700 kg per cubic meter when milled and dried. It is a general-purpose timber with multiple uses from flooring to furniture and building. The timber is durable and termite resistant.

Medical Overview:

Bridelia micrantha has been a staple herb for the Sangomas and healers of South-Eastern Africa for millennia. Many claims have been attributed its use however science has validated only a few of these claims.

Research has shown that the ethyl extract of its bark has a significant impact on the bacterium *Helicobacter pylori* when compared with the standard drugs metronidazole and amoxicillin. Therefore, it has proved to be a valuable management tool for gastric ulcers and cancers that result from long term infection by this bacterium. The researchers from 2011 compared the bark extract of the tree against the standard drug clarithromycin and found the stem bark extract comparable in effect if slightly less. The extract had almost the same effect on the bacteria as metronidazole and amoxicillin.

In keeping with the effects that the extract had on the *Helicobacter pylori* bacteria, the extract has also shown significant control over other bacteria. When research compared the bark extract against the standard drug ciprofloxacin it was verified that the extract showed significant antibiotic potentials against *Staphylococcus aureus* and little effect on other bacteria. As a result, the bark extract displayed very specific antibiotic activity against *Helicobacter* pylori and *Staphylococcus aureus* (2016).

Further research also showed the antioxidant potential of the stem bark, leaves and fruits to be greater than that of ascorbic acid (vitamin C) and therefore is significantly useful in medicinal applications. The research from 2016 confirmed that several of the compounds isolated from the extracts derived from the tree displayed significant antioxidant effect.

In 2016 once again, researchers studied the leaf extract from the tree for an insecticidal application. Their study did confirm that a simple water leaf extract was effective in controlling insects and reducing damage to crops. In keeping with this study other studies have been conducted on the antimalarial applications of its bark extract and it has been found that an ethanol extract made from its bark can be an effective drug in the management of malaria.

In the traditional lore of Africa, it is used to help women maintain health during pregnancy.

Further research has supported the use of the bark extract in the control of intestinal parasites such as tapeworms, roundworm as well as the malaria causing parasites such as *P. falciparum, P. malariae, P. ovale, P. vivax* and *P. knowlesi*.

Recent studies have shown the bark extract to aid in the management of HIV patients.

Caution should be applied as research has also shown that *Bridelia micrantha* has a toxicity that should be carefully monitored should it be prescribed. The administration of the extract from this tree is dose dependent. There is still some debate as to the level of toxicity of the tree as research carried out in 2006 found its extract to be relatively safe which has been contradicted by more recent research from 2009. As a result, the use of *Bridelia micrantha* should be avoided if a safer alternative is available.

Butea monosperma by Bishnu Sarangi from Pixabay

Butea monosperma

Primary Functions:	Central nervous system (CNS) support, Memory enhancement
Secondary Functions:	Male sexual dysfunction, Analgesic
Other Functions:	Anticancer, Hyperglycemia
Common Names:	Flame-of-the-Forest, Parrot tree, Palash, Chamatra, Plasu, Bastard teak
Description:	It is a medium-sized dry season, deciduous tree, growing to 15 meters tall. It is a slow growing tree. Young trees have a growth rate of a few feet per year. The leaves are pinnate, with an 8–16 cm petiole and three leaflets. The flowers are bright orange-red and produced in racemes up to 15 cm long. The fruit is a pod.
Classification:	| Order: Fabales | Family Fabaceae | Genus: Butea (4)
Origin:	It is native to the tropical and sub-tropical parts of the Indian subcontinent and Asia.
Soil Requirements:	Grows on wide variety of soils including shallow, gravelly sites, black cotton soil, clay loams, and even saline or waterlogged soils. Seedlings thrive best on a rich loamy soil.
Timber Quality:	Its timber is not considered durable in normal circumstances, however in its traditional use when submerged in water, it is very durable. Therefore, it is used in the construction of well walls and in other marine uses such as curb side structures.

Medical Overview:

Butea monosperma is a unique tree on many fronts. Its long use in traditional medicine of India has resulted in many claims being associated with the tree and it being woven into the Indian mythology. The tree is thought to be the representation of Ágnidev, the Indian God of fire. It was a punishment to be turned into a tree by the goddess Parvati for disturbing her and Lord Shiva's intimate privacy. Therefore, the timber from the tree is used to make the Sacred Fire in Hindu rituals. The flowers are used as devotee offerings to the goddess Kali instead of blood, and in offerings to Lord Shiva on occasion of Shivratri. On the celebration of Spring, the Festival of Colors, the dried flowers are powdered to make the bright orange Holi color. The tree is also a natural host to the Lac beetle.

Its flowers are used to make an orange dye, which is also insecticidal and supports the claims that the extract from the tree is anthelmintic (de-worming).

As with all medicinal plants and trees that have such pre-eminent profiles within traditional systems, many health claims have been attributed to this tree as well. However, many are not supported by science. Yet, the main use of the tree, the support of the central nervous system, has been well studied and validated.

In research conducted in 2012 it was shown that the leaf extract displayed significant positive effect on the CNS and at doses of 400 mg/kg increased brain functions and cognitive ability in test animals. As a result, the research showed that the extract was comparable to the standard drug donepezil in the treatment of Alzheimer's disease. Further research in 2015 sought to test beneficial effects and found that at doses of 300 mg/kg the stem extract showed significant reduction in convulsions and therefore is suitable to be used in the treatment of epilepsy and other degenerative conditions of the CNS that manifest in convulsive episodes.

The extract derived from the tree has also been shown effective in the management of neuropathic pain (pain associated with nerve degeneration or damage) such as sciatica, hyperalgesia (increased sensitivity to pain), hypoesthesia (numbness), dysesthesia (painful itchy or burning sensation) and allodynia (painful sensations from everyday actions such as washing your face or brushing hair).

Whilst the tree proved to be a unique source of support for all manner of CNS weakness it has also been claimed to be an aphrodisiac. Whilst the claim is misleading, in clinical research the bark extract has been shown to be beneficial in the treatment of erectile dysfunction and may be compared to the standard drug sildenafil. This research also showed that the bark extracts improved sperm viability and numbers. Therefore, the tree shows significant use for men suffering from erectile issues, yet in the Kerala state in India the Kani tribal women utilize the shoot apex as a contraceptive indicating more research is required in this area.

Research into the claims that its extract is effective in the management of diabetes also validated such claims. It was shown that at doses of 200 mg/kg for 14 days significantly lowered blood sugar levels and improved glucose tolerance. Within the same research in diabetes management the extract also reduced serum LDL cholesterol levels and well as improved HDL cholesterol levels.

Cancer management claims of the tree have also been supported in research into the oral administration of the aqueous (water) extract and therefore it has been shown that the tree may be useful as a chemo preventative agent.

Caesalpinia sappan by Forestowlet from commons.wikimedia.org

Caesalpinia sappan

Primary Functions:	Antioxidant
Secondary Functions:	Anticancer
Other Functions:	Hepatoprotective
Common Names:	Sappan wood, Indian Redwood, Sapang, Brazil wood, Patag
Description:	It is a small tree, 3 to 5 meters high, with scattered spines. Leaves are compound, leaflets are obliquely oblong to oblong-rhomboid. Flowers are yellow, on terminal panicles with densely wooly filaments. Fruit is a hard, indehiscent, shiny pod, with a hard recurved beak at the upper angle.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Caesalpinia
Origin:	It is native to Southeast Asia.
Soil Requirements:	It grows best on sandy riverbanks. It does not tolerate too wet soil conditions.
Timber Quality:	Its timber is used in tanning and dyeing of leather. The Asian market is mature and well developed in the trade of the wood chip.

Medical Overview:

Caesalpinia sappan has been used for centuries as a dyeing agent and tanning agent for cloth and leather. The heartwood of the tree is used to make a red dye called brazilin red or natural red 24 dye. This coloring agent is used not only for fashion but also for food and cosmetics. The roots have been reported to also create a dye however the color derived from the roots is a yellow.

The tree has also had a long history as a traditional medicine in its native range. One of these claims is that the extract from the tree is useful in the management of various cancers. This is supported from research conducted in 2011 which has shown the extract, especially derived from chloroform, has significant antioxidant actions and therefore can play a powerful role in health.

Further research has supported the claims that the extract is both kidney and liver protective and reduces damage to both organs from gentamycin induced poisoning. The research showed that the *Caesalpinia sappan* extract was as effective or better than the standard drug being silymarin in the treatment of liver damage. The doses used were between 100 mg/kg and 200 mg/kg body weight.

In the International Immunopharmacology magazine of 2015, a research paper was highlighted in its research into *Caesalpinia sappan* extract having beneficial outcomes in the treatment of bone loss associated with old age or disease. The active principle highlighted in this research was brazilin, the chemical responsible for the red coloring of the tree. At doses of 100 mg per kilo body weight there was a significant lessening of bone loss in femurs of laboratory animals.

Results in various research papers support the claims that the extract from the tree is a potent anti-inflammatory and show beneficial lowering of blood pressure by the relaxation of the endothelial cells of the arteries and veins. Associated research into the sections found that doses of bark extract at 500 mg/kg and up to 1000 mg/kg body weight were significant in the reduction of liver, breast and skin cancers. In research from India in 2011 it was shown that the reducing power of *Caesalpinia sappan* extract on one line of lung cancer (A-549) showed an 87% effectiveness.

Claims that the extract made from this tree has potential as an antibiotic and antibacterial agent have also been supported in research from 2012, however the results indicated that whilst the extract does possess mild antibacterial properties other more effective botanical sources should be used.

The use of the extract in the management of diabetes was supported in research from 1987. Therefore, more recent studies should be undertaken in order to validate this claim.

In toxicology, the extract derived from *Caesalpinia sappan* has been considered non-toxic up to doses of 2000 mg/kg body weight.

Calophyllum inophyllum by Bishnu Sarangi from Pixabay

Calophyllum inophyllum

Primary Functions:	Analgesic
Secondary Functions:	Antirheumatism
Other Functions:	Antibiotic, Anti-inflammatory
Common Names:	Tamanu, Pannay tree, Dilo, Kamani, Alexandrian Laurel, Sultanachampa, Surpunka, Undi, Nagachampa, Punnaga, Surangi
Description:	The tree has a broad spreading crown of glossy elliptical leaves. It can grow up to 20 meters in height. The flowers are pleasantly aromatic, and its nuts are large and round.
Classification:	| Order: Malpighiales | Family: Clusiacea | Genus: Calophyllum inophyllum
Origin:	The tree has spread throughout the coastal regions of India from East African zones and has further spread throughout the Asian and Pacific regions.
Soil Requirements:	It grows best in wet or moderate conditions with impeded drainage soil.
Timber Quality:	Wood is used for general cabinetry, construction and is termite resistant. Traditionally in the Pacific the timber is used to construct the keel of canoes.

Medical Overview:

The nut of the Tamanu or Dilo tree is used for making tamanu oil which contains unique compounds, two of which are calophyllic acid and lactone which medically have the same anti-inflammatory and antibiotic properties. Tamanu oil is a widely used as a traditional topical aid. The oil demonstrates pain relieving properties. The anti-inflammatory activity of oil is due to the presence of 4-phenylcoumarincalophyllolide and a group of xanthones, which explains the reductions of rashes, sores, swelling and abrasions with its application. The oil contains several defensive compounds against human and animal pathogens which are friedelin, canophyllol, canophyllic acid and inophynone.

Recent testing of the antibacterial potential of *Calophyllum inophyllum* indicates that the tree and its derivatives display broad antibiotic activity. One assay compared the antibiotic actions against the well-known antibiotic ciprofloxacin. It was reported that the bacteria *Bacillus licheniformis* had the greatest sensitivity to *Calophyllum inophyllum* of a zone of inhibition of 10.5 mm compared to ciprofloxacin of 11.5 mm. *Calophyllum inophyllum* also had these results against the following other bacteria: *Bacillus subtilis* 11 mm, *Proteus vulgaris* 9.5 mm, *Pseudomonas aeruginosa* 11.5 mm, *Shigella flexneri* 9.5 mm, *S.boydii* 9 mm, *Escherichia coli* 11 mm, *Staphylococcus aureus* 11 mm, *Staphylococcus epidermidis* 11 mm, *Salmonella typhi* 9.5 mm, *Vibrio cholerae* 10 mm, and *Klebsiella pneumoniae* 10.5 mm. It is interesting to note that many of the above-mentioned bacteria are developing resistance to ciprofloxacin. As a result, trees such as *Calophyllum inophyllum* represent novel approaches to disease management.

In research conducted in 2010 it was found that a dose of greater than 200 mg/kg protected laboratory mice from pain induced stimulus, with results slightly lower than morphine sulphate. Whereas the tree's methanol bark extract had a dose of 100 mg/kg and 200 mg/kg had reactions of 11.1 and 12.8 after two hours in comparison to morphine sulphate of a 5 mg/kg dose showing 13.9 after the same time frame. Therefore, whilst its extract had a slightly lower result, it displayed significant potential in pain management. As a result, *Calophyllum inophyllum* represents a unique arthritis treatment as it aids in reduction of the inflammation as well as the reduction of pain associated with these conditions.

The oil from the Dilo nut has long been used to treat skin infections as well as pain management for rheumatism and arthritis. Furthermore, the oil has significant anti-inflammatory effects and would be useful in blunt trauma such as sprain, bruising and fractures.

The tree has displayed potent antifungal actions and has been widely research as an antiviral. Continuing research as an HIV management adjunct is ongoing.

In acute toxicity tests it was found that extracts from the leaves, bark, seed and flower were safe up to doses equal to 2000 mg/kg per kilo body weight.

Camellia sinensis by Amada44 from commons.wikimedia.org

Camellia sinensis

Primary Functions:	Antioxidant
Secondary Functions:	Antibacterial
Other Functions:	Anti-inflammatory
Common Names:	Green Tea, Black Tea, Chai tree
Description:	It is an evergreen shrub or tree and can grow to heights of 30 feet but is usually pruned to 2-5 feet for cultivation. The leaves are dark green, alternate and oval, with serrated edges, and the blossoms are white, fragrant, and appear in clusters or singly.
Classification:	| Order: Theales | Family: Theaceae | Genus: Camellia
Origin:	China and Southeast Asia.
Soil Requirements:	The tree likes well-drained and sandy soil that are mildly acidic. Most tea plantations are situated on sloping lands allowing for the water to drain through the soil and away from the roots of the tree.
Timber Quality:	The tree may reach a size and girth that would allow commercial timber to be milled. The predominant use for the tree is for its leaves and not its timber. Yet the timber is used in carvings and other decorative products due to its hard and fine-grained characteristics. The timber is pale to honey gold as it ages. The timber is durable and is used in Japan to make the wooden training swords used in kendo.

Medical Overview:

Tea is one of the most widely consumed beverages in the world, second only to water, and its medicinally properties have been widely explored. The *Camellia sinensis* tree is the source of black, oolong and green tea. In fact, all tea is derived from *Camellia sinensis* and its varietals such as *Camellia assamicus*. White tea is made from the very young leaves of the tree whilst the Japanese tea Kikucha is made solely from the twigs and branches. The use of the term tea originated from the Tang dynasty in China and is specifically for the herbal beverage derived from *Camellia sinensis*. Therefore, the use of the term for other hot beverages, such as herbal teas, is incorrect. The more correct labelling for herbal hot beverages is either tisanes or infusions.

Green tea is known mainly as a stimulant and refreshing drink. *Camellia sinensis* has been traditionally useful in treating inflammation, asthma and heart diseases, lowering blood sugar and fighting cancer. It is also useful in wound, ulcer, cough, bronchitis, and burning sensation. The traditional preparation as an infusion contains the broad spectrum of active ingredients present in the native plants. They are polyphenols, methylxanthines, flavanols, and amino acids. The polyphenols are potent free radical scavenging due to the hydroxyl groups in their chemical structure.

A previous study results showed that its shoot contained significantly higher total phenolic content, followed by the young and matured leaves ($p<0.005$). The same trend was also observed for antioxidant activity as assessed using FRAP (ferric reducing/antioxidant power), DPH (2,2-diphenyl-1-1-picrylhydraxyl) free radical scavenging assay. As for black tea, the highest total phenolic and total flavonoid content were observed in the shoot, followed by the young and old leaves. The same trend of antioxidant activity with green tea was also observed in black tea extracts. In addition, black tea compost showed comparable high total phenolic and flavonoid content as well as antioxidant activities as assessed using different antioxidant assays.

The methanolic extract of *C.sinensis* showed the presence of antimicrobial activity against *Bacillus subtilis* and *Enterococcus sp*. It reveals the highest zone of inhibition around the bacterial colonies when compared with standard antibiotics. The synergistic antimicrobial activity of tea and antibiotics against entero-pathogens are effective. The combined use of tea and antibiotics could be useful in fighting emerging drug-resistant problems especially among entero-pathogens. *C.sinensis* has been reported to have physiological and pharmacological effects, strengthening capillary, slows down catabolism of catecholamine, and exert anti-inflammatory effect. Further research into the cyto-toxicity has found the ethyl-alcohol based extract of the leaves had the highest effect in retarding and reducing tumours and cancerous growths.

Cananga odorata by Ronggy from commons.wikimedia.org

Cananga odorata

Primary Functions:	Analgesic
Secondary Functions:	Circulatory, Renal system (kidneys) support
Other Functions:	Anti-anxiety
Common Names:	Ylang-Ylang, Makosoi Ylang-ylang, Cananga, Perfume tree, Sepalen, Kenanga, Chenanga, KenangautanIlang-ilang, Alangilang, Kadatngan, Kadapgnam, Sagasein Chhkè srèng, Kradangnga-thai, Kradangnga-songkhla, Sabannga-ton, Ngọc lan tây, Hoàng lan
Description:	It is a fast-growing tree of the custard apple family Annonaceae. Its growth exceeds 5 m per year and attains an average height of 12 m in an ideal climate. The evergreen leaves are smooth and glossy, oval, pointed and with wavy margins. The flower is drooping, long-stalked, with six narrow, greenish-yellow (rarely pink) petals, rather like a sea star in appearance.
Classification	| Order: Magnoliales | Family: Annonaceae | Genus: Cananga
Origin:	It is native to the Malaysian archipelago.
Soil Requirements:	It grows in full or partial sun and prefers the acidic soils of its native rainforest habitat.
Timber Quality:	The timber of the tree is considered non-durable and is of low value. However, it has been used in making boxes as well as matches.

Medical Overview

One of the traditional uses of *Cananga odorata* related specifically to its perfumed flowers that have been worn in the hair of the Javanese and Malay people for centuries. It was the unique smell of the flower that prompted the global market in oil extracted from the flower known as ylang-ylang or cananga oil. The first commercial plantations for the production of Ylang-ylang were in the Philippines. However today the main producer of the oil is Indonesia. A common use for the flowers is for them to be infused in coconut oil, which is then marketed as a hair oil known as Macassar.

The main chemical ingredient found in extracts and oils from *Cananga odorata* is linalool which is responsible for the primary smell or scent of the flowers. Yet, linalool is also used commercially as an insecticide. Hence the claims that the tree is useful in the management of malaria is supported. Geraniol is also found in the oil of the flower, however in much smaller amounts when compared with linalool. Additionally, germacrene has been found in high levels in *Cananga odorata*. These chemicals are developed by plants as defenses against insect attack. Further supporting the claims that the oil and extract from the tree are insecticidal.

Many claims have been associated with *Cananga odorata*, yet one of the most interesting is the research from Indonesia carried out in 2017. It showed the significant improvement in kidney structure and arterial integrity that resulted from an extract made from the flowers of the tree. As a result, this research has shown that the extract may play a vital role in reversing kidney damage as well as reduction in cardiovascular disease. The active principle that this research potentially identified as being responsible for such actions is cinnamaldehyde, which has been shown to aid the body in the reduction of fat deposits. Yet other research conducted in 2007 found high levels of sitosterol in the leaf extract which is a precursor for the anabolic steroid boldenone that has various actions on the body and its organs, but more specifically in stimulating the kidneys to release another hormone that stimulates red blood cell production. The presence of this sterol may also explain the restorative actions of the extract on the circulatory system and renal system.

Research conducted in India in 2015 focused on the claims that extracts from the tree are effective in the reduction and management of pain. From this research, and other associated research, it was found that the alcoholic extract derived from the dried fruit from the tree and equivalent to 400 mg/kg was comparable or better than aspirin in the reduction of pain.

Caryophyllene is also found in sufficient levels in the tree to have a therapeutic effect. This compound has been shown to have antidepressant and anti-anxiety actions. This chemical is also found in large doses in cannabis and is thought responsible for some of the actions associated with THC (tetrahydrocannabinol). Therefore, claims of the ability of *Cananga odorata* to relieve anxiety can be supported.

It has been shown that *Cananga odorata* is non-toxic up to 2000 mg/kg body weight dose.

Carapa guianensis by Forest & Kim Starr from commons.wikimedia.org

Carapa guianensis

Primary Functions:	Anti-allergic
Secondary Functions:	Anti-inflammatory
Other Functions:	Antimalarial
Common Names:	Andiroba, Brazilian mahogany, Crabwood, Bastard mahogany, Krappa, Tangare
Description:	It is a tall rain forest tree that grows up to 40 meters high. It is in the same family as Mahogany. The tree produces a brown, woody, four-cornered nut, some 3-4 inches across that resembles a chestnut. The nut contains several oil-rich kernels or seeds that average about 63% oil, which is pale yellow in colour.
Classification:	| Order: Sapindales | Family: Meliaceae | Genus: Carapa
Origin:	The tree grows in the Amazon region, Central America and the Caribbean.
Soil Requirements:	It can be found growing wild throughout the Amazon rain forest, usually on rich soils, in swamps, and in the alluvial flats, marshes, and uplands.
Timber Quality:	The timber is well thought of as a replacement for Mahogany, however, does not have the quality of Mahogany. It is used in furniture, construction and flooring. Due to over harvesting the tree is being threatened.

Medical Overview:

Carapa guianensis, also known as the Andiroba tree, has a long history of use in the Amazon region. The oil from the tree nuts were reportedly used to preserve the mummified human heads taken by the Munduruku Indians of the region. This simple fact alone indicates the oil to be beneficial in preservation and also insect retardant. Today the oil of the Andiroba tree has well-established markets in South and Northern America.

Research has shown that the oil as well as the leaf and bark extract of the tree are rich in limonoids which support the use of the tree as an insecticide. The presence of melacins and specifically gedunin has further supported the use of Andiroba oil as an antimalarial product as well as being insecticidal. As a result, the traditional use of the tree in the treatment of malarial and other parasitic infections is supported.

Further research has supported the use of its oil as an anti-inflammatory topical agent. Yet, the oil also displays anti-allergenic properties and therefore may be used to reduce the onset of allergic reactions. However, this action has been found to be due to the reduction of T-lymphocyte response and as such the oil may be less effective than other trees in wound healing. The research also postulates that the use of Andiroba oil may result in scar tissue as the oil may slow down and impede wound healing. This paradox whereby the oil is recommended for wound healing, may involve the anti-inflammatory aspect where the wound does not become inflamed, yet heals more slowly. The analgesic claims of the oil are also confused with the anti-inflammatory action whereby T-lymphocyte and histamine response is lessened and therefore pain is thought to be reduced.

Cassia fistula by Rattakarn from Pixabay

Cassia fistula

Primary Functions:	Antibacterial, Liver tonic
Secondary Functions:	Antidiarrhea
Other Functions:	Antifungal
Common Names:	Golden shower, Purgingcassia, Indian laburnum, Golden shower cassia, Pudding-Pipe tree, Kakke, Baton casse, Casse doux, Casse espagnole, Girmala, Saraphala, Canafistula mansa, Tengguli, Amultash, Sondal, Sonali
Description:	It is a medium-sized tree, growing to 10–20 m tall with fast growth. The leaves are deciduous, long, and pinnate with three to eight pairs of leaflets, each leaflet 7–21 cm long. The flowers are produced in pendulous with five yellow petals of equal size and shape. The fruit is a legume broad, with a pungent odour and containing several seeds.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Cassia
Origin:	The species is native to the Indian and the immediately Eastern Asian countries such as Bangladesh, Burma, Thailand and Cambodia. In recent years it has been planted across the globe and in regions outside its normal ecosystem.
Soil Requirements:	It will grow well in dry climates. Growth for this tree is best in full sun on well-drained soil; it is relatively drought-tolerant and slightly salt-tolerant.
Timber Quality:	As with many of the Cassia genus the timber of *Cassia fistula* is hard and heavy with a weight per cubic meter of timber of 800 kg. The timber is used for cabinetry, inlays, flooring and tool handles.

Medical Overview:

Cassia fistula is the state flower of Kerala in India as well as the national flower of Thailand. The bold yellow of the flower represents Thai royalty. These points give some indication of both the beauty of the tree as well as its importance in traditional medicine.

It has long been utilized in traditional health systems in all of Asia but is currently planted in many nations for its beauty. As a result, people around the world can make use of its health benefits. Indeed, in Ayurvedic medicine of India its name is Aragvadha which translates as disease killer. Yet the tree has only a few major Functions.

Cassia fistula has been shown to have strong antibacterial actions, however the ethanol/methanol extract is very precise in which bacteria it targets. These are *Salmonella* and *Staphylococcus*. In one research paper the extract from the seeds had a zone of inhibition of greater than 52 mm. Yet, it is *Staphylococcus* that is most sensitive to the extract and requires only a small dose to be affected. Therefore, the claims that *Cassia fistula* is used for wound healing are supported. Further, the significant effect the extract has on *Salmonella* makes the tree uniquely useful in treating gastro-intestinal issues such as dysentery and also in the treatment of typhoid. Whilst the extract from the seeds and flowers displayed antibacterial action against a range of pathogens it should only be considered for these specific diseases.

It is interesting to note that the water or aqueous extract from the tree displayed no antibacterial properties. Therefore, only the extract made with solvents should be used.

In the same studies the extract was also found to be highly effective in the controlling of *Candida albicans* yeast infections with a zone of inhibition of greater than 15 mm.

Other studies have focused on the beneficial effects that the ethanol extract displays in controlling blood sugar levels and insulin levels in diabetic rats. Doses of greater than 250 mg/kg aided in normalizing the rats sugar levels and as such has supported the use of *Cassia fistula* in diabetic management.

The extract from the leaves and bark have also been shown to have liver protecting properties similar to silymarin, a common drug used to protect this organ.

Castanea sativa by Peggy Choucair from Pixabay

Castanea sativa

Primary Functions:	Antioxidant
Secondary Functions:	Cardiac tonic, Liver tonic
Other Functions:	Antiviral, Antidiabetic
Common Names:	Sweet chestnut, Chestnut, Portuguese chestnut, Spanish chestnut
Description:	The tree attains a height of 20-35 meters with a trunk often 2 meters in diameter. The bark often has a net-shaped (retiform) pattern with deep furrows or fissures running spirally in both directions up the trunk. The trunk is mostly straight with branching starting at low heights. The oblong lanceolate, boldly toothed leaves are 16-28 cm long and 5-9 cm wide. The flowers are borne in 10-20 cm long, upright catkins, the male flowers in the upper part and female flowers in the lower part, the female flowers develop into spiny cupules containing 3-7 brownish nuts. The female flowers eventually form a spiky sheath that deters predators from the seed. Some cultivars only produce one large seed per cupule, while others produce up to three seeds. The nut itself is composed of two skins: an external, shiny brown part, and an internal skin adhering to the fruit. Inside, there is an edible, creamy-white part developed from the cotyledon.
Classification:	| Order: Fagales | Family: Fagaceae| Genus: Castanea
Origin:	All regions of Europe.
Soil Requirements:	Limestone free, deeply weathered soil.
Timber Quality:	The wood is of light colour, hard and strong. It is used to make furniture, barrels, and roof beams notably in southern Europe. The timber has a density of 560 kg per cubic meter and due to its durability in ground contact is often used for external purposes such as fencing.

Medical Overview:

There are contradicting claims about the lifespan of *Castanea sativa*. Some researchers state the tree may live up to 600 years and others claim the tree may live for thousands of years as is the case of the Hundred Horse Chestnut a tree in Sicily that is believed to be over 2,000 years old.

Of all the compounds isolated from all the chestnut extracts, phenolic compounds such as flavonoids and tannins were the most abundant. There are also several flavonoids such as castalin, castalagin, vescalagin, kurigalin, 5-O-galloylhamamelase, (3, 5 dimethoxy-4-hydroxyphenol)-1-0–β–D-(6-O-galloyl) glucose, chestanin and acutissimin. The tree also contained the presence of rutin, hesperidin, quercetin, apigenin, morin, naringin, galangin and kaempferol. Regarding tannins, both hydrolysable and condensed tannins were found.

In 2009, researchers sought to verify the antiviral claims made about the tree. In this research it was found that the timber extract was antiviral in the extracellular spaces. The viruses tested were the avian reovirus and the avian metapneumovirus. The compounds thought to be responsible for this antiviral action were the tannins found in the timber.

Traditionally a tisane is made from the flowers and is believed to be a cure all for many conditions. A study done in 2014 in Spain found that the simple decoction made from the flowers displayed strong antioxidant properties. Other studies further confirmed the strong antioxidant actions not just from the flowers but also from the leaves. It is thought that this antioxidant potential of *Castanea sativa* is also responsible for the extracts of the tree to improve the integrity of the pancreas and therefore be beneficial in the management of diabetes.

The antibacterial properties of the tree have also been supported as well as the antifungal actions. However, it was shown in research from Italy in 2000 that *E. coli* and *K. pneumoniae* were the least effected.

The topical application of *Castanea sativa* extract on the skin has been shown to be protective against UV damage. Cancer research and *Castanea sativa* have found it to be beneficial in the control of leukemia, colon and liver cancer cell lines in laboratory testing.

Castanospermum austral by John Robert McPherson from commons.wikimedia.org

Castanospermum australe

Primary Functions:	Anti-inflammatory
Secondary Functions:	Analgesic
Other Functions:	Antiviral
Common Names:	Black bean, Morton Bay chestnut, Australian Bay chestnut, Bean tree
Description:	It is a large evergreen tree growing to 40 metres tall, though commonly much smaller. The leaves are broad, pinnate, with 11-15 leaflets. The flowers are bi-coloured red and yellow. The fruit is a-cylindrical, the interior divided by a spongy substance in to one to five cells, each of which contains a large chestnut-like seed.
Classification:	| Order: Fabales | Family: Papilionaceous | Genus: Castanospermum
Origin:	It is native to the east coast of Australia in Queensland and New South Wales, and to the Pacific islands.
Soil Requirements:	It grows in moist, fertile, well-drained soils on terraces on the side of mountains or along the banks of rivers and streams.
Timber Quality:	The timber has colours that range from olive greens to browns and is sought after for fine furniture and joinery. The wood is very durable and resists termites and molds. As a result, the market for the timber is well established and lucrative.

Medical Overview:

C. australe is a unique example of a tree or herb which displays the need for exact information. Whilst the majority of the tree is considered non-toxic and useful in many health conditions, the seeds are considered to be highly toxic. Therefore, the need to educate health practitioners from all disciplines is critical.

The timber from this tree was shown to be a highly effective insulator for electrical works. The ability of the timber to restrict electric current was considered to be 100 times that of any other timber and as such it has been used in many switch boards and other electrical fittings.

The tree has been shown to possess several unique chemical compounds. These are castanospermine, and australine. Castanospermine has been well studied and several research papers (1989) found that this compound restricted the AIDS virus from replicating in vivo. Therefore, it showed great promise as an antiviral drug. It has been reported that castanospermine has shown effect in controlling all four variations of dengue fever in vivo.

Much of the research carried out on this tree occurred in the late 20th century and as such is difficult to cite from the internet. Of interest is that most of the research was carried out outside Australia, the natural range or origin of the tree.

Other compounds derived from the ethanol leaf extract were stigmasterol, lupeol, amyrin, castanogenin, medicagenic acid and bayogenin.

Claims of the insecticidal potential of the leaf extract, have been substantiated in research from 2012 and back to 1985. The resulting findings from this research indicate that the ethanol extract as well as the potential oil from the seeds shows great promise in pest control in the agricultural sector. This research also supports the claims in the use of the extract from this tree to control and eradicate internal parasites in mammals.

One of the main uses of the leaf and bark extract from the tree has been in the management of pain and inflammation. Research has been ongoing into the use of the tree and its compounds in this area. Research from 2014 represents the most recent resource here, and it fully supports the claims that the leaf extract exhibits significant analgesic (pain reducing) and anti-inflammatory actions, which are comparable to the standard drugs aspirin and pentazocine. As a result, the use of the ethanol extract to manage osteo-arthritis is well founded as well as its use in other painful injuries and diseases.

Other research sought to verify the antibacterial claims associated with the leaf extract from the tree. This research did indeed find the tree possessed mild antibacterial properties however not at sufficient levels to warrant further research into this area.

Ceiba pentandra by LoggaWiggler from Pixabay

Ceiba pentandra

Primary Functions:	Anti-ulcer
Secondary Functions:	Antidysentery
Other Functions:	Anti-inflammatory
Common Names:	Kapok, Java cotton, Java kapok, Ceiba, Silk cotton tree
Description:	It is a tree that grows to 60-70 meters tall and has very substantial trunk up to 3 meters in diameter with large buttress. The trunk does not have spikes as *Bombax ceiba* has. The differentiating aspects of the trees is *Bombax ceiba* has red flowers whilst *Ceiba pentandra* has white. *B. ceiba* is smaller than *C. pentandra*.
Classification:	| Order: Malvales | Family: Malvaceae | Genus: Ceiba
Origin:	It is native to Mexico, Central America, Caribbean, and Northern South America and also tropical West Africa. Some reports allocate its origins to Southeast Asia also thereby making it difficult to be specific on this point.
Soil Requirements:	It widely grows in the tropical rain forest.
Timber Quality:	The timber is light and not structurally suitable. It is most often used for boxing, and indoor cabinetry.

Medical Overview:

Ceiba pentandra is a unique tree originating from South America. Its story and history have become entwined with that of *Bombax Ceiba*, which is a southeast Asian tree with similar properties such as producing cotton like fibers which can be used in the production of various soft furnishings. Both trees have many indigenous and scientific names or synonyms. *Bombax ceiba* is known by at least 12 scientific synonyms whilst *Ceiba pentandra* is known by at least 39 other scientific names. Hence a significant amount of confusion surrounds these two trees.

Whilst the origins of *Ceiba pentandra* are confusing, reports state that the tree was used by the ancient Mayans and is woven into their mythology, therefore it is probable that the tree has its origins in South America. Reference to the folklore in Trinidad and Tobago that a carpenter made seven rooms in a Kapok tree and trapped the devil inside.

One of the main uses of *Ceiba pentandra* that has been supported by scientific research is the ability of the stem bark extract to aid in the control of gastric ulcers. In doses of 400 mg/kg body weight the ethanol extract had similar or better results when compared to the standard drug ranitidine or zantac. This research also showed that the bark extract was as effective as another standard drug omeprazole which is used not only in the control and management of peptic ulcers but also gastric reflux and Zollinger–Ellison syndrome (one or more tumours in the pancreas or upper gastro-intestinal track cause the stomach to produce too much acid). Therefore, *Ceiba pentandra* shows a significant role in the management of gastrointestinal acidification and resulting pain conditions.

Research carried out in 2012 on the antibacterial ability of both the bark and the leaf extract showed positive results in the in vitro tests. This research may further explain the ability of the bark extract to have such significant influence on gastric ulceration, as such extract may control the effects of *Helicobacter pylori*, which is the bacteria that is responsible for many such ulcerative conditions. The bark and leaf extract showed similar antibacterial effect. Therefore, the ability of the tree to aid in the control of dysentery is also supported in this research as the extracts reduced the growth of bacteria responsible for such conditions such as *E. coli*. However, the extracts were not as effective as the control which was the standard drug chloramphenicol.

Ceiba pentandra, research from 2009 sought to test the claims that the stembark extract was also useful in the control of dysentery. However, this research focused on mechanical influences on bowel function such as castor oil and not bacterial causes. In this research it was shown that the dose of 1000 mg/kg body weight had the same protective result as that of the standard drug loperamide which is sold under the brand name Imodium. This research may be interpreted to show the anti-inflammatory actions of the bark extract.

It has been shown that the use of this tree is non-toxic up to doses of 5000 mg per kilo of body weight.

Cinnamomum tamala by Jee & Rani Nature Photography from commons.wikimedia.org

Cinnamomum tamala

Primary Functions:	Antibacterial
Secondary Functions:	Antifungal
Other Functions:	Hypoglycemic
Common Names:	Indian bay leaf, Indian cassia, Tejpatta, Tejpat, Tamala cassia
Description:	The tree is a medium evergreen tree growing to an average height of eight meters. The leaves are lanceolate and opposite. The flowers are small and white with the cinnamon odour. The fruits are clustered and small. The bark is smooth.
Classification:	| Order: Laurales | Family: Lauraceae | Genus: Cinnamomum (+/- 250 species)
Origin:	The plant is native to India, Bangladesh, Nepal, Bhutan, China.
Soil Requirements:	Cinnamon trees have propagated easily once introduced into new regions, therefore the tree easily adapts to differing soils and regions. In some locations it is considered a pest or invasive species.
Timber Quality:	The timber of the tree is dense, durable and resistant to insect attack. Naturally, the valuable bark is a commodity in its own right however the timber of the tree is also highly prized.

Medical Overview:

The Cinnamon family of trees have a long and respected history of use as both a medicinal plant as well as used in food preparation as a valuable spice. The Romans prized the leaves and bark of the Cinnamon tree, and writings from around 400 BC praise the leaves from Ceylon (*Cinnamomum verum*). The *Cinnamomum tamala* member of the family is considered in high regard as well and originates from the Himalayas. The trade name historically for Cinnamon leaves was malabathrum and this commodity was traded from Asia through Arabia and then to Europe. It was highly likely that the leaves from other members of the genus were sold under the name malabathrum as well.

The leaf extract of *Cinnamomum tamala* has been supported in the claim that it is an excellent antioxidant and just falls short of the standard drug being ascorbic acid.

Yet the significant property of the tree is the use of the essential oil derived from the leaves as an antibiotic agent. In research carried out in 2010 it was shown that the essential oil was more effective than the control drug vancomycin in killing *Streptococcus pneumoniae* and *Staphylococcus aureus* bacteria, which are both developing resistance to the current antibiotics used in hospitals around the world. Additionally, the oil was also effective against *Escherichia coli*, *Pseudomonas aeruginosa* and *Proteus vulgaris*. Further research sought to ascertain the effectiveness of a butanol extract from the leaves, yet the results of this research was not as effective as the essential oil.

Additional research has also supported the oil as a potent antifungal treatment and is effective in the control of dermatitis fungal infections.

Claims that *Cinnamomum tamala* can be used to ease inflammation has been supported by research, however the main attribute of *Cinnamomum tamala* is its antibacterial and antifungal properties.

Clusia Rosea by Forestowlet from commons.wikimedia.org

Clusia rosea

Primary Functions:	Anticancer
Secondary Functions:	Anti-estrogenic
Other Functions:	Antiviral
Common Names:	Kirah, Autograph tree, Copey, Balsam apple, Pitch-apple, Scotch attorney
Description:	The tree can reach heights of 20 meters. Its smooth green leaves are 10 by 15 cm and arranged opposite each other. Scarring on the leaves remains persistent long after damage (or writing, hence the common name). The pinkish flowers are short-lived and have approximately 6-8 petals. The numerous seed capsules split open to reveal its many red seeds. As a hemi-epiphyte, it can grow as an epiphyte (a plant that can grow perched in another plant or structure sending its roots towards the ground) or from the ground upward.
Classification:	| Order: Malpighiales | Family: Clusiaceae | Genus: Clusia
Origin:	It is native to South America and Mexico to southern Brazil and Bolivia.
Soil Requirements:	Can grow on a wide variety of soils.
Timber Quality:	The heartwood is reddish-brown; not clearly demarcated from the lighter colored sapwood. Texture is medium to fine; grain is straight; luster medium; without growth rings. No discernible taste or aroma in seasoned wood. The wood is hard, heavy, strong, and very susceptible to attack by dry wood termites. The wood is used mainly for fence posts, rural construction, and crossties. It is suitable also for light and heavy construction, cheap furniture, farm implement parts, and tool handles.

Medical Overview:

Clusia rosea has been labelled an invasive plant due to the widespread planting and growing of the tree as an ornamental, however, locked within the tree is a potentially invaluable resource for cancer treatment. One of the major compounds found within the tree is nemorosone which has been widely studied for its anticancer actions, cancer cell lines and attributes.

One of the more exciting research papers sought to ascertain the effectiveness of nemorosone on pancreatic cancer which is traditional thought of as one of the critical cancers affecting patients. In this study from 2013 it was found that at doses of 50 mg/kg body weight per day had a significant effect in inhibiting pancreatic tumors with no side effects.

Further research has found that *Clusia rosea*, specifically its floral resins, show significant estrogen blocking potentials. As a result, the research into the effective use of the floral resins in treating breast cancer from 2011 resulted in a positive conclusion. This and other aspects of the nemorosone and associated compounds found within the Clusia family make them uniquely suited to aid in cancer management. The primary action of the extract of *Clusia rosea* is that nemorosone is anti-estrogenic, which is crucial in the management of breast cancer. Yet its extract has shown positive results in other cancer cell lines as well.

Additional research sought to verify the claim that the tree has potent antimicrobial and antibacterial properties. Unfortunately, in this research from a combined effort from Antwerp and Cuba in 2010 showed that nemorosone had mild antibacterial and mild antimicrobial properties except for its actions against the malarial parasite *Plasmodium falciparum*. It found that nemorosone had slightly less actions than the standard drug chloroquine. In this research nemorosone was also studied for its antifungal attributes which were found to be weak and other trees are more effective in these areas.

Research (Germany 2010) into the propolis, a sticky compound made by bees to build hives, found two compounds of interest; 7-epi-nemorosone and plukenetione. It showed that the compounds have profound antiretroviral actions and that they act in different but complimentary manners to each other, therefore are more effective together than singularly. The compound plukenetione is found in significant levels in the relative of *Clusia rosea* named *Clusia plutenetii*, hence the compound is named after the plant source.

More research has focused on the propolis from beehives. One major ingredient required in the bee's ability to make propolis is flower resins. Therefore, in South America, especially in Cuba, it was found that the propolis in hives where *Clusia* species are found, is both antiviral and anticancer in nature. As a result, the demand for Cuban propolis is significant. Another aspect of the anti-estrogenic nature of its extract is to help treat male infertility due to low testosterone and high estrogen levels. The female menstrual cycle requires a peak in estrogen to release a new egg, therefore its use may cause the opposite to men and retard conception.

Cochlospermum religiosum by PEAK99 from commons.wikimedia.org

Cochlospermum religiosum

Primary Functions:	Anticancer
Secondary Functions:	Hepatoprotective
Other Functions:	Antioxidant, Laxative
Common Names:	Silk wool, Yellow silk cotton, Buttercup tree, Torchwood tree
Description:	The tree is a small deciduous tree that grows up to 7.5 meters. The flowers are multi petal and a distinctive bright yellow in colour. The fruit is oval and filled with a fine cotton like fiber that protects the seeds.
Classification:	| Order: Malvales | Family: Bixaceae |Genus: Cochlospermum
Origin:	It is found in the tropical regions of Southeast Asia and the Indian Subcontinent.
Soil Requirements:	It grows on a wide range of soils however prefers dry arid soils.
Timber Quality:	No information found on the timber from this tree.

Medical Overview:

Cochlospermum religiosum is so named as it is used as a temple offering throughout southeast Asia. The tree has been extensively used in Ayurvedic medicines and south Asian traditional medical systems such as Unani. In Theravada Buddhism, this plant is said to have been used as the tree for the achievement of enlightenment, or Bodhi by nineteenth Lord Buddha called Siddhartha. As with other plants and trees used historically in traditional medicine there are many claims on the therapeutic powers of this tree, however many of these claims are not supported by scientific research.

A long-used property of the tree is the exudate gum called gum Katira from which a heteropolysaccharide isolated from the gum of *Cochlospermum religiosum* was found to consist of D-galactose, D-galacturonic acid and L-rhamnose. The gum is often compared to and confused with the gum from another species of bush known as *Astragulus tragacantha*. The gum from *Cochlospermum religiosa* is used in the pharmaceutical industry as well as calico production and treating leather.

One such health claim that is endorsed, is the use of the gum Katira or resin from the tree to treat constipation as it works as a laxative. Katira is also becoming widely used in the pharmaceutical and food industry as an emulsifier to make gels and pastes. It is considered superior to the more common gelling agent made from the plants of the genus *Astragulus* called tragacantha. Katira is a mildly orange resin that exudes from the bark of the tree and is used in various applications from cigar making to ice-cream.

Research in 2016 into the active principles of *Cochlospermum religiosum* found a good source of the compound myricetin This flavanol has been well researched and has been found to have significant antioxidant properties as well as anticancer actions. Myricetin has greater free radical activity than other flavonoids and it will scavenge oxygen radicals. It also inhibits lipid peroxidation. Myricetin is increasingly used for its potential analgesic effects in mostly inflammatory and acute pain states and has antineoplastic and anti-inflammatory effects.

Further research from 2017 supported the use of the ethanol extract derived from the leaves of the tree as an antibacterial. It had slightly less potency than the standard antibiotic streptomycin in controlling various pathogens. The bacteria tested in this research were *Bacillus cereus*; *Bacillus subtilis*; *Pseudomonas aeruginosa*; *Staphylococcus aureus*; and *Escherichia coli*. Therefore, this research has supported the traditional use of the tree in cases of gastrointestinal problems. Within this research paper the leaf extract was also found to be a strong antioxidant.

Cochlospermum religiosum root has been shown to be hepatoprotective (liver) and it has also been shown that the stem bark and leave extract displayed positive results in the protection of liver tissue from various in vitro models. As a result, its extract has been supported via this research in the treatment of hepatitis and jaundice.

Other uses of the tree involve the collection of the fine cotton like fibers found in the fruit encasing the seeds for stuffing pillows and mattresses, however it is considered inferior to the fibers sourced from Kapok.

Commiphora wightii by Geethaka99 from commons.wikimedia.org

Commiphora wightii

Primary Functions:	Thyroid, Depression
Secondary Functions:	Cardiac tonic
Other Functions:	Female fertility
Common Names:	Commiphora Mukul, Indian bdellium-tree, Gugal, Guggul, Gugul, Mukul, Myrrh tree
Description:	The tree has a maximum growth height of approximately 4 meters and has thin papery bark. The leaves are almost simple as well as trifoliate. Some trees can be bisexual in reproduction whilst others simply female. The flowers are a pink or white.
Classification:	| Order: Sapindales | Family: Burseraceae | Genus: Commiphora
Origin:	The tree is found in northern Africa and India
Soil Requirements:	As with many of this species it is found on rocky arid areas with poor soils.
Timber Quality:	Members of this genus have been used for their timbers as well as using the trees or bushes as natural fencing due to their sharp spines. However, as the sap of the timber is so valuable there is no recorded use of the timber.

Medical Overview:

Commiphora wightii has a long history as a medicinal plant. It is traditionally used in incense and perfumes as well as for the treatment of various diseases. The resin of *Commiphora wightii* has been traded for over two thousand years under the name bdellium, which is dark and brown in colour thereby making it easy to distinguish from its cousin myrrh, which is light in colour.

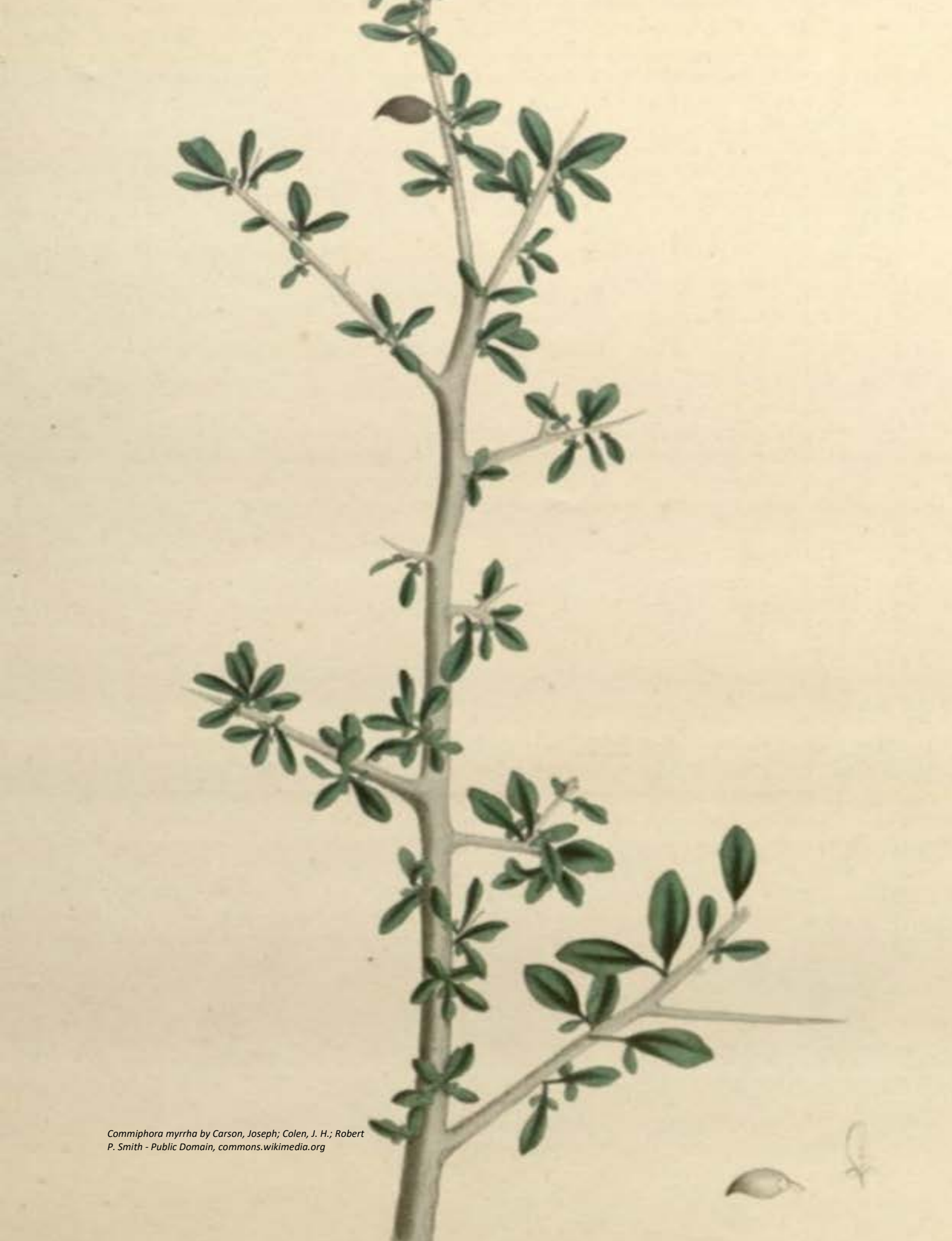
In fact so much importance has been associated with *Commiphora wightii* over the centuries that it has been reported to cure dysmenorrhea, dyspepsia, endometritis, hypercholesterolemia, hyper tension, impotence, bronchitis, caries, catarrh, gingivitis, hay fever, hysteria, inflammation, laryngitis, lochia, mania, pharyngitis, phthisis, pyorrhea, rheumatism, sores, sore throat, stimulant, tonsillitis, tumours, wounds bone fractures, gout, scrofula, sciatica, facial paralysis, diplegia, leprosy, leukoderma, pectoral disorders, otorrhea, epilepsy, fever, strangury, hemorrhoids, amenorrhea, ulcers, anemia, coronary, thrombosis, stomatopathy, pharyngoplasty, spermatorrhea, urinary calculus, diabetes, trichosis, to enhance phagocytosis, to increase leukocytes, to induce abortion, and as a tonic for the uterus.

As can been discerned from the above list, legend or myth must be separated from scientific fact.

The main health attribute claimed by the vendors of *Commiphora wightii* or its oleo resin is for its weight loss effects via the reduction in cholesterol. However, this is under contention as the only randomized controlled clinical study conducted outside India showed no cholesterol lowering effects. Research has shown that *Commiphora wightii* resin significantly increases the levels of dopamine and norepinephrine in rhesus monkeys as a result it increases the metabolic rate via the flight or fight response. The increase of dopamine may result in the patient being more prone to risk taking and the seeking of pleasure as a result. The lack of dopamine has been associated with Parkinson's disease. The same research also found that *Commiphora wightii* resin increases the uptake of iodine by the thyroid, and significantly increases the thyroid hormone triiodothyronine, which further supports the use of the resin to increase metabolic rate as well as mood, and which may result in weight loss rather than the claim that it reduces cholesterol.

Additional research supports the claim that the resin is a fertility treatment as it has been found that mild use of the resin orally increases the weight of the uterus and the ovaries but not the cervix. Additionally, the blood pressure lowering effect of the resin also aids in the avoidance of premature birth.

The presence of catecholamine in *Commiphora wightii* further supports the claims that the resin is useful for cardiac conditions such as angina and hypertension. The presence of this chemical is thought to be behind the increase in dopamine and norepinephrine. Guggulsterones found in *Commiphora wightii* have been compared to nifedipine and propranololin for the control of angina and high blood pressure. In addition to its cardiac protective properties, it has a further attribute as a blood thinner or antiplatelet, thereby reinforcing its use as a cardiac protective medicine.



Commiphora myrrha by Carson, Joseph; Colen, J. H.; Robert P. Smith - Public Domain, commons.wikimedia.org

Commiphora myrrha

Primary Functions:	Antibacterial (MRSA)
Secondary function:	Antiseptic
Other Functions:	Anti-inflammatory
Common Names:	Corkwood, Kanniedood, Mur, Myrrh, Herabol myrrh, Common myrrh, African myrrh
Description:	It is a thorny shrub or small tree about 4 m in height. The leaves are almost compound, with only a few species bearing simple leaves. The tree is covered in spines and oozes a gum resin from the trunk and branches which is the main part of the tree used in medicinal applications.
Classification:	| Order: Sapindales | Family: Burseraceae | Genus: Commiphora
Origin:	The tree is native to the Arabian Peninsula. Amon and Yemen as well as the Africa Northern Kenya, Ethiopia and Somalia.
Soil Requirements:	It grows best at dry deciduous forest and desert between an altitude of 250 to 1,300 meters. It prefers calcium rich soils and can survive in poor to thin soils.
Timber Quality:	Members of this genus have been used for their timbers as well as using the trees or bushes as natural fencing due to their sharp spines. However, as the sap of the timber is so valuable there is no recorded use of the timber nor images available.

Medical Overview:

Commiphora myrrha is traditionally used in incense and perfumes for treatment of various diseases. The Egyptians used myrrh and natron to embalm bodies for burial. The name is derived from Aramaic and Arabic meaning bitter. References to the product myrrh, derived from this tree, are found throughout historical texts from the Greeks to the Bible and as such has played an important role in trade, religion as well as medicine.

Traditionally the gum resin of the tree has been used for wound healing and to stop infection. In one study from Al-Rass Qassim University of Saudi Arabia the researchers showed that the vapor from the burnt gum suppressed the growth of Methicillin Resistant *Staphylococcus aureus* (MRSA). Therefore, the potential of the gum from the tree is significant as an antibiotic to manage difficult to treat infections.

Further research, again from Saudi Arabia, sought to verify the active shelf life of the aqueous extract against four bacterial infectious agents *Micrococcus luteus*, *Neisseria sicca*, *Proteus mirabilis* and *Pseudomonas aeruginosa*. This research showed that these bacteria had been developing resistance to many of the antibiotics used today. The antibiotics in this research were gentamicin, neomycin, cephalothin, cotrimoxazole, tobramycin, carbenicillin, chloramphenicol, polymyxin, penicillin, streptomycin, oxytetracycline and erythromycin.

Of the above antibiotics, *Micrococcus luteus* was found resistant to seven of them, *Neisseria sicca* was resistant to three, *Proteus mirabilis* was resistant to 4, and *Pseudomonas aeruginosa* was resistant to six of the antibiotics. Yet in this research it was found that all the bacteria are susceptible to retardation by *Commiphora myrrha* aqueous extract. Therefore, this tree and its use in bacterial infection control displays significant benefits, especially in cases of pneumonia, urinary tract infections, meningitis, necrosis and septicemia.

Claims that *Commiphora myrrh* can reduce seizures in epileptic sufferers have also been researched and whilst it has been found that a dose of 500 mg/kg of the leaf extract did reduce seizures induced by pentylenetrazole by up to 80%+/-, the standard drug diazepam reduced the same seizures by up to 90%+/- with a 4 mg/kg dose.

Copaifera langsdorffii by Jorge EFO Silva from commons.wikimedia.org

Copaifera langsdorffii

Primary Functions:	Anti-inflammatory (skin and gastrointestinal disorders)
Secondary Functions:	Anti-anxiety
Other Functions:	Endometriosis
Common Names:	Oil wood, Miracle tree, Diesel oil tree, Copaiba
Description:	Tree reaches about 12 m in height and up to 3 m in circumference. The flowers are white, and the fruits are small oily and ripen to a yellow colour.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Copaifera
Origin:	It is native to the tropical regions of Latin America and Western Africa.
Soil Requirements:	Tolerates annual temperature, suited for areas with excessive amounts of water, and this tree is ideally suited for tropical and high rainfall regions.
Timber Quality:	The wood is resistant to termites. It is used in civil construction and the manufacture of boards and flooring.

Medical Overview:

Copaifera Langsdorfii is one of 72 members of this genus. The Latin name for the tree is derived from the resin that is found seeping from the trunk and branches; copar means resin. Of the *Copaifera* trees found in south America approximately nine are tapped for the abundance of a watery oleoresin found in its trunk. This resin is distilled to create the oil sold as copaiba oil. Whilst the indigenous peoples of southern America have utilized this oleo resin for centuries the health benefits have only recently been studied and unraveled. In the clinical research a great deal of confusion occurred due to researchers sourcing the oil in bulk or mixed from differing species of *Copaifera*. It has been found that each differing member of the genus has common attributes and medicinal results yet will differ from its cousins significantly on new or unique aspects. As a result, the oils or resins from each individual tree must be studied in isolation. The *Copaifera langsdorffii* tree is one the main sources of the oil and its timber is valuable.

One of the major claims for the use of its leaf extract is in the control of ulcerative colitis. Both the leaf extract as well as the fluid tapped from the trucks of the trees did indeed suppress ulcerative conditions. At doses of 500 mg/kg body weight it is believed that this effect was the result of the antimicrobial actions of the trees extracts as well as its ability to aid in the coating of the ulcers with additional mucus in the gastrointestinal tract. Further research into the antimicrobial actions of the oleoresins from the tree showed its ability to retard *Staphylococcus aureus* and *Bacillus subtilis* at a level comparable to the standard drug chloramphenicol.

In traditional ranges of the species, the indigenous peoples have long used the tree as a cure for leishmaniosis (disease of the lymph nodes and skin lesions) which was further supported in clinical trials.

As discussed, prior, confusion occurs when a claim is made concerning *Copaifera* in a generic or broad sense where it includes several members of the genus. This is clearly shown in the claims that *Copaifera* is a potent anticancer medication. In reviewing the research into the cancer modulating actions of the oleoresins it found that the resins from *Copaifera multijuga* do indeed inhibit the growth of tumours in Erlich tumour bearing test mice, however the oleoresins from *Copaifera officinalis* stimulated the tumor growth in vaginal and cervical cancers.

Other questions arise about the claims that the oil aids in wound healing and reduction in scarring. In one research paper it was found that the *Copaifera Langsdorfii* extract obtained from leaves (50, 250 or 500 mg/kg) reduced the injured area compared to control. Yet in other papers and testing it was found that the oil did not improve wound healing, and in some cases had negative results. Whilst the contradicting research requires resolution, the allied research that support the anti-inflammatory and antibacterial actions of both the leaf extract and oil indicate a positive result in wound healing.

Research conducted in 2011 showed that the oil from *Copaifera langsdorffii* had beneficial results in reducing endometriosis.

Many research papers have been written on the antimicrobial and antibacterial attributes of the oil from the tree. Most of these papers have results that endorse the use of the oil as an antibacterial agent with good results when compared with the standard controls.

The claims that the oil from the tree is able to aid in the reduction of anxiety and depression have also been supported, and the active compound found in the oil has been identified as beta-caryophyllene which has similar actions to CBD oil (cannabidiol) in being an effective central nervous system support. Further, the pain relief or analgesic actions of the oil may be attributed to this compound as well.

Couroupita guianensis by Ngoc Huy Nguyen from Pixabay

Couroupita guianensis

Primary Functions:	Breast cancer
Secondary Functions:	Anticancer
Other Functions:	Anti-inflammatory
Common Names:	Cannon ball tree, Nagalingam Pushpam macacarecuia, Coco sachapura, Bala de cañón, Kanonskogelboom, Arbre à boulet de canon, Kouroupitoumou, Nagalinga Ful, Nagalinga Pushpa, Lingam, Nagamalli, Sala, Granadillo de las huacas, Ayahuma, Boskalebas, Naaga danthee
Description:	It grows up to 35 meters in height. The clustered leaves vary in length, generally from 8 to 31 centimeters. The flowers are born in large bunches up to 80 cm long. Flowers are strongly scented and are especially fragrant at night and in the early morning. Fruits are spherical with a woody shell and reach diameters of up to 25 centimeters, which give the species the common name Cannon ball tree. One tree can bear 150 fruits. The fruits take up to a year to mature.
Classification:	| Order: Ericales | Family: Lecythidaceae | Genus: Couroupita
Origin:	It is native to the rainforests of Central and South America.
Soil Requirements:	Grows widely on riverbanks and lowlands.
Timber Quality:	Heartwood is light yellow; not clearly demarcated from the sapwood. Texture is medium to coarse; grain straight or interlocked; there is an unpleasant odour from the green wood. Wood is light in weight, soft, not durable, susceptible to fungi, dry wood borers and termites. The wood is used for various lower value purposes.

Medical Overview:

The tree is native to South America and has been planted pan globally due to the beauty of its flowers and scent. The tree is recorded to have been first planted in India in 1881 and has been quickly incorporated into the Hindu mythology. It is believed that the tree is sacred to Shiva as the flowers look like naga or a king cobra. There have been many health claims made concerning *Couroupita guianensis*. One of which is the antibacterial potential of extracts made from the bark and leaves. However, in research conducted in India in 2015 compared the ability of these extracts against two standard antibiotics ciprofloxacin and ampicillin. The findings did show mild to low inhibition of both gram(+) and gram(-) bacteria. However, the results indicated the effects to be mild at best, and other trees are better solution to bacterial infections. Included in this research paper was the additional finding that the extracts were not as effective as the standard antifungal medication known as fluconazole, and also indicating the extracts to not be effective against fungal infections. Yet in an older research paper from 2012 the fruit extract was shown to be an effective antibacterial against *Staphylococcus aureus* in a manner that was more effective than the standard antibiotic known as streptomycin. In this research the fruit extract was effective against the following bacteria, *Klebsiella aerogenes*, *Micrococcus luteus*, *Escherichia coli* and *Klebsiella pneumoniae* to a level slightly less than streptomycin. Therefore, the fruit extract is the only part of the tree to possess antibacterial attributes. This research also failed to show a significant antifungal result.

Chemical studies of this species have shown the presence of α-amirin, β-amirin, β-sitosterol, nerol, tryptanthrine, indigo, indirubin, isatin, inoleic acid, carotenoids and sterols. In the leaf, triterpenoid ester of fatty acids such as β-amirin palmitate are found. Isatin, a compound found in the flowers of the tree, has shown significant cytotoxicity against breast cancer cell lines. It is one of the compounds that give the flowers of the tree their colour. As a result, it may be considered that an ethanol extract of the flowers may be beneficial in the management of breast cancer. Other research has found that isatin is effective in the control of human leukemia cancer cells.

Another compound found in the flowers of the tree is indirubin. This also has shown promise as an anticancer chemical. Therefore, the presence of these two compounds further supports the use of the flower extract in the management and treatment of cancer. In the research into the cytotoxicity of indirubin it was evaluated on its ability to reduce tumours in respect to the lung cancer, glioblastoma and leukemia.

The anti-inflammatory activity in the ethanol extract of *Couroupita guianensis* leaf was conducted in 2013. In doses of 100 mg/ kg body weight of the leaf extract a significant reduction in the inflammatory response was observed. It is thought that this anti-inflammatory action is due to the inhibition of the leukocyte migration to areas of the body to create an inflammatory reaction.

Crataegus monogyna by u3heuehh9 from Pixabay

Crataegus monogyna

Primary Functions:	Cardiovascular system support, Angina, Congestive heart condition, Arrythmia
Other Functions:	Antioxidant, Hepaprotective, Antihypertension
Common Names:	Maythorn, May blossom, White thorn, Motherdie, Quickthorn, Hawthorn
Description:	It is a small tree 5-14 meters tall, with a dense crown. The bark is dull brown with vertical orange cracks. The younger stems bear sharp thorns, approximately 12.5 mm long. The leaves are 20 to 40 mm long, obovate and deeply lobed. The surface of the leaves is dark green above and paler underneath. The flowers in clusters or bunches of 5-25 together; each flower is about 10 mm diameter, and has five white petals, numerous red stamens, and a single style. However, some trees have red to pink flowers with white stamens. The haw is a small, oval dark red fruit about 10 mm long, berry-like, containing a single seed.
Classification:	| Order: Rosales | Family: Rosaceae | Genus: Crataegus
Origin:	Europe, Northern Africa and West Asia.
Soil Requirements:	Various.
Timber Quality:	The sapwood is a creamy white colour and the heart wood becomes darker reddish brown. The timber is perishable and susceptible to borer and termite. It is used for making small items and it is used in wood turning.

Medical Overview:

In Irish superstition it is considered bad luck to pick the flowers of Hawthorn as the tree is believed to be associated with the fairies, apparently Irish *'faerie'* can be very dangerous. In northern England it is believed that if you pick the Hawthorn flowers your mother may fall ill and possibly die hence the name Motherdie, yet this name has been used for many other plants in the United Kingdom. The fruit of the tree called haws can be eaten directly from the tree however they are also used to make jams, syrups and even into wine. The flowers are also eaten as can be the young leaves both of which can be added to salads.

The primary use of the leaves and flowers of *Crataegus monogyna* is in the support of the entire cardiovascular system. Several compounds found in the leaves and flowers are responsible for these actions. Hyperoside is anti-inflammatory, especially in the vascular system, antithrombotic, antihypertension, antidiabetic and antioxidant. Vitexin is shown to reduce cardiac hypertrophy (thickening of the walls of the heart), antidiabetic, anticancer, neuroprotective, improves cognition, antibacterial and has shown positive results in Alzheimer's disease. Procyanidins stop the accumulation of LDL lipids in on the vein walls. Catechin has been shown to be angiogenesis inducing (growth of new blood vessels) as well as antihypertensive, antihyperlipidemic, antioxidant, anti-inflammatory and antithrombotic.

In a study from 2008 researchers found that the extract of *Crataegus monogyna* had a 39% reduction in sudden death by cardiac arrest. Other research has also shown its leaf and flower extracts had a significant positive effect in patient's recovery from congestive heart failure and other heart conditions.

The leaf and flower extract has been used in the treatment of varicose veins and also regulating blood pressure. The use of the extract also aids in improving sleep patterns and reducing stress and anxiety.

It is further believed that due to the presence of quercetin, kaempferol and catechin, that the extract from *Crataegus monogyna* is also beneficial in the reduction of tumors and cancers. A study from 2015 found that the fruit or haw of the tree did inhibit human tumor growth in the laboratory.

A more recent study, this time from Ankara university in Turkey (2020) showed that the leaf extract protected testicles and thereby sperm production against copper toxicity in mice. The researchers found that the leaf extract improved the volume and speed of sperm. As a result, *Crataegus monogyna* may also be beneficial in treating men suffering low levels of testosterone and sperm that restrict couples starting families.

Crataevia religiosa by Vinayaraj from commons.wikimedia.org

Crateva religiosa

Primary Functions:	Urinary tract infection, Kidney stones
Secondary Functions:	Anti-inflammatory, Analgesic
Other Functions:	Benign prostate hyperplasia (BPH), Laxative
Common Names:	Temple tree, Three leafed caper, Sacred garlic pear, Varuna, Spider plant, Sacred barma, Tonliem, Yumu, Banugan, Salingbobog, Gyo-boku, Barna, Bila, Bilasi, Cinnavulimidi, Maredu, Nervala, Setu, Tellavulimidi, Usiki, Varno, Veruna, Vayvarna, Vitusi, Barunday, Marana, Kumz, Dala, Kepayan, Hkan-tak, Kum nam, Bún thiêu
Description:	It is a moderate size tree growing to approximately 15 meters in height. The bark is relatively smooth with a light grey colour. The leaves a deep green being ovate-lanceolate shape. Fruit is oval drupe in shape with green hard skin speckled with white and yellowish pulp interior. The flowers white petaled with long stamens protruding.
Classification:	| Order: Capparales | Family: Capparaceae | Genus: Crateva
Origin:	It is native to India, Southeastern Asia, China, Japan, some Pacific islands.
Soil Requirements:	The tree prefers moist, rich, neutral to acid soil.
Timber Quality:	The wood is used for joinery, small furniture, utensils and implements such as tool handles. The wood color is yellowish white when cut and then fading to light brown. The wood is even close and smooth-grained and straight grained.

Medical Overview:

There is some confusion as to the correct spelling of the scientific name of *Crateva religiosa*. In some references it is spelled as Crataeva or Crataevia and others simply as Crateva. This is relatively unimportant however worth a mention.

Crateva religiosa has long been used is India and southeast Asia in traditional medicinal systems such as Unani and Vedic. The tree is included in the Philippines register of important medicinal plants. It has been introduced into Africa and it is also used there as a medicinal plant as well as grown for its fruit.

The claims that the extract derived from its leaves and bark are antibacterial and antifungal has been researched in various scientific papers, however the results are less than impressive. Whilst in one research paper from 2017 the bark extract was shown to be antibacterial and antifungal the results were far less than the standard antibiotics used as comparative controls. Therefore, there are better sources of antibacterial tree extracts to choose from. The use of the tree extract in healing or treating wounds is supported yet not as effective as other tree sources.

The traditional use of the tree as an effective urinary tract medication is supported via research from various papers. Numerous herbal medicinal blends are being sold on the Asian and Indian markets that use *Crataevia religiosa* as a treatment for kidney stones and urinary tract infections. The tree extract has been shown to increase urine flow, and as such is also being used to treat benign prostatic hyperplasia (BPH). The main compound found in the bark extract is lupeol which has long been studied and found effective as an antitumor, anti-inflammatory, and inhibits prostate and skin cancers. Taraxerol is also found in the bark extract which has also been studied for its anticancer and anti-inflammatory properties. Research from India in 2011 discussed these compounds and others such as diosgenin (estrogen precursor useful in management of menopause) and sitosterol (menopause, BPH and colon cancer). The range of novel and well-known compounds present in its leaf and stem bark have been used in scientific literature to support the claims that the extracts from the tree are effective in treating urinary and kidney problems.

Additional findings from research include the effective use of the extracts in the treatment of inflammatory conditions and also as a pain management medicine. At doses ranging from 250-500 mg/kg body weight, the ethanol extract showed greater anti-inflammatory actions than the standard anti-inflammatory drug indomethacin. As a result, the use of the tree in treating arthritis and rheumatoid arthritis is well founded.

The extracts derived from its leaves and stembark act also as an effective laxative, therefore this must be considered when prescribing the tree as it may or may not be welcomed by the patient.

The extract and its chemical constituents help in downregulating the potassium and sodium levels in the blood. This has been shown to have a retarding effect on sperm motility, and as a result the extract is also considered to be a mild spermicide.

Cynometra cauliflora by Francisco Manuel Blanco (O.S.A.) from commons.wikimedia.org

Cynometra cauliflora

Primary Functions:	Anti-obesity
Secondary Functions:	Cancer management
Other Functions:	Antioxidant
Common Names:	Nam nam, Namo namo
Description:	It is an evergreen and much-branched small tree or shrub can grow up to 15 m tall with flowers and fruits on its trunk. The fruits are a kidney shaped pod, greenish yellow to brown in brown in colour, with rough and wrinkled surface.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Cynometra
Origin:	The tree is native to Malaysia.
Soil Requirements:	Grows on a wide range of tropical moist soil types.
Timber Quality:	The timber of has no commercial uses.

Medical Overview:

Cynometra cauliflora is a typical underutilized fruit that has the medicinal values in folk traditional medicine and cultivated as an ornamental plant in many villages and towns. Unripe fruits taste sour and the mature fruit is also cooked with sugar to make compote.

In 2013, clinical research in Malaysia found that the ethanol extract derived from the leaves of *Cynometra cauliflora* stopped lipase activity (fat absorption) in the gut by 100%. As a result, the leaf extract had similar activity to the standard anti-obesity drug orlistat. The research tested 98 plant based herbal medicines and found that only three of these had such levels of success. The presence of kaempferol a highly researched chemical is thought to be one of the main active agents for this anti-lipase (fat reducing) action of the tree extract.

In other research in Malaysia from 2000, the fruit extract was evaluated for its reported cytotoxic (cancer reducing) ability. Within this research the fruit extract was used against human promyelocytic leukemia cell lines (HL60) and also mouse fibroblast cell lines (NIH/3T3). The outcome of this testing showed that the fruit extract was indeed effective against the human leukemia cell lines and to a lesser extent against the mouse fibroblasts. The standard anticancer drug vincristine was used as a comparison in the study. Once again kaempferol found in the extracts from *Cynometra cauliflora* has been extensively studied for its anticancer actions.

Allied to the above research was another study into the antioxidant nature of the extract which found the tree to be a potent antioxidant when compared to the standard antioxidant being ascorbic acid. As a result, this further enhances and supports the use of the extract in the management of potential cancer lines.

The methanolic extract of *Cynometra cauliflora* whole fruit was assayed for toxicity against the human promyelocytic leukemia HL-60 and the normal mouse fibroblast NIH/3T3 cell lines by using the MIT assay. Flow Cynometra analysis of HL-60 cells treated at CD (50) of the extract showed that the early apoptotic cells were 31.0 and 26.3 and 19.9% at 24, 48- and 72-hours treatment, respectively. The percentage of late apoptotic cells was increased from 62% at 24 hours to 64.1 and 70.2 at 48 and 72 hours, respectively. The methanolic extract of *C. Cauliflora* whole fruit was cytotoxicity towards HL-60 cells and induced the cells into apoptotic cell death mode, but less cytotoxicity towards NIH/3T3 cells.

Claims of the ability for the extract from the leaves to reverse or manage diabetes type II has also been studied however further research is required as the claims have neither been supported fully nor refuted as unfounded.

The extract from the tree is considered to be non-toxic.

Delonix regia by M W from Pixabay

Delonix regia

Primary Functions:	Antioxidant
Secondary Functions:	Antibacterial
Other Functions:	Anti-inflammatory
Common Names:	Flame-tree, Royal Poinciana, Gulmohar, Peacock tree, Flamboyant, Sekoula, Phoenix tree, Kaalvarippoo
Description:	The flowers are large, with four spreading scarlet or orange-red petals up to 8 cm long and a fifth up right petal called the standard, which is slightly larger and spotted with yellow and white. They appear in corymbs along and at the ends of branches. The naturally occurring variety flavida (Bengali: Radhachura) has yellow flowers.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Delonix
Origin:	The tree is endemic to the Madagascar's dry deciduous forest but has been introduced to tropical and sub-tropical regions world-wide.
Soil Requirements:	Requires a tropical or near tropical climate but can tolerate drought and salty conditions. It prefers an open, free-draining sandy or loamy soil enriched with organic matter. The tree does not like heavy or clay soils and flowers more profusely when kept slightly dry.
Timber Quality:	The sapwood is light yellow and the heartwood is yellowish to light brown. It is soft, heavy, coarse grained, weak, brittle, takes good polish and is rather resistant to moisture and insects although very susceptible to attack by dry-wood termites. In China it is used in plywood manufacture.

Medical Overview:

In the Indian state of Kerala, Royal Poinciana is called Kaalvarippoo which means the flower of Calvary. There is a popular belief among the Saint Thomas christians of Kerala that there was a small royal Poinciana tree nearby the cross when Jesus was crucified. It is believed that the blood of Jesus Christ was shed over the flowers of the tree, and this is how the flowers of Royal Poinciana got a sharp red color. This species was previously placed in the genus *Poinciana*, named for Phillippe de Longvilliers de Poincy, the 17th century governor of Saint Christophe (Saint Kitts). It is interesting to note that for a tree with a small original geographical area it has become the official emblem for many towns, cities and institutions.

Claims of the antioxidant properties of *Delonix regia* leaf extract was studied in 2013 and 2011 in India. From this research it has been established that *Delonix regia* leaf extract does possess significant antioxidant effects. Therefore, it is recommended from this research that the leaf extract may play an effective role in the management of various diseases.

Allied to this research from India has been additional research from Taiwan in 2016 that showed that the leaf extract, at a dose of 400 mg/kg body weight, had beneficial effects on the cardiovascular system, where it acted as a vasodilator (relaxed the blood vessels) thereby reducing blood pressure on the cardiovascular system and heart and increasing blood flow. This research is further supported by findings that the leaf extract has anti-inflammatory actions at similar dose levels indicating the reduction in inflammation in the cardiovascular system, which is directly linked with heart disease.

The flower extract from the tree, especially extract derived from water (aqueous extraction) had similar antioxidant levels as the leaf extract does and also similar anti-inflammatory properties (2016).

Claims of the antibacterial properties of *Delonix regia* have also been studied. In these studies, it has been shown that the leaf, seed and flower extract have similar antibacterial actions when compared to gentamycin, a standard antibiotic. The ability of the extract from the tree to control *Staphylococcus aureus, Bacillus cereus*, *Escherichia coli*, *Klebsiella pneumoniae* and *Klebsiella aerogenes* has been verified and therefore the extract is useful in wound infections as well as dysentery.

Within these research papers it has been shown that the herbal extract of *Delonix regia* is non-toxic and safe to use.

Dombeya rotundifolia by Consultaplantas from commons.wikimedia.org

Dombeya rotundifolia

Primary Functions:	Anti-inflammatory
Secondary Functions:	Cardiac tonic
Common Names:	Wild Pear, Velutina
Description:	There are discrepancies in the description of *Dombeya rotundifolia* in regard its height. Some report state it grows to 20+ meters in height whilst other describe it as a small tree of no more than six meters. However, most references agree that the tree is small in stature and there may be old trees that have attained considerably more height than the average. The flowers are small clustered and white. The leaves are round, hence the name rotundifolia, and have a velvety mat green upper surface. The fruits are inconspicuous small sphere at the center of the flower panicles. The bark of the trunk is a dull fissured grey.
Classification:	| Order: Fabales | Family: Malvaceae | Genus: Dombeya
Origin:	Tropical and Southern Africa.
Soil Requirements:	The tree is frost and drought tolerant and can exist on a wide variety of soils from poor to deep loam soils in rocky slopes and riverbanks.
Timber Quality:	The timber has a blueish grey colour and is extremely dense and hard. The uses for such timber are many and the applications in furniture, flooring, carriage works such as wheels and axels, and tool handles are common, however there is a short supply as the trunk of the tree does not achieve a large size.

Medical Overview:

Dombeya rotundifolia has been used as a medicinal tree by the indigenous peoples of west and southern Africa for millennia. As with traditional medicines that have been utilized for a long time in a wide geographic population, many differing claims have been made as to the effectiveness of the tree.

One such traditional claim is that the bark and leaf extract from the tree is beneficial in the control of parasitic worms. Sadly, this has been shown to be mild to weak in effectiveness in research conducted in 2007. As a result, the use of the tree in the management of schistosomiasis (bilharzia) may be largely ineffective. Further research from 2004 did show that a methanol extract of the bark and leaves did retard larvae development however it did not state that the efficacy of the tree warranted its use.

The antibiotic or antimicrobial claims for the tree have been researched extensively and it has been found that the aqueous (water) extract of the leaves and bark showed minimal antibacterial action, whilst the ethanol extract of the same material had modest antibacterial action and was most effective in retarding *Bacillus subtilis* and *Staphylococcus aureus*. Within the same research from 2000 the anti-inflammatory action of the tree was supported as accurate, and it was found that the ethanol extract had the highest anti-inflammatory response.

Cardiac glycosides have been identified in the bark and leaf ethanol extract which supports the traditional use of the tree to treat heart issues. This research into the cardiac tonic effects of the tree is sparse and more research is needed to fully understand the actions of the tree as a cardiac treatment.

Both the anti-inflammatory and cardiac aspects of the tree may be the reasons why the tree and its extracts are used for relief from headaches. In the traditional health systems of southern Africa, it has long been used in such a way.

Within the available research, various papers have shown that the leaf and bark extracts are high in tannins and may therefore prove the tree useful in the treatment of tumors and hypertension. Yet the presence of tannins is counter to the claims that the use of the tree reduces nausea.

Reference to the use of the herb to induced delayed labor should be taken seriously as the tree may have abortifacient properties and therefore should not be taken by pregnant women.

Elaeocarpus ganitrus by Drew Avery from creative commons, Wikimedia Commons

Elaeocarpus ganitrus

Primary Functions:	Diabetes
Secondary Functions:	Anti-inflammatory
Other Functions:	Antibacterial
Common Names:	Chattusampangi, Rudraksha, Rudraki, Bead tree, Wooden beggar Bead, Rudrakya, Rudrakshimara, Rudraksh, Rudraksam, Ruttiratcam, Rudraksi udrai, Ludrok, Udrok, Sivaksha, Sarwaksh, Paawan, Nilkanthaksha, Haraksha, Sivpriye
Description:	It is a large evergreen tree with blue fruits and the unique red leaf positions on each branch. It can be easily distinguished by the phantom eye symbol that is found in the bark of the trunk and branches.
Classification:	| Order: Oxalidales | Family: Elaeocarpaceae | Genus: Elaeocarpus
Origin:	It is thought to have originated in the Himalayan mountains however it is now found through Southeast Asia and India.
Soil Requirements:	Found on a variety of soils from deep, well-drained to shallow and rocky.
Timber Quality:	Its wood is reported to be white and pale with a surprising strength to weight ratio which has seen its use in the manufacture of propellers for airplanes. Few if any reliable images can be found as this tree is protected due to its religious importance.

Medical Overview:

Elaeocarpus ganitrus is a tree of huge religious importance, which has both elevated the reported powers of the tree and in a strange manner kept science away due to the possible desire to not prove that its powers may be false.

The tree is known as Rudraki in Hindi and Rudraksha in Sanskrit and has been known as the bridge between the evils of the world and the divine. It is believed that within the tree are all the secrets of the cosmos. Named after the god Shiva, its name is made up of both Shiva and eyes, ergo, the eyes of Shiva. The unusual markings travelling up the smooth trunks do indeed look like faint outlines of eyes. As is assumed by the believers of Hinduism that the small blue fruit must therefore be the tears of Shiva and the unusually shaped nut kernel, simply known as Rudraksha bead, are of high value in India. It is believed that by simply wearing the beads they will impart all manner of spiritual powers and healing and therefore the beads are much sought after. Indeed, they are traded in a similar fashion to precious stones.

Science however is scarce on all the medicinal claims of this tree. Many of the research papers focus on the traditional uses of the tree and its respective parts. These traditional uses have accreted over time to support the use of the tree to cure a multitude of illnesses. Yet research has found the tree to be useful in the treatment of disease states caused by *Staphylococcus aureus*, *Escherichia coli* and diabetes type II.

In one study the researchers attempted to validate *Elaeocarpus ganitrus* as an antimicrobial to be used in the control of various bacteria and fungi. The findings of this study validated the use of the ethanol extract from the tree's bark, leaves and fruit displayed strong inhibition for *Escherichia coli*, *Staphylococcus aureus* and *Bacillus subtilis*. However, the extract only inhibited one fungal species called *Rhizopus oryzae* which can cause infections such as tinea and other dermis infections. Therefore, scientific research supports the use of the ethanol extract from the tree to manage conditions such as pneumonia, food poisoning and infections of the skin.

Due to the presence of coumarin, gallic acid and quercetin the extract of the leaves has been shown to be antihypertensive and therefore may be used in doses of 200 mg/kg to treat inflammation and hypertension. The research into this area has been conclusive in validating *Elaeocarpus ganitrus* for the management of inflammatory conditions.

Further research (2015) has shown the methanol extract of the seeds possess a strong hypoglycemic action and therefore support the use of the tree in the management of type II diabetes, (mellitus). The researchers showed that doses of 40 mg/kg and 75 mg/kg had the best results by lowering the blood and urine glucose levels by 60% and 42.8% respectively compared with insulin that reduces the glucose levels by only 27%.

Toxicity testing has shown the extracts from this tree to be relatively harmless in high doses.

Erythrina variegata by Bishnu Sarangi from Pixabay

Erythrina variegata

Primary Functions:	Antibacterial
Secondary Functions:	Antifungal
Other Functions:	Anti-inflammation
Common Names:	Indian coral tree, Tiger's claw, Moochy wood tree, Sunshine tree, Dadap, Pharad, Paribhadra, Panervo, Coral Tree, Diego tree
Description:	The tree is a dense shrub or small tree with lumpy stems that can grow up to 6 to 9 meters in height. The leaves are pinnate with a 20 cm petiole and three leaflets, each leaflet up to 20 cm long and broad. It has dense clusters of scarlet or crimson flowers and black seeds.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Erythrina
Origin:	The tree is a native of coastal forests, from East Africa, through Southeast Asia to Australia.
Soil Requirements:	It grows on a variety of soils from sandy loam to gravel. It tolerates seasonally waterlogged soils, and is also often found on saline, tropical, clayey and coral limestone soils.
Timber Quality:	The timber is poor and of light nature, however it is used for pulp in the paper industry in India. In Okinawa Japan it is used as the base for lacquer work.

Medicinal Overview:

Due to the wide geographic range of *Erythrina variegata* it has been used as an ornamental flower in many societies. In Okinawa prefecture in Japan, it has become the official flower and is called Diego. The timber of the tree is used in the famous Ryukyuan lacquerware. In Vietnam, the leaves are used to wrap fermented meat. In Sri Lanka when the tree blossoms it is considered to herald in the Sri Lankan New Year. In the Philippines it is used as an herbal medicine, and it is also used in the Siddha medicinal system of southern India and Sri Lanka.

A great deal of interest has been shown to this tree due to its wide range of chemical constituents.

In 2015, research into the use of the leaf extract to kill parasites, specifically worms, was conducted and found that doses at or above 200 mg/ml resulted in better effectiveness than the standard drug albendazole. As a result, the evidence and research support the traditional claims that *Erythrina variegate* can be used in the eradication of parasitic worms.

Research from Thailand in 2016 sought to understand the anti-inflammatory suppression actions of the leaf extract from the tree and found that in certain cases the leaf extract was a potent anti-inflammatory medicine. However, it also found that the leaf extract was not as effective as the standard drug, being prednisolone in cases of chronic inflammation. This research therefore supported the use of *Erythrina variegate* in the treatment of acute short-term inflammation, and also supported the actions of the leaf extract in the reduction of fever. Whilst additional research has shown that the leaf extract from the tree is as effective as paracetamol in reducing fever or temperature in patients the analgesic actions of the tree has been shown to be mild when compared to diclofenac sodium, which is a non-steroidal anti-inflammatory and the active ingredient in Voltaren. Therefore, further research is required on the claim that the leaf extract is effective as an analgesic.

Research conducted separately in India in 2012 and 2014 sought to understand the antibacterial actions of the leaf extract. In both of these research papers it was proved that the methanol and ethanol extracts did control bacterial growth. Methanolic extract was found to have highest activity against all pathogens and highest zone of inhibition was observed against *Serratia marcescens* (20 mm). The chloroform extracts, highest activity was shown via the control of *Escherichia coli,* followed by *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas putida*, *Serratia marcescens*. In these two research papers the control antibiotics were ampicillin and gentamicin.

The anti-ulcerative claims of the extract were verified in research from 2009 where the extract was found to be highly effective in controlling ulcerative conditions caused by bacterial infection and or high levels of acid.

Eugenia uniflora by John Robert McPherson from commons.wikimedia.org

Eugenia uniflora

Primary Functions:	Antibacterial, Antioxidant
Secondary Functions:	Antiparasitic
Other Functions:	Antihypertensive (blood pressure lowering)
Common Names:	Brazilian cherry, Suriname cherry, Monkimonki kersie, Cerisier carre, Cayenne cherry, Pitnga
Description:	It is a large shrub or small tree with a conical form, growing slowly to 8 meters in height. New leaves are bronze, copper or coppery-pinkish in color, maturing to a deep glossy green, up to 4 cm long. During winter the leaves turn red. Flowers have four white petals and are borne on slender long stalks, with a conspicuous central cluster of white stamen sending in yellow anthers. Flowers develop into ribbed fruits 2 to 4 cm in diameter, starting out as green, then ranging through orange, scarlet and maroon as they ripen.
Classification:	| Order: Myrtales | Family: Myrtaceae | Genus: Eugenia (14 species)
Origin:	South American tree found in Brazil Uruguay, Paraguay, Argentina and Suriname.
Soil Requirements:	It grows on a wide variety of soils and thrives even on poor dry ground however the tree does not like wet or waterlogged sites.
Timber Quality:	There is no reported use of the timber.

Medical Overview:

Eugenia uniflora has been used by the south American indigenous peoples for centuries and it entered the Empirical medicine due to the use of the tree by the Indians of Paraguay in the 1500's. Often the fresh leaves of the tree are cast over the floors of houses to keep flies away, yet the odour from the leaves has been reported to create difficulty for people with respiratory issues.

Whilst research has shown that the ethanol extract derived from the leaves has significant antibacterial and antifungal properties the essential oil does not. Therefore, there is a distinct separation of uses for products derived from *Eugenia uniflora*. The research into the antibacterial properties of the tree has shown that the leaf extract had similar or better results when compared to penicillin for gram(+) bacteria and erythromycin for gram(-) bacteria. For the control of *Micrococcus roseus* and *Bacillus cereus* the extract was better than penicillin. Whereas for *Pseudomonas aeruginosa* the extract was over twice as effective as erythromycin.

However, the essential oil derived from the leaves has been used as an antihypertensive and research has supported this use due to the oil and extract creating vasodilation in test animals, thereby proving that it lowers blood pressure. It is believed that the claims attributed to the tree where it is a diuretic may in fact be a result of the vasodilation activity.

The fruit of the tree *Eugenia uniflora* have been utilized by the local people of south America for generations and the fruits have proved to be a very high source for both vitamin C (ascorbic acid) and vitamin A, resulting in the therapeutic use of the fruit for dietary deficiencies of these compounds.

A significant use of the leaves of the tree to treat insect and parasite infestations has been analyzed and studied with the results showing that the leaf extract is comparable to the standard drug endosulphan in the control of intestinal worms such as round worm, tape worm etc. As a result, the leaves of *Eugenia uniflor*a may be considered as an alternative to Endosulphan which possess many health risks in its use. This action corresponds with the use of the fresh leaves in the houses to deter flies and other insects.

In Africa, the leaf extract is used as an antipyretic (fever reducing) agent however this may be due to the anti-hypertension properties whereby the lowering of blood pressure corresponds to a lowering of body temperature.

Fagus sylvatica by GunnarCreutz from Wikimedia

Fagus sylvatica

Primary Functions:	Antibacterial
Other Functions:	Skin whitening
Common Names:	European Beech, Common Beech
Description:	The tree may attain heights of up to 50 meters and a trunk of 3 meters diameter. It has a typical lifespan of 150–200 years, though sometimes up to 300 years. It grows quickly in densely forested areas with branches being high up on the trunk as the tree quickly tries to get its crown out into sunlight through the forest canopy. In open locations however, it will become much shorter and wider, as it does not have the competition for sunlight. The leaves are alternate, simple, and entire or with a slightly crenate margin, 5–10 cm long and 3–7 cm broad, with 6–7 veins on each side of the leaf. The buds are long and slender, 15–30 mm long and 2–3 mm thick. Male flowers appear in the small catkins. Female flowers produce beechnuts, small triangular nuts 15–20 mm long and 7–10 mm wide at the base; there are two nuts in each cupule.
Classification:	| Order: Fagales | Family: Fagaceae | Genus: Fagus
Origin:	Temperate Europe
Soil Requirements:	Moist well drained soils
Timber Quality:	Beech timber is a heavy timber having a dry weight of approximately 720 kg per cubic meter. The timber is not durable as it is susceptible to rot and insect attack. The wood is used in furniture making.

Medical Overview:

Fagus is the name of a Gallic-Roman god who was worshiped as the god of children and birth. Interestingly red heads were considered sacred to the god Fagus. In Celtic mythology the Beech tree is associated with the warrior god Ogma who is accredited with inventing the Ogham, a pre-medieval Irish alphabet. In the Greek, Roman and Norse mythologies Beech can be found as well. Therefore, it is no surprise that the bark flowers and leaves of the Beech tree have long been used in herbal medicines.

The nuts of the tree can be eaten raw or cooked and are considered to have somewhere between pine nuts and sunflower seeds in taste.

The Bach flower remedy system uses a Beech tincture which is believed to balance intolerant, judgmental and highly critical people.

In a review from 2018 conducted in Romania researchers sought to verify the antibacterial claims made about the tree. In this study the extract made from the leaves was shown to be antibacterial however most of the bacterial studies were less effective than the standard antibiotics oxacillin and ciprofloxacin. Yet, the extract was highly effective in controlling *Staphylococcus epidermidis.* Another study also from Romania in 2017 attempted to test the antibacterial actions of the bark from the tree and found it to be once again mildly effective. Both studies confirmed that the extracts from Beech are only effective on gram(+) bacteria.

Some of the main compounds isolated from *Fagus sylvatica* are vanillic acid, catechin, taxifolin, syringin, gallic acid epicatechin, catechin, protocatechuic acid, chlorogenic acid, ferulic acid, and iso-quercitrin.

Another study sought to verify various health claims associated with *Fagus sylvatica*. One outcome from this study was support for the use of the bark extract as an inhibitor of tyrosinase, an enzyme involved in the production of melanin. As a result, the extract may be used as a skin whitening agent and also may be useful in the treatment of vitiligo. Whilst the bark extract was not as effective as the standard drug acarbose it may be considered useful none the less.

Faidherbia albida by SAplants from Wikimedia

Faidherbia albida

Primary Functions:	Antibacterial, Antipyretic
Secondary Functions:	Diarrhea
Other Functions:	Anti-inflammatory
Common Names:	Apple-ring acacia, Ana tree, Acacia albida, Balanzan tree, Winter thorn, Saas, Gao tree, White acacia
Description:	The tree is known to reach up to 25 meters high and over 1 meter trunk diameter at breast height. Its bark is grey, rough. The leaves blue-green and opposing with up to 12 pairs of pinnae carrying, 6-23 pairs of leaflets up to 12 mm long x 5 mm wide. Pods are bright orange to reddish-brown in colour 10-15 cm long x 2-3 cm wide, containing 10-20 shining dark-brown seeds. It remains leafless during the rains and assumes new foliage and flowers after the start of the dry season.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Faidherbia
Origin:	It is spread throughout tropical and Sub tropical Africa from Egypt down to South Africa.
Soil Requirements:	Preferring riverbanks and flood plains containing alluvial soils. This genus is frost tolerant. The tree does not like clay soils.
Timber Quality:	The wood, soft and of medium quality is used as timber, handicraft, various tools, fuel and charcoal. The wood has a density of about 560 kg/m3 when the moisture content is lower than 12%.

Medical Overview:

Faidherbia albida is called the Saas tree by the Serer people of Senegal. The Saas tree is sacred to these people as it believed to be the tree of life and fertility in their creation mythology. In western Africa and especially the nomadic people of Nigeria the bark extract is used to treat illness caused by spirits and the fruits are carried to ward off evil spirits.

Faidherbia albida is unique as it sheds its leaves in the rainy season and keeps them throughout the dry season. This is made possible by the fact that the species behaves as a phreatophyte, which is a term used for trees that have extremely deep roots systems that can draw from underlying water table. In the case of *Faidherbia albida* its roots are reported to delve up to 80 meters in depth. Because of the tree maintaining its leaves and flowers during the dry season it became an important tree in beekeeping as its flowers are available to the bees when other flowers are not. Some tribes in Africa use the tree as an embalming agent in the preservation of the deceased indicating a high level of tannins in the leaves and bark. Such tannins would naturally aid in wound healing. It is of interest that a grove of these trees is found in Israel and are reported to be genetically identical which indicates that they have been propagated by vegetative reproduction. Therefore, it may be surmised that the ancient people of this region also used the tree in the practice of embalming the dead.

In research into its medicinal actions, it has been found that doses of 100 mg/kg body weight its bark ethanol extract displayed similar results in the control of *Escherichia coli*, *Salmonella typhi* and *Shigella dysentery*. The research compared the bark extract to the standard anti-biotics azithromycin, ciprofloxacin and chloramphenicol. Therefore, this research from 2013 supports the traditional use of the tree for wounds, gastrointestinal problems and fever.

Additional research, from 2008, sought to verify the claims that the bark and leaf extract also acted as an antipyretic (fever reduction) and anti-inflammatory. This research also proved that doses higher than 500 mg/kg body weight decreased fever in a similar manner or comparable to aspirin. And doses of between 250 gm/kg up to 500 gm/kg significantly reduced inflammation in the bowel and as a result diarrhea caused by bowel inflammation. The antibiotic actions of the bark and leaf extract would also enhance these results.

Additional studies have been conducted to ascertain the effectiveness of the stem bark extract in treating malaria. This research from 2010 did support these claims.

The toxicity testing of the extracts from the tree have shown that doses higher than 5000 mg/kg body weight may cause concern, however these doses are extremely high and therefore the tree and its extracts are safe and non-toxic.

Ficus religiosa by Shadow Ayush from Wikimedia

Ficus religiosa

Primary Functions:	Hepatoprotective, Antidepressant, Diabetes
Secondary Functions:	Antioxidant, Ulcers, Convulsions
Other Functions:	Anti-asthma
Common Names:	Bo tree, Bodhi tree, Sacred fig, Pippala, Peepal, Ahant, Asvattha, Ashud, Ashvattha, Jari, Piparo, Pipala, Pipalo, Ranji, Basri, Ashvatthanara, Ashwatha, Aralimara, Aralegida, Ashvathamara, Basari, Bad, Arayal, Pipal, Pimpal, Pippal Ravichettu
Description:	It is a large widely branched tree with leathery, heart-shaped, long-tipped leaves on long slender petioles and purple fruits growing in pairs.
Classification:	| Order: Rosales | Family: Moraceae | Genus: Ficus
Origin:	Southeast Asia, southwest China, India and the Himalayan foothills
Soil Requirements:	The tree can adapt easily to a wide variety of soil and climate conditions.
Timber Quality:	Wood is greyish-white, moderately hard and heavy, weighs 480-640 kg/m3. It is moderately durable under cover and quite durable under water. It is not traded commercially.

Medical Overview:

The Sacred fig is perhaps one of the most sacred of trees in the world, as it is considered holy by Hindus, Buddhists and Jainism. For centuries Sadhus and Sadhvi's (holy men and women) have revered the tree and Buddha achieved enlightenment whilst sitting under one for 49 days. In India women believe that if they tie red threads or cloths around the tree, they will be accorded the birth of a son.

2011 research showed the use of the ethanol bark extract is an effective treatment for gastric ulcers, and at doses up to 400 mg/kg body weight there was a significant reduction in gastric juices and an increase in the Ph of the gastric fluids. Further research over a decade have supported the use of both the leaf and bark ethanol extract as a broad spectrum antibacterial. It is important to note that most if not all of the research papers showed that a simple water extract was not effective in the control of any of the bacterial strains tested. More research from 2011 concentrated on the immunomodulatory (immune system support) of its leaf extract and concluded it showed significant modulatory effects on the immune system, and this amplifies the body's ability to fight infections. Research from 2011 found that the immune system support derived from the leaf extract significantly reduced histamine response and reduced bronchial spasm associated with conditions such as hay fever, allergies and asthma.

On analysis of its bark various compounds such as lupeol were found. These compounds act as anti-inflammatory agents. Research from 2007 showed that the methanol extract of the bark was as effective as aspirin in the management of inflammatory conditions. Of note is the presence of bergapten in the bark extract. Whilst this compound has been found to have a direct link to certain cancers it is still used in medicine as it is a very potent photosensitizer (making more sensitive to sun light) and therefore it has been used in the treatment of psoriasis and vitiligo.

The diabetes management claims made on behalf of the use of the tree have been supported in papers from 2010, 2011 and 2017. Doses ranging from 50 -100 mg/kg body weight have been shown to be effective in the support of both the pancreas and the liver.

The most interesting medical benefit supported by science are the varying health benefits the fruit extract or simply eating the fruit of the tree has on brain function. It has been found that the extract derived from the fruit reduces convulsions and epilepsy in a dose dependent manner. A paper from 2009 states that a dose of 100 mg/kg to body weight of fruit extract was equivalent of better than the standard drug diazepam. A paper from 2011 supported the antidepressant activity of *Ficus religiosa* fruit extract, possibly via modulating serotonergic neurotransmission. It is this serotonergic action of the fruit extract that is believed responsible for central nervous system and brain function support. As a result, a diet high in figs is now scientifically supported as being beneficial for all manner of nervous system degenerative conditions. The use of the fruit extract would be more effective than simply eating the fruit. Further research found that the extract of stem bark is able to inhibit the acetylcholinesterase enzyme and therefore is beneficial in the treatment of diseases affecting cognitive function.

Studies into the antioxidant potential of its leaf and bark extract have been positive. At doses of 100 mg/kg body weight of either a methanol or ethanol bark, leaf and fruit extract showed significant antioxidant actions. The tree is nontoxic in all forms other than care using its fresh latex sap as it is considered a skin irritant.

Flacourtia indica by Vinayaraj from commons.wikimedia.org

Flacourtia indica

Primary Functions:	Hepatoprotective (liver), Antimalarial, Anti-inflammatory
Secondary Functions:	Antioxidant, Diuretic, Hypertension
Other Functions:	Anti-asthma
Common Names:	Governors plum, Madaraskara plum, Bilangra, Kondai, Ramontchi
Description:	It is a small tree with axillary thorns and often with tuffs of branched thorns on the stem. The tree may grow to a height of 15 meters.
Classification:	| Order: Malpighiales | Family: Salicaceae | Genus: Flacourtia
Origin:	It is an indigenous medicinal plant widely distributed in India and Bangladesh.
Soil Requirements:	The tree often grows in mountainous tropical conditions.
Timber Quality:	The sapwood is light brown, gradually merging into the chocolate-brown heart wood. It is very hard and very heavy (850 kg/m^3), straight grained and durable, though liable to splitting. It has a fine even texture. Used for agricultural implements such as ploughs, posts, building poles, rough beams, walking sticks used in wood turning.

Medical Overview:

Flacourtia indica has been used in the medicinal systems of India for centuries and is considered to be one of the botanic medicines of critical importance. Many health claims have been attributed to the tree, and therefore many research articles have been written on the various medicinal actions attributed to the tree. In Indochina region it is believed that the tree can be used in cases of snake bite, however this claim has not been substantiated.

A study was undertaken in 2010 to ascertain the antimalarial claims of the tree. This research arrived at the conclusion that the ethanol extract from the leaves did indeed have beneficial effects on reducing the *Plasmodium falciparum* (the parasite that causes malaria) as effectively as the standard control being chloroquine. The researchers isolated three main compounds, pyrocatechol, homaloside D and poliothrysoside, which they believe are responsible for the antimalarial actions of the plant.

Research conducted in India (2011) in to the hepatoprotective actions of the tree were undertaken. The results from this research showed that the petroleum extract from the leaves reversed necrosis of liver tissue in the laboratory. The researchers injected methotrexate, a chemical used for chemotherapy as well as arthritis which has known side effects damaging the liver, into laboratory mice to cause damage to the mice liver tissue. After they were given a petroleum leaf extract dose of 350 gm/kg orally for 5 days. The results clearly showed that the leaf extract improved liver function and protected the tissue in the liver from damage.

Beneficial results were obtained in the research into the extract from its roots of the tree in treating problems in kidney function. This research from 2013 showed that doses of the ethanol root extract of 500 mg/kg increased urine flow significantly with result only slightly lower than that of the standard drug frusemide. Therefore, the ethanol root extract may be used in lowering blood pressure, edema (water retention) and poor urine flow due to kidney scarring or stones. The extract may also be useful in treating gout.

Two claims that the extracts from the tree are useful in treating asthma and inflammation have been researched separately, however the results may indeed be due to similar properties of the tree. It has been shown in research from 2011 that the leaf extract in doses up to 400 mg/kg showed significant antihistamine response in test animals. This was also displayed in the extract acting as a bronchodilator (enlarging the windpipe). These results therefore ally themselves with the claims of anti-inflammatory actions of the tree, which was researched in 2016 and which showed that doses of extract from the tree up to 400 mg/kg had similar anti-inflammatory responses when compared to the standard drug diclofenac. Within the same research paper, the analgesic actions of the extract were also studied and compared to morphine. The results were also positive showing the ethanol extract of the leaves of the tree having slightly less pain alleviation when compared to morphine. Traditional claims that the extracts from the tree can be used in infections and for gastrointestinal complaints indicate that the extracts have antibacterial properties. This has been studied in 2013 and the results have supported these claims. The results of the research showed that the extract derived from the roots of *Flacourtia indica* had only mild antibacterial action when compared to the standard antibiotic tetracycline. However, it was effective against *Vibrio cholerae* where the ethanol extract had a slightly less effective result as compared to tetracycline. Therefore, the extract derived from the tree may be useful in the treatment of cholera only. These findings were supported by additional research in 2011.

The use of its extracts have been tested for toxicity and it has been found that all parts of the tree are safe.

Fraxinus excelsior by Donar Reiskoffer from commons wikimedia.org

Fraxinus excelsior

Primary Functions:	Anti-inflammatory, Antibacterial, Vasoprotective
Other Functions:	Cardioprotective, Antioxidant, Liver tonic, Diabetes management, Antiviral
Common Names:	European Ash, Common Ash, Ash tree, Birds tongue
Description:	The tree usually grows to 12–18 meters tall with a trunk up to 2 meters in diameter, with a tall, narrow crown. The bark is smooth and pale grey on young trees, becoming thick and vertically fissured on old trees. The leaves are opposite, 20–35 cm long, pinnately compound, with 7–13 leaflets with coarsely serrated margins, elliptic to narrowly elliptic, 3–12 cm long and 0.8–3 cm broad and sessile on the leaf rachis. The flowers are borne in short panicles, open before the leaves, and have no perianth. Female flowers are somewhat longer than the male flowers, dark purple, without petals, and are wind pollinated. Fruit is flat and winged and are 2.5–4.5 cm long and 5–8 mm broad, often hanging in bunches they are often called ash keys.
Classification:	| Order: Lamiales | Family: Oleaceae | Genus: Fraxinus
Origin:	Europe
Soil Requirements:	May grow on a wide range of soils.
Timber Quality:	The timber is popular for furniture making and also for sports equipment such as the unique sticks used in the game known as Hurling. The timber has been used in the frames of airplanes and also cars. The wood is creamy white and darkening to a light brown. It is not durable as it is susceptible to rot and insect attack. The wood has a density of approximately 700 kg per cubic meter.

Medical Overview:

In Celtic mythology the Ash tree is considered to be the World Tree that is the backbone of the universe and spans between this world and others. In Greek mythology the tree was associated with the god Poseidon, and in Norse mythology the Yggdrasil tree is at the center of the nine worlds and on which Odin hung for nine days and nine nights.

Fraxinus excelsior possesses a variety of compounds, some of which are scopoletin (anti-inflammatory), neuronal support (upregulates acetylcholine thereby improving memory and cognition), aesculin (found to be vasoprotective/cardioprotective), fraxetin (improves insulin levels and reduces blood sugar in diabetics), verbascoside (acts as an anti-inflammatory especially on the central nervous systems as well being an antioxidant and antiviral), quercetin (also an anti-inflammatory and antioxidant thought to be useful in the treatment of cardiovascular disease), oleuropein (useful in the reduction of hypertension and is also cardioprotective, anti-inflammatory, antioxidant, anticancer, anti-angiogenic and neuroprotective function), kaempferol (found to exert anticancer effects and is also antioxidant and anti-inflammatory), hesperidin (another cardio protecting compound as well as anti-inflammatory and prevents cholesterol plaques from forming in arteries), and chlorogenic acid (regulates the release of glucose into the blood thereby aiding in the management of diabetes as well as protecting the liver and inhibiting the hepatitis B virus). In a review from 2020 it was shown that *Fraxinus americana* also possesses similar actions as that of *Fraxinus excelsior.*

Further research into the antibacterial and antifungal aspects of the leaf extract showed that it was highly effective in controlling *Candida albicans.* The leaf extract also acts as a diuretic and is used to treat minor urinary tract infections and well as oedema. The sap from the tree can be tapped in much the same manner as the maple tree.

In Greek Mythology when Zeus was a baby and hiding from Chronos, he was fed on the sap from *Fraxinus ornus* called Manna along with goat's milk.

A simple tisane (tea) made from the leaves of the tree is an effective way to enjoy the health benefits.

Genipa americana by Antonio Sérgio Farias Castro from flckr.com

Genipa americana

Primary Functions:	Antiviral (herpes)
Secondary Functions:	Anticancer
Other Functions:	Antibacterial
Common Names:	Marmalade box tree, Genipapo, Huito, Jagua, Hawa, Wituq
Description:	It grows to height of approximately 15 meters and has opposite lanceolate leaves ranging in size from 20 to 30 cm long and up to 20 cm wide. The leaves are dark green. Its flowers may be white, yellow or red up to 6 cm in diameter. The prized fruit is small, thick skinned and up to 8 cm in diameter.
Classification:	| Order: Gentianales | Family: Rubiaceae | Genus: Genipa (3 species)
Origin:	It is native range spreads from Mexico throughout Northern Tropical South America.
Soil Requirements:	G. Americana prefers slightly acid soils with high precipitation up to 4 meters and tropical temperatures in the range of 18C to 28C.
Timber Quality:	Its timber is hard and used in cabinetry, light construction and as fence posts. However, the timber is not durable and suffers easily from termite, borer and fungus. The wood has a yellow to white colour and sometimes pink hues with red/brown streaks.

Medical Overview:

A blue-black dye has historically been made from the green fruits of *Genipa americana*. Initially the juice from the fruit is clear however it oxidizes quickly and turns black allowing it to be used as a dye. There are two trees that have this attribute and are used for skin coloring, the other tree is Henna *(Lawsonia inermis)*. The native Indians of south America have traditionally used this dye as a body paint. The dye is temporary however, as it only penetrates the first few layers of skin cells and as a result disappears 15–20 days after application due to the skin cells being replaced. Research has shown that the fruit possesses a strong antioxidant effect.

Legend and folklore states that *Genipa americana* protects from a parasitic fish found in South America called Candiru. However, research has shown that this is questionable. The Candiru fish is a parasitic fish with back ward facing barbs on their heads that prevent them from being removed once they have lodged on a host. The most famous story concerning this fish is that it follows urine streams up into the human urethra and having to be removed via surgery. However, this has been completely disproved by scientific research.

In research it has been shown that the ethanol extract of *Genipa americana* leaves and bark was significantly effective in the control of herpes, and it has been used as a topical application by the south American Indians for centuries. As a result, *Genipa americana* deserves a place in this volume as antiviral agents derived from trees are uncommon. In research from 2017, it was shown that the fruit extract was effective in the control of the equine herpes virus but not against the human herpes strain. Yet the leaves and bark from the tree were effective in controlling the human herpes strain and not against the equine herpes. The result from this study is of special interest as it clearly demonstrates the differing affects different parts of trees may have on disease control. The leaves and branch ethanol extracts had a 73% and 79% positive control in retarding human herpes.

The main compounds found within the fruit extract of the tree are campesterol, stigmasterol, and β-sitosterol. In the same research paper, the scientist also studied the antimicrobial actions of the fruit extract and against two bacteria *Staphylococcus aureus* and *Escherichia coli*. The results from this study showed that the fruit extract was mildly effective in the control of these two strains of bacteria, however the fruit extract had no effect in the control of candida or other fungi.

Two main antibiotic cyclopentoid monoterpenes have been isolated from the fruit, being geniposidic acid and genipatriol. These compounds are of the iridoid class and have been studied for their anticancer, antibiotic, anti-inflammatory and antidiabetic properties. Research into these compounds can be found from the 1960's until the present time. One paper from Japan in 1991 into the compounds of the tree showed the anti-tumor actions of the tree.

Ginkgo biloba by wal_172619 from Pixabay

Ginkgo biloba

Primary Functions:	Cardiovascular support, Anti-inflammatory, Cognitive support
Other Functions:	Central nervous system, Anticancer, Diabetes, Asthma, Aphrodisiac
Common Names:	Maiden Hair tree, Kew tree, Fossil tree
Description:	Trees normally reach a height of 20–35 meters. The tree has an angular crown and long, randomly placed branches. The root system penetrates deeply into the ground making the tree resistant to wind and snow damage. Its leaves are fan shaped and a uniform verdant green in summer and transitioning to a vibrant yellow in the autumn
Classification:	| Order: Ginkgoales | Family: Ginkgoaceae | Genus: Ginkgo
Origin:	China
Soil Requirements:	Fine silty acid clays with good drainage.
Timber Quality:	The wood is a pale yellow to a caramel colour, often with black streaks. The wood is soft limiting its uses, has a fine uniform texture making it a good prospect for carving and turning.

Medical Overview:

Ginkgo biloba is known as the Fossil tree due to many examples of fossilized leaves of the tree dating back 200 million years. It has been used for several centuries in Chinese herbal medicine and is cited in various ancient herbal texts from China. The tree is now grown throughout the world.

Recently the interest in *Ginkgo biloba* has centered around its reported benefits on cognition and brain function, however when reviewing scientific studies on the effects of its extract many papers have doses as low as 120 mg/kg body weight and up to 300 mg/kg body weight, and the findings do not support any benefit from the herb. Yet, in papers that use 600 mg/kg body weight dosing and above there are improvements in memory and cognition speed. However, the mode of action is still being debated with the main focus on the improved blood supply and oxygenation to the brain attributed to the herb. As a result, those suffering from vascular dementia and other chronic vascular conditions of the brain are the most likely to benefit from the extract.

Yet the unique compounds found in the tree, being ginkgolides andbilobalides, have been shown to be neuroprotective and modulate the effect of gamma-aminobutyric acid (GABA) the main inhibitory neurotransmitter in the central nervous system. They have also been shown to be allosteric modulators which bind to receptors in the central nervous system and make them either more or less sensitive to stimuli. In a review from 2019 in molecular medicine it was further shown that these compounds play a regenerative and protective role in the treatment of brain damage such as in the case of cerebral ischemia. Other scientific results have shown improvements in memory and cognitive function.

Ginkgo biloba also reduces the blood platelet formation to allow the blood to flow more freely, and significantly reduce inflammatory responses in the vascular as well as the central nervous systems.

Several studies have been conducted into the possible use of the leaf extract from *Ginkgo biloba* to treat sexual dysfunction. It was noted that geriatric patients being treated for depression with antidepressant drugs suffered from lack of sexual desire and in the case of men erectile dysfunction. Yet, those male patients also receiving *Ginkgo biloba* had a reported improvement in erectile issues. The surprise outcome from these studies was that the leaf extract was more effective for women in all aspects of sexual health such as arousal, lubrication, fantasy and orgasm. These finding support the use of *Ginkgo biloba* as an aphrodisiac.

Gmelina arborea by Dinesh Valk from commons.wikimedia.org

Gmelina arborea

Primary Functions:	Anti-ulcerative, Analgesic
Secondary Functions:	Antipyretic (fever reduction), Diabetes management
Other Functions:	Diuretic, Immune system stimulant
Common Names:	Malay Beech tree, Yemane, Gamhar, Gambhari, Shewan, Shivani, White Teak, Candahar tree
Description:	It is a deciduous fast growing tree reaching heights of 30 meters. The bark is a pale gray. The leaves are a simple heart shape up to 20 cm long and arranged opposite each other. Flowering occurs in February to April in its native range and when the tree is leafless. The flowers are small (4 cm) trumpet shaped and hairy. The fruits are small drupes of approximately 2 cm in length and may contain up to 4 seeds.
Classification:	| Order: Lamiales | Family: Lamiaceae | Genus: Gmelina
Origin:	It is spread throughout India and surrounding nations such as Malaysia, Myanmar, Thailand, Laos, Cambodia, Vietnam and in southern provinces of China.
Soil Requirements:	It prefers moist well drained fertile soils, with a typical tropical rainfall pattern of a range between 800 mm to 4500 mm per annum.
Timber Quality:	The timber is a much sought-after timber and highly prized. As a result, there is a large international market for the timber. Its colour is pale yellowish to white. When freshly cut it may have pink hues. The timber is very stable once dry and is used in boat building, construction, fine cabinetry, musical instruments and more. It is moderately resistant to termite and borers.

Medical Overview:

Gmelina arborea has long been utilized in the Ayurvedic medicine of India. Indeed, it is often found mentioned in ancient texts as one of the main medicinal ingredients in this ancient medicinal system. Naturally, many claims have been associated due to the buildup of time and legend, and with many being disproved by science. However, science has also verified that the tree is a highly useful for the treatment of several conditions.

At doses of 250 gm/kg body weight the leaf and stem ethanol extract proved highly efficient in protecting the gastrointestinal tract from ulcerative conditions. As a result, the extract of the tree is recommended for inflammation and ulceration of the entire gastro-intestinal system.

Further, whilst it has been claimed that the leaf and bark extract possess significant antibiotic actions, it has been shown to be not quite true. Rather, the extract from this tree is effective at controlling two main bacteria being *Staphylococcus aureus* and *Streptococcus pyogenes*. These two bacteria are responsible for boils and wounds that become infected and ooze pus. Therefore, the use of *Gmelina arborea* as an antibiotic agent should be restricted to wound healing and boils.

Further research has shown that doses of 150 mg/kg body weight reduced blood sugar levels significantly and was comparative to the standard drug glibenclamide with a dose of 2 µg/kg. The action that the extract is believed to enhance is the uptake of glucose by the cells. Therefore, it is seriously considered as an adjunct in the treatment of diabetes.

A further attribute of the tree is the diuretic action that the extract induces. It has been shown that the methanol extract of the leaves inhibits the reabsorption of water in the kidneys and therefore enhances urine output.

At doses of 420 mg/kg body weight the tree extract displayed similar analgesic and fever reduction actions similar to the standard drug paracetamol at doses of 50 mg/kg. This is thought to work more on the peripheral pain conditions such as neuralgia and inflammation.

At doses of 100 g/kg body weight the extract has been shown to anthelmintic (parasite control) therefore one side effect of the use of this tree for the above conditions is that it will aid in the removal of intestinal worms.

Finally, the extract of *Gmelina arborea* has been shown in clinical studies to increase white blood cell count and therefore is labelled an immune stimulant.

The toxicity testing of *Gmelina arborea* has shown that it is safe to take in dose up to 2 g/kg body weight.

Guaiacum officinale by young shanahan from flickr.com - commons.wikimedia.org

Guaiacum officinale

Primary Functions:	Thrombosis, Angina
Secondary Functions:	Antiviral
Other Functions:	Anti-inflammatory, Analgesic
Common Names:	Rough Lignum vitae, Guaiacum tree, Guaiac wood. Gayak fran, Gayak, Frazostraee, Pokhout, Lignum-vitae tree, Gum guaiacum, Guaiacum, Arbredevie, Boissaint, Gaïac,Gaïacbâtard, Gaïacfranc, Gaïacmâle, Gaïacofficnale, Guajakholz, Franzosenholz, Guajaco, Legnoguajacano, Legnosanto, Guyaiaco, Palosanto, Guayacan, Guayaco, Lenosanto, Bakaut, PanosantodelasIndias, Fransosenholts, Lignum-vitae
Description:	It is a small tree growing to an average of 10 meters. The flowers are a bluish purple when young and turn to white as they age. The flowers have ten erect protruding stamens. The leaves a compound, drab olive green with a leathery nature. The fruits of the tree are a flat round shape that matures into a yellow orange colour and have a red internal flesh and black seed.
Classification:	| Order: Zygophyllales | Family: Zygophyllaceae | Genus: Guaiacum
Origin:	It is spread throughout the Caribbean and the Northern Coast of South America.
Soil Requirements:	It grows on a range of soils.
Timber Quality:	The timber is one of the hardest timbers known and is called *Lignum vitae* which means Wood of Life in Latin. The timber is the densest timber traded and is used for gears, motor shafts and bearings. Another unique aspect of the timber is its ability to self-lubricate. The average weight of the timber when dried is 1,260 kg/m. The timber is still used in specialized machinery, bowling balls and mortar and pestles.

Medical Overview:

Guaiacum officinale is the nation flower of Jamaica. The timber has been used throughout maritime history when it was used on the galleons of the Spanish and then in more recent times in the engine rooms of both steam and diesel ships. More recently it has been replaced by metals and synthetic materials. Whilst the timber is renowned for its properties the tree has been used by the native peoples of northwestern South America and also the Caribbean as an herbal medicine.

It is traditionally used for inflammatory conditions such as arthritis and rheumatoid arthritis. It is also recommended in treating gout as it is thought to remove uric acid from the body. Claims that it possesses antibacterial actions have also been attributed to the tree. The main parts of the tree that is used is the timber, bark and the leaves.

In more recent times researchers have found that the leaf extract is useful in the removal of blood clots. In a research paper from 2017 it was shown that the ethanol water extract derived from the leaves was only slightly less effective than the standard drug streptokinase in reducing thrombosis (blood clots). Whilst the results showed the ethanol extract promoted clot lysis (destruction of clots) by 81%, streptokinase showed 91%. In other literature the extract derived from both the bark and the leaves improved overall blood circulation and is used in the treatment of angina.

In the same research it was shown that the antioxidant actions of the ethanol extract displayed significant results equal to or slightly less than the control being ascorbic acid. The actions of the extracts from this tree are thought to be due to new and novel compounds discovered from it.

In 2014 additional research was undertaken to substantiate the antiviral claims of the tree. This research concluded that the leaf, seed and twig methanol extract had similar or greater results in controlling the virus HIV-1 than the standard drug betulinic acid. This finding indicated that the methanol and or ethanol extract may be used in the management of viral conditions.

The gum or resin from the tree is called Guaiac gum and is today used as a food preservative and antioxidant. Yet, the gum is also used in medicine as a test for blood in stool or feces. The gum will react with the blood and turn blue indicating bleeding in the bowel.

Handroanthus impetiginosus by 2006 Carla Antonini - Autoría propia.commons.wikimedia.org

Handroanthus impetiginosus

Primary Functions:	Anticancer
Secondary Functions:	Antibacterial, Antiviral
Other Functions:	Anti-inflammatory, Analgesic
Common Names:	Pink ipê, Pink lapacho, Pink trumpet tree, Lapacho Negro, Tahuarinegro, Ebanoverde, Groenhart, Puy, Yellow Poui, Ebene Verte,Pau D`arco, Acapro, Cortéz, Akkeja, Akkekeja, Bowwood, Calabazo, Paratodo, Washiba, Ipê, Polvillo, Amapá Prieta, Iron Wood, Guayacán, Cortés, Anago Switie, Canaguate, Hakia, Tahuari, Roble Morado, Cañaguate morado, Tajibo, Polvillo, Araguaney Poi, Piúva, Ipê Una, Ipê Rojo, Red Ipe
Description:	The tree is a rather large deciduous tree, with trunks sometimes reaching 30 meters in height. The leaves are palmately compound with usually 5 leaflets. In India, the flowering season is December to January, after the leaves are shed. Pink lapacho flowers between July and September, before the new leaves appear.
Classification	| Order: Lamiales | Family: Bignoniaceae | Genus: Handroanthus
Origin:	It is found throughout South America from Mexico to Argentina.
Soil Requirements:	As its range indicates the tree grows in a varied soil types and climatic conditions.
Timber Quality:	The timber has a clearly defined yellow sapwood and a yellowish-brown heartwood. The grain is fairly, straight and interlocked. The durability of the timber makes it resistant to marine borer and therefore the timber is considered to be highly durable.

Medical Overview:

Handroanthus impetiginosus has been used in traditional medicine for many centuries by the Incas, Aztecs and other peoples of south America. Today, it is cut down for its timber, harvested and sold as dried bark for infusions, or to make herbal medicines. It is interesting to note that the retail price of dried bark from the tree is worth much more than the timber only. In the rain forests of south America indigenous tribes use the inner bark of the trunk for healing infections and against many common ailments, ranging from flu to yeast infestations and malaria. In Paraguay, the crude drug is used against wounds, inflammations and cancer. It is also the national tree of Paraguay

The antioxidant activity of the tree has been established in many research papers. One written in 2015 in Portugal found that the methanol extract of the bark from the tree had the highest antioxidant effects when compared to the standard drug trolox.

A unique compound named xyloidone found in the extracts from the tree is considered to be the main antimicrobial and antiviral agent. In further research into the antibacterial nature of the tree it was found that the extract had significant effects on retarding the growth of the Helicobacter pylori which causes ulcerations in the gastro-intestinal system. Therefore, the use of the extract from the tree is useful in the management of stomach ulcers. The results in clinical trials showed the extract from the tree to equal to or be higher than the standard drug metronizide. Other research has supported the use of the tree in the control of other bacterial strains as well. In this research the authors also studied the extract's effects on various fungal conditions and showed that these can also be managed with Handroanthus impetiginosa extract.

A great deal of interest was shown toward Handroanthus impetiginosus from the 1960's when it was found that the bark of the tree had cancer curing properties. The main compound from the tree associated with the cancer management actions of the tree is lapachol. In one research paper it was found that only the alcohol extract showed cytotoxic actions, as lapachol and other quinoids are not water soluble. It has been used in South America to manage and in some reported cases to cure completely a wide range of cancer types.

It was further shown that Handroanthus impetiginosus has shown significant use as a chemotherapy mitigating medicine, whereby it reduces the damage caused by the use of chemotherapy. Therefore, this research has shown a comprehensive use for the bark extract in cancer management. The extract has also been shown to be a liver protecting substance.

Research into the claims that extract from the tree have endorsed its use as an anti-inflammatory and pain management medicine as a result it is useful in the treatment of arthritis and other inflammatory conditions. The extract from the tree is also employed to control viral conditions such a herpes, influenza, HIV and others. Research into this use have supported such actions.

Hernandia nymphaeifolia by Bishnu Sarangi from Pixabay

Hernandia nymphaeifolia

Primary Functions:	Anticancer
Secondary Functions:	Antiplatelet (clumping of red blood cells), Anti-inflammatory
Common Names:	Lantern tree
Description:	The tree that can grow up to 22 meters high. The leaves are dark green and ovate. The flowers are white or greenish, hermaphrodite, with fragrant odour; male and female are separated. The fruit is fleshy, waxy red or white and round with a hollow center in which the seed is found.
Classification:	| Order: Laurales | Family: Hernandiaceae | Genus: Hernandia
Origin:	This species is found extensively throughout the tropics.
Soil Requirements:	It grows exclusively in coastal areas.
Timber Quality:	It has been used in South Pacific islands for fishing rods, fish net floats, wooden sandals, fan handles, drawing boards, canoe accessories, furniture and firewood. It is considered to be a perishable timber.

Medical Overview:

Hernandia nymphaeifolia has been used as a medicinal tree for many centuries in the Pacific region and as such many claims have been made as to its ability to treat a range of medical conditions. However, the largest amount of research on this tree has had to do with its antitumour or cytotoxic potential. The tree is named after the Spanish botanist Francisco Hernandia Cordigera.

Research has supported the actions of the stem bark in the treatment of tumour growth and also the treatment of people susceptible to blood clots. In research almost 50 compounds found in Hernandia nymphaeifolia have been tested for their antitumour properties and showed results similar to the drug mithramycin, thereby supporting its use in this area. Various cancers were tested with Hernandia nymphaeifolia extract. These cancers cell lines were mouth epidermoid, lung cancer, human tumour cell line and lymphocytic leukemia. In a research paper from 2003 various compounds were attributed with the suppression of cancer cell lines. Further research from Belgium in 2005 showed that the bark extract from the tree was many times more effective than the standard drug mithramycin in the suppression of certain cancer cell lines. These are just a few papers on the cytotoxic (quality of being toxic to cells) nature of the tree (cancer management).

Hernandia nymphaeifolia has been found to have various unique compounds which have been named after the tree.

The extract from the leaves and fruit of the tree has been reported to be antibacterial as well as anti-inflammatory however the research on these aspects is not as great as that looking at the cytotoxic applications of the tree. Research from Taiwan in 2018 has shown the presence of anti-inflammatory compounds.

In 1999 a research team in Taiwan found that the bark extract from the tree showed significant antiplatelet aggregation (clumping of red blood cells). The research proved that the extract from the tree may be used in the treatment of diseases where blood clots pose a significant risk, such as thrombosis, stroke, aplastic anemia, fibrosis etc. The extract may be used to replace or support the use of aspirin as a blood thinner. However, people with profuse bleeding issues and women going through their monthly cycle may treat this extract with caution.

Hibiscus tiliaceus by Sandid from Pixabay

Hibiscus tiliaceus

Primary Functions:	Anti-inflammatory
Other Functions:	Antioxidant, Anticancer, Male contraceptive
Common Names:	Sea hibiscus, Beach hibiscus, Coastal hibiscus, Green cottonwood, Native hibiscus, Native rosella, Cottonwood hibiscus, Kurrajong, Sea rosemallow, Balibago, Malabago or Malbago, Waru, baru or Bebaru, pagu, Hau, Fau, Purau and Yau tree
Description:	It reaches a height of 4–10 meters, with a trunk up to 15 cm in diameter. The flowers are bright yellow with a deep red center upon opening. Over the course of the day, the flowers deepen to orange and finally red before they fall. The branches of the tree often curve over time. The leaves are heart shaped.
Classification:	| Order: Malvales | Family: Malvaceae | Genus: Hibiscus
Origin:	Austral-Asia and the Pacific oceans nations.
Soil Requirements:	Slightly acidic alkaline soils.
Timber Quality:	Its timber is light weight and has a good strength to weight ratio making it an ideal wood for boat building. It was also used as floats for fishing nets. The timber turns well and as a result is sought after for furniture making. The colour is predominantly white with a dark core.

Medical Overview:

Hibiscus tiliaceus is a unique plant for many reasons however the most interesting fact is that it has been planted intentionally all throughout the pacific by the ancient Polynesian and Melanesian seafarers. These master navigators did so due to the fine and strong ropes they were able to make from the inner bark that enabled them to sail their ships across vast distances and in all types of seas. In Hawaii, the tree is called Hau, in Fiji it is called Vau, in Samoa it is called Fau and in Tahiti it is called Purau therefore it can be seen the etymology of the name lends support to the claim that the tree was intentionally planted and did not haphazardly migrate to these distant shores over time.

All the ancient seafaring peoples considered Hibiscus tiliaceus of being imbued with spiritual and religious importance. In Hawaii, folklore claims that the tree is the physical manifestation of the sister of the Goddess Hina who was either the mother, wife or sister of the god known as Maui. In all other regions of the Pacific and also Asia folklore contains references to this tree.

Chemical constituents reported are gossypol (male contraceptive, anticancer, anti-endometriosis, anthelmintic), mansonones – D and F (antifungal), gossypetin glycoside (antibacterial), hibiscones (anticancer), hibiscoquinones-A & D, lapachol (anticancer, antibacterial and antimicrobial), quercetin (anti-inflammatory, anticancer), kampferol (cardiac tonic, anticancer) and p- coumaric acid (melanin modulator and skin whitening). friedelin, stigmasterol (steroid, cardiovascular) β-sitosterol (anticholesterol, anticancer), vanillin (antibacterial), syriacusin A, hibiscolactone, scopoletin (anti-inflammatory), cleomiscosin C, fumaric acid, daucosterol, azelaic acid, succinic acid, and rutin.

Hibiscus tiliaceus has been used to treat skin infections due to the coumaric acid and other antibacterial compounds found in the tree. Also, it has been shown that the leaf extract is a powerful antioxidant as well as an anticancer therapeutic, retarding tumor growth in several different types of cancers. The flowers have been shown to be antidepressant and the roots of the tree have the highest levels of the compound known as gossypol which is used as a male contraceptive as well as anticancer. Care should be taken as the is a fair amount of controversy as to the levels of gossypol in Hibiscus tiliaceus as the compound is considered toxic and therefore the tree and its extracts are better utilized topically rather than internally.

To make the rope or cordage from the tree long sections of bark are stripped off the branches keeping the bark as long and complete as possible. The outer bark is scrapped off which will leave fines fibers of the inner bark. These fibers are soaked in sea water for several days and then woven into ropes and string.

Holarrhena antidysenterica by Sreekanthkamballur from commons.wikimedia.org

Holarrhena antidysenterica

Primary Functions:	Anti-inflammatory, Analgesic
Secondary Functions:	Antibacterial (digestive system, urinary system)
Other Functions:	Hypoglycemic, Laxative
Common Names:	Kutaja, Kurchi, Conessi bark, Inderjo tulkh
Description:	A small shrub or deciduous tree, up to 13 meters in height, with a milky latex (Plate 34). The bark peels off in flakes and is grey to pale brown in colour. The leaves are shiny on the upper surface, dull and hairy on the lower, opposite, subsessile and elliptic. The flowers are white, in terminal corymbose (level with all flowers on the same level or plane) bunches, the fruits are cylindrical, dark grey with white specks, and occur in pairs; the seeds are light brown, 0.5-1.5 cm long, with long tufts of hair.
Classification:	| Order: Gentianales | Family: Apocynaceae | Genus: Wrightia
Origin:	It is found all over India and other Asian countries.
Soil Requirements:	It grows well in deciduous forests and open wastelands.
Timber Quality:	There is no information on the timber characteristics.

Medical Overview:

Holarrhena antidysenterica is one of the main medicines from Unani and Ayurveda traditional medicine. As such it has been greatly studied of the past decade and many of the attributes associated with the use of this tree have been supported.

It has been shown in research, carried out in 2014 in India, that the ethanol extract of the leaf and bark from this tree displayed significant antibacterial activity against various multi drug resistant bacteria that was comparable to the standard antibiotic chloramphenicol. However, it was realized that the leaf extract was much more effective than the bark extract. The zones of inhibition in some cases showed the extract had a greater result than that of chloramphenicol. Therefore, the leaf and bark extract may be used in the control of infectious diseases and the research further supports the use of the extract in the treatment of diarrhea and dysentery. Of the bacteria tested the following results emerged from the research; Klebsiella aerogenes 24 mm, Escherichia coli 21 mm, Salmonella enterica 19 mm, Salmonella typhi 18.5 mm, Shigella dysenteriae 22 mm, Shigella sonnei 18 mm and Vibrio cholerae 19 mm.

The seeds of the tree have long been used in the treatment of diabetes. Various research papers have been written on this aspect of the tree and it was found that at doses of 250 mg/kg body weight the seed extract did indeed have positive results. The leaf extract from the tree has also been researched for hyperglycemic control and found to be effective at doses of 400 mg/kg body weight and comparable to the diabetic drug glibenclamide. Within the research into the antidiabetic properties of the seed and leaf extract made from Holarrhena antidysenterica it was also found that the extracts had a positive effect in reducing cholesterol levels in the blood as a result the seed and leaf extract are considered to have anti-hyperlipidemic (fat reduction) properties.

Holarrhena antidysenterica has long been studied for its anti-inflammatory and analgesic properties. One such study conducted in 2010 found that the methanol extract at doses of 200 mg/kg body weight had slightly lower effects on both inflammation and pain thresholds than the standard drugs being aspirin and diclofenac sodium. In more recent research the main compound responsible for these actions was isolated from the tree and found to be conessine a steroid alkaloid, which has strong antihistamine properties. Therefore, the methanol and ethanol extract of the leaves, bark and seeds from the tree may be used in the management of inflammatory conditions such as asthma, rheumatoid arthritis etc.

It is of further interest that the isolation of conessine from Holarrhena antidysenterica has shown in research from 2017 that the extract from the tree acts as a larvicide and is recommended for the control of mosquito larvae in the reduction of malaria vectors. This research enhances the claims that the ethanol extract of the leaf and bark possess anthelmintic (worms) control and their removal.

Other compounds from Holarrhena antidysenterica are ergosterol, holarrhenine, kurchicine. It is believed that one of these or perhaps a combination of them is responsible for the stimulation of the gastrointestinal tissue and at higher doses the relaxation of the same tissue which has been associated with the use of the tree in the treatment of constipation and other gastrointestinal problems. A paper written on this aspect of the tree was published in 2010.

Claims that the tree has a beneficial effect in the treatment of Vitiligo (Leukoderma) have not been supported.

Hydnocarpus pentandra by FarEnd2018 from commons.wikimedia.org

Hydnocarpus pentandrus

Primary Functions:	Leprosy, Skin irritation
Secondary Functions:	Antibacterial
Other function:	Antifungal, Anti-inflammatory
Common Names:	Chaulmugra, Thotti maram, Suranti, Surti, Mirolhakai, Toratti, Chalmogra Yenne Mara, Kotti, Marotti, Maravetti, Thamana, Nirvatta, Neeratti, Nirvetti, Maravatty, Niralam, Kodi Niradi, Niralam, Koti, Kadu-Kavath, Kadu Kawath, Kastel, Kantel, Tuvrak, Neerutti Garudaphala, Neeradi-muthu, Attuchankalai, Adi-badam
Description:	A medium sized tree growing up to 10 meters. The leaves a long spear shaped and alternate whilst the flowers are small racemose in character. The fruit is round and globulous approximately 5-7 cm in width with the large brown seeds contained in a white pulp.
Classification:	| Order: Malpighiales | Family: Achariaceae | Genus: Hydnocarpus (73 members)
Origin:	It is found throughout Western India.
Soil Requirements:	It grows well in deciduous forests and open wastelands.
Timber Quality:	The timber is considered to be moderately hard with a dry weight of approximately 510 kg per cubic metre. The timber is not considered to be durable and as such is used in light construction and for making matches and packing cases.

Medical Overview:

The Hydnocarpus genus has approximately 73 members of which 40 are found in central and eastern Asia. The trees have been used for millennia in Ayurvedic, Unani, Siddha and Chinese health practices. In most cases various trees appear to be interchangeable in what is considered one of the most famous tree classes from this region. Primarily the oil derived from the seeds of the fruits from a select number of the Hydnocarpus genus has been called chaulmoogra oil and has been used in the early 19th Century and 20th Century as the prime medication for treating Hanson's Disease. It is a matter of contention as to which member of the genus was the most effective. In early texts the oil derived from Hydnocarpus kurzii was believed to be the most effective. Then later the oil derived from Hydnocarpus wightania and in more recent times Hydnocarpus pentandra. However, all of these deliver similar or the same effect. Other notable members used in this manner are H.alpine, H.anthelminticus, H.laurifolia, H.hainanensis and H.annamensis have all been used.

Hanson's disease is more commonly known as leprosy and was untreatable for most of human existence. The bacteria responsible for this condition was identified as Mycobacterium leprea and has proved difficult to control until recently where a mixture of antibiotics is now used in the treatment. Yet prior to this revolution of the antibacterial medications the oil from the tree known as chaulmoogra oil was the most effective leprosy treatment and was used topically, internally, and also via injection. As a result, the trees have been planted pan globally for this main purpose of leprosy management.

The primary use of the oil is for the treatment of all manner of skin disorders such as eczema, rosacea, acne, burns, and inflammation. The clinical research has supported these claims and shown that whilst chaulmoogra oil is a mild antibiotic the presence of unique compounds such as hydnocarpic acid, gorlic acid, hydnocarpin and chaulmoogric acid may also aid in the oil being effective in the treatment of leprosy.

Today the oil from the seeds may play a major role in cosmetics and other skin treatments if it becomes popular outside its traditional regions. Yet even within its traditional range of the western Gats of India Hydnocarpus pentandra is considered endangered and is on the IUCN Red List Categories and Criteria (CITE red list) of threatened plants due to over harvesting.

Additional research has shown that the oil and the ethanol extract derived from the leaves also have antioxidant properties which enhances the use of the tree for the treatment of inflammation or long-term conditions. Therefore, both the ethanol extract and the seed oil may be used to treat skin complaints.

Further research was conducted into the ability of the tree and its constituents in the control of worms and insects. The findings from this research in 2017, supported the use of the oil and extract in the control of parasites and insects as well as fungi. This research focused on the ethanol leaf extract and the results show that the tree has a broad range of actions that may combine to make the use of the tree more effective than one action alone.

Hymenaea courbaril by mauroguanandi from commons.wikimedia.org

Hymenaea courbaril

Primary Functions:	Asthma
Secondary Functions:	Anti-inflammatory
Other Functions:	Antiviral
Common Names:	Courbaril, Jatoba, West Indian locust, Brazilian copal, Amami-gum, Brazilian Cherry, South American Cherry, Stinking Toe, Old Man's Toe, Stinktoe
Description:	The tree may grow to more than 30 meters in height and achieve a diameter at breast height of more than 100 cm. It is an evergreen tree and rarelThe seeds pods are large sausage shape fruits, and the leaves are simple alternate.
Classification:	| Family: Leguminosae | Genus: Hymenaea | Species: courbaril
Origin:	From South America and more precisely the Brazilian rainforest, however it may be assumed that the tree is found and originates throughout the Amazon basin and tropical South America.
Soil Requirements:	The tree grows to prodigious heights within South American rain forests on a variety of soils from deep, well-drained to shallow and rocky.
Timber Quality:	The wood of the tree is renowned for its hardness and weight. Commonly used in flooring and construction it is also used for fine furniture. The colour of the timber is a tan pink colour with black accent stripes that turn dark red overtime. It is a highly prized and therefore valuable timber on the South American and International markets. 2,350 lbf (10,500 N) on the Janka scale.

Medical Overview:

Hymenia coubaril or Jatoba is much sought after for its timber the tree has long been known for its medicinal and nutritional values. It is well known throughout Brazil and the equatorial regions of south America and has been used by its indigenous peoples for centuries, using its fruit as an ingredient in cakes and cookies. Research into the medicinal and health claims made about the tree are delivering detailed findings that endorse the traditional usage. One such research paper from 2014 found evidence to support the use of the xylem (sapwood) exudate (sap) called fisetin as a strong antifungal and can be used to treat a wide range of fungal infections. Within the sap the compounds fisetinediol, fustin, 3-O-methyl-2,3-trans-fustin and taxifolin have been identified.

Research in 2013 further supported the use of Hymenia courbaril as an anti-inflammatory and also a muscular relaxant. The conclusions of this research support the use of the extract from the tree in treating such conditions as asthma, hypertension and muscular dysfunction.

Another traditional claim is that the leaf extract from the tree is effective in treating diarrhea. One such cause of this condition is via the infection by the rotavirus and in 2011 a team of scientists from south America sought to understand if the ethanol leaf extract from the tree could act as an antiviral medication. Their research confirmed that the leaf extract did have significant positive effect in stopping the rotavirus from replicating and therefore may be considered an antiviral medication.

Hymenia courbaril is also considered an excellent antioxidant and in research from 2016 it was shown that a 70% ethanol water extract of the seeds was the most effective preparation from the tree in regard the antioxidant potential.

Hymenia courbaril is considered nontoxic.

Ilex paraguariensis by C T Johansson from commons.wikimedia.org

Ilex paraguariensis

Primary Functions:	Antioxidant, Anti-inflammatory
Secondary Functions:	Antidiabetic
Other Functions:	Anti-obesity
Common Names:	Yerba mate, Yerba-maté
Description:	It can grow up to 15 meters stall. The leaves are evergreen, 70–110 millimeters long and 30–55 millimeters wide, with a serrated margin.
Classification:	| Order: Aquifoliales | Family: Aquifoliaceae | Genus: Ilex
Origin:	It is widely cultivated in Central & Southern region of South America.
Soil Requirements:	It often grows in mountainous tropical conditions.
Timber Quality:	There is no information on the timber characteristics as the entire tree is used in the making of the Yerba mate beverage.

Medical Overview:

Ilex paraguariensis originates in the region of Paraguay and has long been used by the traditional people of the region, the Guarani people. As can be ascertained from the information so far, the scientific name of the tree is derived from the location (origin), and the native people/culture are thought to be the first users of the herb derived from the tree.

The leaves of the tree might be the third most popular herbal drink apart from Camelia senensis (tea) and Coffea Arabica (coffee). It is estimated that the annual production of the leaves from the tree may be close to a million tons per annum, most of which is drunk in South America. The herb is now exported globally and has found wide acceptance in many countries. The fine stems of the tree are also ground into powder and used in the same way as the leaves.

The herbal infusion of the leaves is commonly called yerba which was given to the drink by the Spanish and simply means herb. The drink is also known as mate which comes from the native language of Peruvian highlands known as Quechua. The main stimulant found in yerba/mate is caffeine at levels slightly more than half found in coffee.

In research the claims that mate/yerba may be a significant weight loss and diabetes management agent have been supported. In research and in vivo studies, it was found that I. paraguariensis reduced both blood glucose levels as well as cholesterol levels.

Research from 2013 the hepatoprotective (liver) effects were endorsed and it was shown that the leaf extract has beneficial actions on the liver as well as reducing cholesterol levels in the liver itself. A diet of mate fed to laboratory rats did show a reduction in thiobarbituric acid and thereby protected unsaturated fatty acids from oxidation. Also, in 2013 researchers focusing on other aspects of the tree found that the stem bark extract had significant anti-inflammatory actions supporting its use in the management of arthritis and other autoimmune diseases.

Whilst there has been a great deal of claims made about the medicinal benefits of mate (Ilex paraguariensis) it has been shown over time that the herb does indeed result in significant health benefits. However, in the claims that the herb can help in the management of cancers has been called in to question as research has found that overconsumption of the herb appears to result in the development of cancer, which is the reverse of the historical claims in regard this aspect.

The use of Ilex paraguariensis in the management of obesity has also been supported via clinical research. The actions responsible for the weight loss is not clearly known however it is believed to be as a result of the herb increasing or elevating the metabolic rates whilst at the same time reducing cholesterol and blood glucose levels. Therefore, the use of mate for both weight loss and diabetes may be beneficial.

The antioxidant aspects of the leaf extract are well documented and the tea from the tree has similar actions to the more traditional Asian and European consumption of Camelia sinensis (tea). Whilst there has been an association in regard overconsumption of mate and the development of certain cancers a lower consumption may have the opposite therapeutic effect and retard the development of tumors.

In 2010, it was shown that the herb infusion acted as a diuretic and therefore may be useful in the management of edema.

Illicium verum by Hugo Aitken from Pixabay

Illicium verum

Primary Functions:	Antiviral
Other Functions:	Anti-inflammatory, Anticancer
Common Names:	Star anise, Bunga-lawing, Semanis, Anice stellate, Ba chio, Anasphal, Hakkaku-uikyo, Anis de la Chine, Anise etoile, Anis estrellado, Bajiaohuixiang
Description:	An evergreen tree up to 15 meters tall. Trunk about 25 cm in diameter with white bark. The leaves are glossy, leathery leaves are held in bunches of three to six. The flowers are solitary, yellow-green, sometimes flushed pink to dark red, with 7-12 tepals, up to 20 stamens (male organs) and usually 7-9 carpels (female organs). Fruits are star-shaped, consisting of a ring of single-seeded, dark reddish-brown carpels attached to a central column. The fruits are fleshy, but on drying become woody and wrinkled.
Classification:	| Order: Austrobaileyales | Family: Schinsandraceae | Genus: Illicium
Origin:	Tropical China and Northern Vietnam.
Soil Requirements:	Varied.
Timber Quality:	The timber is fragrant and is used both for construction and furniture.

Medical Overview:

Illicium verum is translated from Latin as illicio = entice/seduce and verum = genuine.

This tree has been used in China for centuries for the warming yang method and dispelling colds and regulating the flow of Qi to relieve pain or common colds, nervousness, and sleeplessness and also as a sedative. In other regions of the world the oil and also tea are used to reduce colic in small children and flatulence in the more aged children.

The primary use today other than in cuisine is the production of the universal influenza medication known as Tamiflu. The active principle is shikimic acid which Illicium verum is the highest natural source. Shikimic acid is both preventative and used post infection as it inhibits a virus from replicating in the host body by blocking neuraminidase and thereby stopping the virus from an infected cell from getting out to infect other cells in the host. Research from 2007 conducted in China isolated two compounds named illiverin and tashironin from the roots of the tree that also showed significant antiviral actions against HIV. In essence the extract from the tree may act as a potent antiviral medication.

The essential oil from the fruit of the tree has long been considered useful in the management of cancer and inhibition of tumor growth. Reports from 2015 showed that the essential oil did exhibit antitumor actions against breast cancer, cervical carcinoma, fibrosarcoma, and Ehrlich ascites tumour largely due to one major compound found in the tree known as trans-anethole. In 2015 further research was conducted to ascertain the positive effects of the essential oil on colon cancer. The findings from this research did support the essential oil in arresting tumor growth in colon cancer and therefore proved to be a useful cancer management tool.

It is the presence of trans-anethole that also give Illicium verum its antifungal actions. It is thought that the extract from the tree is a significant antibacterial however there are better tree sources in this regard.

The anti-inflammatory actions of Illicium verum has also been studied extensively. One paper from 2018 compared the extract from the tree to the actions of aspirin. The findings from this study showed that at 500 mg/ml the extract had similar actions to aspirin at a dose half that of the extract.

Care should be taken in identifying Illicium verum as its relatives, especially Illicium anisatum are poisonous. The Japanese Star anise tree, known as the Shikimi tree, contains the compound anisatin which causes life threatening inflammation of the bodies organs and eventually respiratory failure leading to death.

Jacaranda mimosifolia by Patty Jansen from Pixabay

Jacaranda mimosifolia

Primary Functions:	Antibacterial
Secondary Functions:	Cancer management
Other Functions:	Anti-inflammatory, Analgesic
Common Names:	Jacaranda, Blue jacaranda, Black poui, Fern tree
Description:	The tree grows to a height of 5 to 15 m. Its bark is thin and grey-brown in colour, smooth when the tree is young though it eventually becomes finely scaly. The flowers are up to 5 cm long and are grouped in 30 cm panicles.
Classification:	| Order: Lamiales | Family: Bignoniaceae | Genus: Jacaranda
Origin:	It is a sub-tropical tree native to south-central South America.
Soil Requirements:	It grows widely in any type of soil.
Timber Quality:	The timber is yellowish-white, hard, moderately heavy, fine textured, easy to work, and is used for carpentry.

Medical Overview:

The capital of South Africa, Pretoria, is well known for the abundance of Jacaranda trees along its streets and the city is referred to as the Jacaranda city. The tree has been extensively planted around the world in tropical zones. In Australia, the tree is found throughout the warmer more temperate climates.

A great deal of research has been conducted into the claims that the bark and flower extract from *Jacaranda mimosifolia* has antibacterial properties. Research from 2015 had positive results with the stem bark extract against *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus*. With results greater than the standard drug used as a control being gentamycin. Other research had similar results while using the standard drug ciprofloxacin and also amoxicillin. However, in some research it was shown that the extract was not effective in controlling *Salmonella Typhi* which is the bacteria that causes typhoid fever. As a result, the extract from *Jacaranda mimosifolia* has been shown to be a highly effective antibacterial medicine except for the treatment of typhoid.

A unique compound found in *Jacaranda mimosifolia* named jacaronone is thought to be effective against cancer cell lines. In research conducted in Egypt in 2017 showed that the leaf ethanol extract, inhibited tumour growth by up to 42% for both liver and cervical cancer lines. Within this research the ability of the leaf extract to act as a liver protective medication was also supported as well as the ability of the extract to reduce blood sugar levels by as much as 59% which supports its use in the management of diabetes. Recent research from 2017 supported the use of the methanol leaf extract from the tree in support of liver function and protection. Further testing of the extract derived from the tree has shown anti-inflammatory actions as well as analgesic (pain management).

It was also found that the leaf extract from the tree was more effective as an antioxidant than vitamin E. Further endorsing the extracts derived from the tree in the treatment of degenerative diseases and cancer.

As a result, the tree *Jacaranda mimosifolia* has a wide range of applications which support its use in traditional medicine.

Kigelia africana by Margaret Donald from commons.wikimedia

Kigelia africana

Primary Functions:	Antimalarial
Secondary Functions:	Antibacterial, Antifungal
Other Functions:	Male fertility, Cosmetic, Anti-inflammatory
Common Names:	Sausagetree, Cucumber tree, Worsboom, UmVunguta, Umfongothi, Modukguhlu, Muvevha, Pandoro, Saucissonnier, Fauxbaobab, Mvun-gunya, Mwegea, Mwicha, Mranaa, Balam kheera, Hathi bailan
Description:	It is a tree growing up to 20 meters tall. The bark is grey and smooth at first, peeling on older trees. The leaves are 30–50 cm long, pinnate, with six to ten oval leaflets up to 20 cm long and 6 cm wide. The fruit is a woody droop up to 100 cm long and up to 18 cm thick with significant weight of up to 10 kg, and hangs down on long, rope-like branches. Flowers are arranged in panicles; they are bell-shaped orange to red or purplish green, and up to 10 cm wide.
Classification:	| Order: Lamiales | Family: Bignoniaceae | Genus: Kigelia
Origin:	Tropical Africa and Southern Africa.
Soil Requirements:	Peat, medium loam.
Timber Quality:	The wood is pale brown or yellowish, undifferentiated, and not prone to cracking. Wood is moderately heavy (air-dry 720 kg/m^3). The wood is easy to work and produces a good-quality timber for general use. The sap wood is whitish or yellow and, although rather soft, has been used for planking, yokes, fruit boxes and shelving. Heartwood is light brown and is used for drums, utensils and cutlery. In South Africa, inhabitants of the areas along larger rivers, especially the Chobe and Zambezi, make their dugout canoes from the tree.

Medical Overview:

Research conducted in France in 2013 showed that the stem bark extract from the tree of Kigelia africana was effective in the control of the fungus known as Candida. In this research it was believed that the compounds caffeic acid, nonacosanoic acid and kojic acid were responsible for the suppression of Candida. It is interesting to note that kojic acid is also used as a skin whitening compound and that the acid has also been found effective in the treatment of light scaring of the skin and melasma. Due to this the tree has been used in traditional medicine as a cosmetic. In research from Italy in 2005, the anti-inflammatory actions of the tree were verified and as such this adds to the cosmetic use of the tree extract in the reduction of swelling and redness of skin. In other research kojic acid was found to have a significant radiation protective attribute. Laboratory testing pre-treatment with kojic acid significantly increased the survival time of mice subjected to lethal doses of radiation.

Both the stem bark and fruit ethanol extract were evaluated for their antibacterial properties, and both compared well to the standard control drug amoxicillin. However, the aqueous (water) extract did not show significant antibacterial properties. It is thought that the main compound for the antibacterial actions displayed by the extracts was palmitic acid.

Research from 2000 found that an extract made from the root bark of Kigelia africana displayed equal or stronger control over the malarial parasite than quinine. In the research a quinine like compound was isolated from the extract as well as lapachola compound that has been considered strongly cytotoxic (anticancer), however high levels of lapachol may cause skin irritation. This compound may be the reason why the fruits are considered toxic as the fresh juice from the fruit causes blistering of the lips and mouth. Yet, the fruit, leaves and bark of Kigelia africana have long been used in traditional medicine and recent studies of bark extract have found it to be relatively non-toxic in doses up to 5000 mg/kg body weight.

Additional research was conducted in to the cytotoxic (anticancer) attributes of the tree and found similar results where the fruit extract showed promise in the management and treatment of breast cancer.

Research has been undertaken to assess the claims that Kigelia africana is useful in the management of diabetes, however this research is not substantial enough at this stage to either support or deny these claims. Further uses of the bark and fruit extract to cure dysentery have been supported due to the antibacterial nature and anti-inflammatory aspects of the tree extracts.

The tree is also considered to be an aphrodisiac and research has been undertaken (2013) that confirms the tree extract does display tonic effects on the male testes as well as increase sperm count and fertility in men.

Lagerstroemia speciosa by Bishnu Sarangi from Pixabay

Lagerstroemia speciosa

Primary Functions:	Antidiabetic
Secondary Functions:	Anti-obesity, Weight loss
Common Names:	Banaba, Queens Flower, Pride of India, Crape Myrtle, Arjuna, Bungur, Ta-bak
Description:	Semi-deciduous small to medium tree, up to 20 meters tall, with a fluted base. Pink or purple flowers. The leaves are dark green simple ovates that are opposite each other.
Classification:	| Order: Myrtales | Family: Lythraceae (622 species) | Genus: Lagerstroemia
Origin:	It is native to Southeast Asia.
Soil Requirements:	Found on a range of soil types.
Timber Quality:	The wood is considered durable to very durable, and the heart wood is resistant to termite. The timber takes a medium gloss. The sap wood is not easily discerned from the heart wood as they have similar colouring. The heart wood does not easily absorb treatment however the sap wood does.

Medical Overview:

Lagerstroemia speciosa is considered the tree of enlightenment in Theravada Buddhism. It has long been used in the Philippines for the management of diabetes and other ailments. A great deal of research has been conducted as to support or disclaim the diabetic activity, with the majority of research supporting the claim that Lagerstroemia speciosa does indeed have beneficial therapeutic results in diabetes type II management. It has been found that in one research paper describing a trial of Lagerstroemia Speciosa, water soluble extract, reduced the fasting blood glucose levels of participants by 16.6%. The study was for a 1-year period. There was no change in liver function and onset of hypoglycemia did not occur.

Studies on the antidiabetic properties of Lagerstroemia Speciosa have been conducted across the globe and largely all arrived at the same result that the tree does reduce blood glucose levels in pre-onset diabetes and diabetes type II, however there is some confusion as to the active principle. A great deal of researchers believe that the effectiveness is due to the high level of corosolic acid. However, corosolic acid does not separate from the plant matter in water, hence is not present via the water extract process but only via the use of the methanol and ethanol extraction process.

Another research looked at lagerstroemine which is an ellagitannin unique to Lagerstroemia Speciosa. Whilst corosolic acid had been researched and studied in its unique form and has supported the claims associated with researchers, it is further posited that other principles found in the tree also have similar actions, such as the high levels of tannic acids found in the Lagerstroemia speciosa extract. This then serves as a unique example of the complexity of botanic medicines and the difficulty or mass production in the laboratory. In the case of diabetes management, it is clear that the effectiveness of Lagerstroemia speciosa extract has been supported with further mention of the extract working reasonably quickly (60+min) and for extended periods. One study showed alloxan induced diabetic mice displayed reduced glucose levels for up to two weeks after a single dose. A dosage of approximately 1-2 gm/kg has been used with good effect.

Another unique therapeutic effect supported by research is the ability of its leaf extract to reduce fat levels in the body and as a result weight reduction. In one study a group of mice were fed a 5% solution of Lagerstroemia speciosa for two weeks and resulted in a (+/-) 10% reduction in body weight when compared with the control mice who were fed the same diet without the Lagerstroemia speciosa. The key chemistry has not been identified as yet, however research has shown that in some studies up to 65% reduction in liver lipid content. Of interest is a 10% reduction in the parametrial adipose tissue that may indicate that Lagerstroemia speciosa has health benefits for women in particular.

No studies have reported concerns of the toxicity of Lagerstroemia Speciosa. And in the study that spanned one year, no adverse effects of the continuous use were reported.

Claims by traditional uses in the Philippines and other Asian cultures stating that Lagerstroemia speciosa had special antibiotic attributes have also been researched. In one paper Lagerstroemia Speciosa was compared to the antibiotics kanamycin, streptomycin, vancomycin and chloramphenicol. The conclusion from the research was that Lagerstroemia speciosa whilst not significantly beneficial as a botanic source of antibiotics yet, the extract was effective in the control of Escherichia coli. Some claims have been researched where the tree extract is recommended for diarrhea yet the dosage to be effective has been found to be approximately 5 g/kg which is too large to be user friendly.

Lawsonia inermis by Dinesh Valke from commons.wikimedia.org

Lawsonia inermis

Primary Functions:	Anticancer
Secondary Functions:	Antibacterial, Anti-inflammatory
Other Functions:	Tuberculosis
Common Names:	Henna, Hina, Mignonette tree, Alcanna spinosa, Casearia multiflora, Lawsonia alba, Lawsonia speciose, Lawsonia spinosa, L.Rotantha combretoides Samphire, Cypress shrub, Mendhi, Mendika, Timir, Alhenna, Hinna Alcana d'Orient, Kypros Medi Hena, Alvanam, Aivani, Goranta, Kormmi
Description:	It is a small tree growing up to 7 meters. Its branches are equipped with spines. The leaves are dark green ovate and tapering into sharp pointed ends. The leaves grow opposite each other along the branches and vary in sizes from 1.5-5 cm long and 0.5-2 cm wide. The fruit of the tree are small brown rounded balls that may contain up to 49 seeds in each. The flowers, which are small pink/white and grouped in bunches at the end of the branchlets.
Classification	| Order: Myrtales | Family: Lythraceae | Genus: Lawsonia.
Origin:	Northern Africa, western and southern Asia, and northern Australia.
Soil Requirements:	It is found in semi-arid as well as tropical zones and can grow on a variety of soils from poor depleted soils to deep rain- forest loams.
Timber Quality:	The timber is reported to be very fine grained and dense making it ideal for the manufacture of tool handles and for use in fine cabinetry.

Medical Overview:

Lawsonia inermis has been used throughout the orient and Arabia as a cosmetic agent more commonly known as henna, which is used to color the skin and hair. The dye derived from its leaves has long been used to dye natural fabrics such as wool and cotton. Yet *Lawsonia inermis* has been repeatedly shown to possess significant medical attributes and actions.

The primary of these is its use in the management of cancer. Research has shown that the ethanol extract derived from the leaves is effective in the control of various cancers, such as breast cancer, liver cancer, lymphatic cancer, skin cancer and others. The active principal of *Lawsonia inermis* is lawsone which is used in the production of various anticancer drugs such as atovaquone, lapachol and dichloroallyl lawsone. Several other chemicals naturally found in henna have also been reported in research for their anticancer properties. Research has displayed that a dose of 20-30 mg/ml showed significant promise in the treatment of liver cancer cell lines. The essential oil derived from its leaves and seeds showed promise in the treatment of skin cancers. Research into its reported use as an antibacterial agent have also supported this claim. However, the extract derived from its leaves showed control over most bacteria except for *Pseudomonas aeruginosa* which is the agent in the diseases of the respiratory system, such as Pneumonia. There is also some doubt in the ethanol extracts control of with gram(-) bacteria. The research is contradictory on some findings.

Additionally, research has claimed that *Lawsonia inermis* is a potent antifungal, yet it has shown little effect on *Candida albicans*. The traditional medicinal systems of Yemen however have long used *Lawsonia inermis* for the treatment of fungal infections.

The claims that *Lawsonia inermis* can be used to control malaria have been supported yet only mildly result whereby in a controlled experiment the ethanol extract was not as effective as the control (chloroquine disulphate). Therefore, it is not recommended as an antimalarial.

Studies from 1990 sought to ascertain the effectiveness of *Lawsonia inermis* in the control of tuberculosis (*Tubercle bacilli*) and found that a dose of 5 mg/kg body weight did indeed aid in the treatment.

The anti-inflammatory and antipyretic activity of *Lawsonia Inermis* was also supported through research in both 1993 and 1995. It was this research that showed significant anti-inflammatory and antipyretic results in a dose dependent manner.

Of particular interest are the claims that *Lawsonia Inermis* can be used to alter moods and emotions (nootropic) with specific attention given to memory, anxiety and depression. This research of 1998 did claim that the ethanol and petroleum extracts derived from the leaves had a positive effect. Further research should be undertaken on this issue. All research has claimed that the use of *Lawsonia inermis* is safe and the toxicology testing of the plant. Some studies have shown that it may act as an abortifacient (terminate pregnancy) therefore until this is further clarified or supported pregnant women should not use henna.

Ligustrum lucidum by Fanghong from commons.wikimedia.org

Ligustrum lucidum

Primary Functions:	Osteoporosis prevention
Secondary Functions:	Immune system stimulant
Other Functions:	Cardiac tonic
Common Names:	Broad Leaf Privet, Glossy Privet, Tree Privet, Wax Leaf Privet, Chinese Privet, Chaste Woman Tree, Nu Zhen zi
Description:	It is an evergreen tree growing up to 10 meters in height. It has broad spreading crown with a straight thick trunk. The leaves are dark glossy green positioned in an opposite manner to each other. The leaves are long reaching up to 17 cm in length and up to 8 cm wide. The flowers are small white and born in panicles (groups) with a pungent smell.
Classification:	| Order: Lamiales | Family: Oleaceae | Genus: Oleeae
Origin:	Southern China.
Soil Requirements:	It has proved that the tree is adaptive to many soil types and climates as it has adapted easily to many foreign ecosystems which has made it be labelled an invasive species in many regions.
Timber Quality:	The timber is a dense and cream coloured. It has a reported density of 660 kg/m^3. It is used for furniture, construction and tool handles. It has been reported to have a good nail holding attribute and planes well. Due to its rapid development growth and timber attributes, it should be considered as a timber plantation tree.

Medical Overview:

Ligustrum lucidum has long been used in Chinese herbal medicine and is known as the tree of the Chaste Woman due to its evergreen and stable appearance throughout the year. Therefore, quite naturally it is considered a Yin medicine, or a soft internal female medicine. The Chinese physician Li Shizhen wrote in his compendium entitled Bencao Gangmu during the Ming dynasty that *Ligustrum lucidum* improves the eyesight, liver and even reduces grey hair. This simple but fascinating tree of the Privet family is considered a major pest in much of the world where it has been introduced. However, its medicinal actions are significant.

One of the important actions of the ethanol extract derived from the fruit of the tree is its ability to correct osteoporosis degenerative conditions especially in menopausal women. The findings have shown that the dose of 550 mg/kg of the ethanol extract from the fruit has the most beneficial effect in restoring bone density and mass. The research substantiated that the extract increases vitamin D and calcium balances for both male and females alike. No research has been found of the use of *Ligustrum lucidum* on children suffering from the condition known as Rickets, yet it may be safely assumed that should this be undertaken then it may prove that *Ligustrum lucidum* has an important role in the treatment of this disease. The actions believed to be the key to the beneficial effects of the fruit extract is the reduction of serum osteocalcin and urinary deoxypyridinoline thereby reducing bone turn over and calcium reabsorption whilst retarding calcium excretion via urine. The extract has also been found to be useful in the prevention of bone marrow loss for chemotherapy patients.

Besides oleanolic acid the fruit contains nuzhenide, oleuropein, manitol, betulin, lupeol, salidroside, oleic acid, linolenic acid, palmitic acid, ursolic acid and other fatty acids.

Further research has shown that the leaves of the privet family also possess strong anti-inflammatory and analgesic actions. However, it is the smaller members of the family that have the most potential in this regard with *Ligustrum sinense* and *Ligustrum pricei* having a more pronounced effect on the anti-inflammatory response than did *Ligustrum lucidum*, yet *Ligustrum lucidum* did also display improved anti-inflammatory results to 4% points lower than the control drug ASA. The resulting outcome of the research further substantiates the use of *Ligustrum lucidum* in the management of arthritis.

Research has further shown that the use of the fruit as a medicine significantly increases the body's immune system. The research relied on simple water (aqueous) tisane (tea) made from the fruit. It was this research that indicated a dosage of 12.5 mg/kg and 25 mg/kg (1 gm / 1 ml) as a decoction significantly increased the body's ability to fight infection and disease. The use of the fruit extract in the control of cancer has also yielded positive results with special emphasis on uterine cancer cell lines.

Other research has worked on the claims that the fruit extract has a beneficial effect on the cardiovascular system and heart output.

Limonia acidissima by Bishnu Sarangi from Pixabay

Limonia acidissima

Primary Functions:	Antibacterial
Secondary Functions:	Diuretic
Other Functions:	Antifungal, Diabetes management
Common Names:	Wood Apple, Elephant Apple, Monkey fruit, Curd fruit, Sthala vriksha, Feronia limonia, Schinus limonia, Kaith, Belangi, Kapittha
Description:	It is a large tree growing to 9 meters tall, with rough, spiny bark. The leaves are pinnate, with 5-7 leaflets, each leaflet 25–35 mm long and 10–20 mm broad, with a citrus-scent when crushed. The fruit is a berry 5–9 cm diameter and may be sweet or sour. It has a very hard rind which can be difficult to crack open and contains sticky brown pulp and small white seed.
Classification:	| Order: Sapindales | Family: Rutaceae | Genus: Limonia
Origin:	China, Bangladesh, India, Pakistan, Sri Lanka, and Vietnam.
Soil Requirements:	The tree can be grown in a wide variety of soils, however a good yield is obtained in a well-drained, sandy loamy soil with acidic or a neutral pH. The tree prefers a monsoon climate with a distinct dry season.
Timber Quality:	Wood is yellow-grey or whitish, hard, heavy, durable, and valued for construction, agricultural implements, rollers for mills, carving, rulers, and other products.

Medical Overview:

Limonia acidissima is sometimes confused with Bael tree, however they are both separate and unique. The tree is considered Holy by many in India, and it is often found on the grounds of temples and shrines. The Puranas of India describe the tree as being like a cosmic egg holding the origin of creation. The leaves are used as offerings to Lord Shiva. *Limonia acidissima* is the only species with the genus *Limonia.* Its gum is used to make artists paints.

As with a tree such as this that has evolved religious importance due to its health-giving qualities there are many claims of its attributes, yet not all have been supported through the scientific research conducted on its chemistry.

It has been shown that the ethanol extract of the leaves displayed antibacterial actions like that of the control ciprofloxacin and is therefore useful in the treatment of bacterial infections of wounds and certain diseases caused by bacteria such as *Staphylococcus aureus*, *Escherichia coli*, *Vibrio cholera*, *Salmonella typhi, Shigella boydii* and *Bacillus Licheniformis*. This research showed a dose dependent result of between 100ug/ml to 200ug/ml. Additional research also showed that the dried fruit pulp and rind of the fruit had similar properties in the management of bacterial infections.

Research into the diuretic actions of the tree were also positive where the methanol extract of the leaves increased urine flow and increased removal of both potassium and sodium from the body.

The crude ethanol extract derived from the bark of the tree was shown to have significant antioxidant properties and as such supported its use as a liver tonic or hepatoprotective agent. A dose of between 200 mg and 400 mg per day resulted in significant protection against liver damage and repair.

The anticancer or antitumor claims have also been supported via research into this area. It has been shown that the fruit extract had a limiting effect on two differing breast cancer lines at a dose of 100 ug/ml over a 48-hour period. Further research into the claims of the trees cancer management attributes is needed.

An essential oil made from the leaves of the tree are useful in treating fungal infections of the body with special emphasis on skin or dermatological conditions.

The ethanol extract derived from the bark of the tree has been shown to have anti-inflammatory actions and displayed significant ability to reduce histamine release into the body due to clonidine induced catalepsy. As a result, the bark extract is useful in the treatment of inflammatory disorders such as asthma.

Of note is the spermicidal action of the fruit extract to be considered when using this tree to treat ailments in men. It has been shown that the ethanol extract of the fruit can induce reversible sterility in men.

Liquidambar styraciflua by Rob Young from Wikimedia Commons

Liquidambar styraciflua

Primary Functions:	Antiviral
Secondary Functions:	Antibacterial, Anti-inflammatory, Neuroprotective, Antidepressant, Cardioprotective
Other Functions	Hepaprotective, Antithrombotic
Common Names:	American Sweetgum, American Storax, Sweetgum, Hazel Pine, Satin Walnut, Alligator wood, Star leaf Gum, Redgum, Bilsted
Description:	It is a large tree, growing up to 40+ meters with a trunk that may reach 1 meter in diameter. The tree is a symmetrical shape and crowns into an ovoid shape. The tree has been called Alligator wood due to the grey scaly bark on its trunk and branches. The leaves are a unique five-pointed star shape and sometimes the leaves may have as few as three points and up to seven. The fruits are spiked globes that have up to 120 spikes containing the seeds.
Classification:	| Order: Saxifragales | Family: Altingiaceae | Genus: Liquidambar
Origin:	Southeastern United States, Mexico, Central America.
Soil Requirements:	Various.
Timber Quality:	The timber is much sought after and is normally sold under the name Satin Walnut. It has a creamy white textured sap wood with the heart wood have a reddish brown colour that may have black flecks. The wood is non-durable and is susceptible to rot and insect attack. It is used primarily in furniture making, flooring and plyboard manufacture.

Medical Overview:

Liquidambar styraciflua is a panacea for a broad range of health conditions. In its natural range it has long been used by the indigenous people especially the Cherokee nation of southeastern America. The trees name is due to the free-flowing sap that can be extracted from the trunk of the tree known as Storax. Even the later part of the name styraciflua means flowing with storax.

The tree is considered as a source of shikimic acid which is the precursor for the manufacture of Tamiflu influenza medicine. The main plant used in the production of influenza medications is *Illium verum* which has one of the highest levels of shikimic acid known however *Liquidambar styraciflua* has also been found to have high levels of shikimic acid in both its bark and seeds.

Some of the compounds isolated ad identified from the tree gallic acid, isorugosin B, casuarictin, quercetin, myricetrin, quercetinorientin, myricetin, shikimic acid, massagenic acid, kaempferol, sitosterol, lupeol, oleanolic acid, ursolic acid, luteolin pinene, pinene, limonene, caryophyllene humulene, and germacrene.

In a study conducted in 2015 sought to evaluate the hepaprotective (liver protection) and antioxidant potential of the leaves from the tree. By using a methanol leaf extract the researchers established that at doses of 50 mg /kg body weight the extract outperformed the standard liver drug silymarin. The study also showed that the extract acted as a powerful antioxidant.

The bark extract of *Liquidambar styraciflua* has been tested as an antitumor therapy and results have confirmed that the tree is a useful cancer management adjunct.

The aerial parts of the tree are useful in the management of neuronal disorders such as Alzheimer's disease, depression, anxiety and stress. It is thought that the extract and the compounds contained within it act as acetylcholinesterase inhibitory agents and therefore increase the levels of neurotransmitters in the central nervous system. A report from 2014 confirmed the above findings, however another research from 2016 showed no benefit. The difference between the two is that the 2016 negative finding applied a dose much lower than the successful findings.

Liquidambar styraciflua is also an anticoagulant and useful in the management of cardiovascular thrombosis. Also, the anti-inflammatory actions of the tree are well supported and indicate significant improvements in Crohn's disease, rheumatoid arthritis amongst other inflammatory disorders.

Madhuca indica by Teacher1943 from commons.wikimedia.org

Madhuca indica

Primary Functions:	Antipyretic, Anti-inflammatory
Secondary Functions:	Analgesic
Other Functions:	Antibacterial, Anthelmintic
Common Names:	Mahua, Honey tree, Sweet Butter tree, Illipe, Mahwa, Kuligam, Nattiluppai, Tittinam, Mowa, Mavagam, Moa, Madurgam, Mowrah, Illuppai
Description:	It is a large deciduous tree growing up to 20 meters in height. The flowers are white and sweetly scented, which grow to 2 cm long and are found in bunches at the end of the branches. In each fruit are two kernals which are separated dried and expressed for their rich oil content.
Classification:	| Order: Ericales | Family: Sapotaceae | Genus: Madhuca (100+/- species)
Origin:	Central and Northern India.
Soil Requirements:	The tree is found is semi-arid and dry regions of India it can tolerate a variety of soils from poor to rich. The tree enjoys full sun.
Timber Quality:	Its wood is a well traded commercial timber. Especially the *Madhuca utilis* (utilis means useful) is sought after.

Medical Overview:

Madhuca indica has long been revered in India for its health promoting properties. As such, many people consider it to be a holy tree. However, this normally implies that the tree will be attributed with fanciful and unfounded abilities. Such claims as the tree increases sperm in males, is a cure for poisoning or that it is an aphrodisiac are largely unfounded and a good indication of the breadth of claims made on behalf of this tree. Some confusion exists in regard *Madhuca indica* and *Madhuca longifolia,* however both are used as traditional medicines and have similar if not the same attributes.

The flowers of the tree are harvested as a food sweetener as well as used to make an alcoholic beverage. The flowers are also dried and milled into a fine powder to make certain breads.

The main product or use of this tree is the harvesting of the seeds for their oil. Approximately 45-52% of the seeds weight is attributed to the oil content. Hence, the rich yield of oil is attractive to the forest dwellers of its regions. The oil is semi solid at ambient temperatures and is used as a skin cream, cooking oil and as a lamp oil for light. It is estimated that approximately 120,000 tons of the seeds are harvested annually. The oil is considered to be an emollient and is used for skin diseases and as a rheumatic arthritis treatment.

The *Madhuca indica* methanol extract showed similar results to paracetamol and aspirin as anti-inflammatory and pyretic responses. Therefore, the research has supported the claims for its use in these areas. Further analgesic (pain management) was also found to be comparable to these two standard drugs.

The antibacterial properties have been analyzed and found to be comparable to the standard drug ampicillin in regard the control of the bacterial *Staphylococcus aureus* and *Escherichia coli*. It is reported that the extract is useful in wound healing and has been found to decrease healing time significantly.

The research into the effects of *Madhuca indica* as a parasite control or anthelmintic has shown the leaf extract to have similar or better results when compared with the standard drug albendazole. As a result, the tree has an important place in the control of intestinal parasites in both humans and animals.

Magnolia officinalis by Capri23auto from Pixabay

Magnolia officinalis

Primary Functions:	Antidepression, Anti-anxiety
Secondary Functions:	Alzheimer's, Anticancer, Insomnia
Other Functions:	Analgesic, Anti-inflammatory, Hepatoprotective
Common Names:	Hou po (Chinese)
Description:	It is a deciduous tree growing to 20 m in height. The bark is thick and brown and does not fissure. The leaves are broad, ovate, 20–40 cm long, and 11–20 cm broad. The flowers are fragrant and 10–15 cm wide, with 9–12 white tepals, and appear from May to June. The image here is of *Magnolia grandiflora* which displays the family's main characteristics of large bands and greyish colours.
Classification:	| Order: Magnoliales | Family: Magnoliaceae | Genus: Magnolia (100+/- species)
Origin:	Southern China.
Soil Requirements:	Moist well drained soils with a slightly acidic Ph. The tree prefers full sun.
Timber Quality:	The wood of the Magnolia family is used in fine carpentry. However, it is not a durable timber and therefore is not used in general carpentry or construction. The timber is a specialty timber in China and Japan especially.

Medical Overview:

The *Magnolia* genus or family possess several unique chemical compounds such as honokiol, magnolol, methylhonokiol, obavatol and magnosalin, amongst many others. Many of the *Magnolia* genus have been studied, and research has shown that *Magnolia officinalis* has some of the highest levels of these active compounds. *Magnolia officinalis* is the Chinese Magnolia whilst *Magnolia obovata* is the Japanese Magnolia.

The Magnolia family have been used in far eastern medicine for centuries and as such has become one of the main drugs in both the Chinese and Japanese pharmacopeias. In Chinese medicine reference to *Magnolia* bark as a treatment are found in the Sheng Nong Ben Cao Jing (Shen Nong's Herbal), the earliest Chinese Materia Medica, which is believed to be written around the first century BC.

Research has shown that the flower and especially stamen utilized to produce an ethanol extract show significant liver protection and regeneration similar to sylmarin, which was the comparative drug used in the research.

A great deal of research has been conducted on the cancer efficacy of *Magnolia officinalis*, *Magnolia obovata*, *Magnolia grandiflora* and others of the *Magnolia* genus with substantial results. A majority of this research has been conducted during the period from 2002 to 2009 with significant results on many forms of cancer cell lines. The research has shown beneficial results in the management of thyroid, ovarian, glioblastoma (brain), prostate, colon, angiosarcoma cancers. As a result, it may be considered that *Magnolia obovata* and other members of this family should be considered a major adjunct in cancer therapies.

Additional research has focused on the neurological benefits of *Magnolia* with results supporting its use in the treatment of depression, memory loss, elevation of serotonin levels and the reduction in anxiety levels. It is interesting that the use of *Magnolia* for anxiety and depression was found to increase the quality and length of sleep patterns.

The claims that certain members of the *Magnolia* genus are useful in the treatment of inflammatory diseases has also been verified and supported. Research has endorsed their use in the management of rheumatoid arthritis, stroke, bronchial asthma, inflammation of the bowel and also blood vessels.

Magnolia extract, either aqueous or ethanol, has been used as treatment for gastrointestinal disorders and also as an anti-emetic.

It is of interest that the aqueous extract of the seeds and leaf has shown greater content of active principles when compared to an ethanol extract of the same material. Therefore, a simple tisane (tea) made from the leaves and seeds is an effective method of use.

Mallotus phillipensis by Franz Xaver from commons.wikimedia.org

Mallotus phillipensis

Primary Functions:	Cardiac tonic
Secondary Functions:	Anthelmintic (parasite control)
Other Functions:	Anticancer, Cancer therapy
Common Names:	Kamala tree, Kumkum tree, Red Kamala, Banato tree, Monkey Face tree, Croton tinctorial, Galuga furu, Balik angin, Ba chia.
Description:	It can reach heights of 25 meters on a slender trunk that is fluted and irregular at the base. The bark is a smooth grey colour. The leaves are opposing and oval in shape. They also have a distinctive pale grey colour on the dorsal side of the leaves. The flowers are a yellow to brown colour on racemes up to 6 cm long. The fruit is a small round shape of three lobes and is covered in a red powdery coating.
Classification:	| Order: Malpighales | Family: Euphorbiaceae | Genus: Mallotus
Origin:	It is a Southeast Asian tree that is also found in Afghanistan as well as Australia.
Soil Requirements:	Rainforest margins and as a pioneer tree on disturbed lands. It grows on a wide range of soils.
Timber Quality:	Its timber is a fairly heavy timber which is reported to come in at 770 kg/m³ (dry). The colour of the wood is whitish to pale reddish grey with darker streaks. The heart wood is not discernible from the sapwood. The timber works well and is used in cabinetry as well as a fuel wood. The timber is vulnerable to insect attacks and is not stable as it shrinks significantly.

Medical Overview:

Mallotus phillipensis has long been recorded in the Ayurvedic medicinal systems of India as well as used throughout the east Asian cultures as a medicinal tree. However, research has shown that some of the claims attributed to this tree are not as good as thought. One such claim is that the bark and leaves of the tree possess antibacterial functions. Whilst this has been proved true it is not as effective as other trees or plants. Indeed, the bark did have a beneficial effect on gram(-) bacteria only and even here the results were much lower than the standard antibiotic drugs.

The claims that *Mallotus phillipensis* is an effective parasite treatment have been endorsed by research, and therefore the flower extract has been shown to an effective control for internal parasites for both humans and also animals, as well as for the treatment of ringworm on the skin.

The main medicinal attribute of *Mallotus phillipensis* is due to the unique principle found in the fruits and red powder that coats the fruits. This chemical, named Rottlerin after the botanist who identified it, is used in cardiac treatment as it improves heart muscle contraction and function. Yet there is much debate on exactly how this is affected. As a result, researchers and scientists are still debating the overall efficacy of *Mallotus phillipensis*. However, the use of *Mallotus phillipensis* in heart attack recovery continues.

Further research has shown that Rottlerin displays cancer therapeutic functions via apoptosis of cancer cells in various types of cancer. As a result, the claims in this are proved valid as well. The research recommends that Rottlerin be used in conjunction with other cancer therapies, such as chemotherapy in order to amplify the effectiveness of both therapeutic applications.

The red powder that coats the fruit is also used as a red dye for cloth and also timber.

Mayodendron igneum by Hungda from commons.wikimedia.org

Mayodendron igneum

Primary Functions:	Hepaprotective (liver)
Secondary Functions:	Anti-inflammatory, Fever reducing
Other Functions:	Anticancer, Cancer therapy
Common Names:	Radermachera ignea,Tree Jasmine, PeepThong, Kasalong Kham, Khae Po, Kaki, Samphao LamTon, Chang Chuet, Saphao, Oichan
Description:	It can reach heights of 15 meters and is an evergreen tree. The flowers are yellow and orange shaped like open flared tubes and grow directly from the branches. The leaves are oval pinnate and are not uniform in that the different sides are unequal. The leaves may grow to 12 cm long and 5 cm wide.
Classification:	| Order: Malpighales | Family: Bignoniaceae | Genus: Mallotus
Origin:	It is a Southeast Asian tree with a native range covering Burma, Myanmar, Laos, Southern China and Vietnam.
Soil Requirements:	Along the verges of tropical forests and preferring limestone soils.
Timber Quality:	Information on its timber is not found.

Medical Overview:

Research sought to show that *Mayodendron igneum* has significant liver protection (hepaprotective) properties. This research shows that oral administration of the petroleum extract proved highly effective in protecting the liver from damage induced by high level of drug use. The ethanol extract of the plant material (leaves) was also effective, however not as much as the petroleum. As a result, *Mayodendron igneum* has been shown to be as effective as the standard drug silymarin. It was found that a daily dose of 0.67 g/kg of *Mayodendron igneum* had the same result as that of the standard drug (silymarin) at a dose of 0.5 g/kg in a therapeutic manner by which liver tissue was aided in regeneration and repair.

Further research sought to understand the analgesic (pain alleviation) and anti-inflammatory claims of *Mayodendron igneum*. This research showed that at doses of 100-150 mg/kg the ethanol extract showed both significant therapeutic results in the management of pain and also inflammation. The comparative drug for inflammation was indomethacin and the comparative drug for pain management was metamizole. *Mayodendron igneum* showed results where it was 98.8% and 100.42% comparative, respectively.

It has been shown that the flowers of *Mayodendron igneum* possess significant antioxidant activity, even higher than that of ascorbic acid (vitamin C). Therefore, the ethanol extract of the flowers may play a beneficial role in cancer treatment and as a free radical scavenger. Further research into the antioxidant activity of the leaf extract was found to be less effective than the flower, with a comparative antioxidant activity equal to 77% to that of ascorbic acid. The research sought to understand the possible beneficial actions of the leaf extract on four cancer cell lines (liver, cervix, breast and colon) with the result that the leaf extract showed highest therapeutic actions against cervical cancer and lesser against the other three. The active principle for the antioxidant activity was found to be the chemical by the name of zeaxanthin. The findings have shown that the ethanol extract of the flowers may prove highly beneficial in the treatment and management of breast, liver, cervical and colon cancers.

Within the research it was attempted to also validate the antipyretic (fever reducing) claims of the tree. This research that did validate the claim show however that the comparative standard drug (paracetamol) was more effective. Yet the 77% effectiveness of *Mayodendron igneum* compared to paracetamol still endorses its use in this area.

Toxicity of the plant is considered low as it is used as a vegetable in Southern China.

Michelia champaca by Josch13 from Pixabay

Michelia champaca

Primary Functions:	Anti-inflammatory, Analgesic
Secondary Functions:	Wound healing (burns)
Other Functions:	Anti-ulcerative, Anticancer
Common Names:	Chempaka, Orangechempaka, Su, Champaka, Sagah, Safan, Cempaka, Champakhao, Cempakakuning, Capaka, Mawk-samlung, Champa, Champa pa, Cham pa
Description:	It is a large tree that can grow up to 50 meters in height with a trunk reaching slightly less than 2 meters in diameter. The flowers are off-white or cream and pale orange in colour.
Classification:	| Order: Magnoliales | Family: Magnoliaceae | Genus: Michelia
Origin:	It is native to in the Southern parts of India and Southern Asia.
Soil Requirements:	Moist deep and fertile soils are optimal.
Timber Quality:	The heartwood is semi durable and has a green hue when cut, making the timber appear olive brown. As the heartwood ages, it deepens into a darker brown with green tinge. The sapwood is thick and nondurable. The main uses of the timber are for furniture and wood turning.

Medical Overview:

The essential oil made from the flowers of *Michelia champaca* are one of the main ingredients in the perfume Joy, one of the world's most expensive perfumes. The flowers are also used to make a yellow dye. In India in the month of May for the God of Love, Pradyumna (an incarnation of Kama), is to be worshiped with the flowers from *Michelia champaca*.

The analgesic (pain management) attributes of the flowers from *Michelia champaca* were evaluated in 2016 and it was found that the flower extract at doses of 200 mg/kg body weight was more effective than aspirin.

A finding from 2013 showed the ethanol extract of the flower was a good agent to reduce inflammation. Therefore, the flowers of the tree may be used for the treatment of inflammatory disorders and injuries. Within this study it was shown that the anti-inflammatory effect of the flower extract at a dose of 300 ug/ml was slightly lower than the standard anti-inflammatory drug diclofenac.

Research (2011) has shown that the oral and topical administration of the ethanolic extract derived from the flowers of the tree increased and aided in the healing time of burns. This research from India used the standard burns treatment drug cimetidine as a control in the testing and found the extract to slightly less or as effective as the drug cimetidine in the treatment of burns.

Research from Oman (2011) verified the use of its flowers and leaves in the treatment of gastrointestinal disorders and more specifically ulcers. At doses of 300 mg/kg of the water extract and also the ethanol extract made from the flowers and leaves had significant positive results in laboratory testing. It was the aqueous extract of the flower that was the most effective and as a result a simple tisane (tea) made from the flowers may be considered to be an effective treatment for ulcers and heart burn.

In Taiwanese study from 2011 the main compounds found in Anonaine, asimilobine, nuciferine, anolobine, romerine, N-acetylanonaine, liriodenine, syringaresinol, N-transferuloyl tyramine, N-cisferuloyltyramine, scopoletin, 4-acetonyl-3,5-dimethoxy-p-quinol, vanillin, vanillic acid, syringic acid, -sitosterol and stigmasterol. Furthermore, in this analysis the researchers believe that the compound liridenine is the main anticancer compound of the tree. In an older study from 1977 the anticancer compounds found within the tree were parthenolide and costunolide.

Mimusops elengi by Bishnu Sarangi from Pixabay

Mimusops elengi

Primary Functions:	Antibacterial
Secondary Functions:	Anthelmintic
Other Functions:	Antioxidant
Common Names:	Bullet wood, Spanish cherry, Mulsari, Sinha kasaraka, Bakula, Tanjung, Nani, Morikis, Toto
Description:	It is a small evergreen tree that can grow up to 15 meters high. Generally characterized by a short, dark and very rough trunk and wide spreading, the ends of which tend to rise and forms a thick globular head to tree. The leaves are glossy and are dark green when old and the new leaves mostly appear in February. The flowers have a cream colour and are tessellated. The fruit colours from green to yellow then to red and is bullet shaped hence the common name of the tree.
Classification:	| Order: Ericales | Family: Sapotaceae | Genus: Mimusops
Origin:	It is native to India, Myanmar and Sri Lanka.
Soil Requirements:	It grows in a variety of soils.
Timber Quality:	The timber is reported to be highly sought after and is extremely dense and tough making it ideal for flooring. The timber is used also in furniture and architectural.

Medical Overview:

Mimusops elengi is venerated in India and is an important tree in the traditional medicinal systems of the region. The flowers are considered to symbolize love and beauty. The tree has been extensively researched and it has been found that the tree contains unique compounds such as mimusopane along with mimugenone, mimusops acid, mimusopsic acid, mimusopfarnanol and a saponin called mimus.

In research from India from 2011 resulted in significant results in the antibacterial actions of the leaf extract from the tree showed slightly lower effects on *Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Vibrio cholerae* and *Streptococcus pneumonia* than the standard antibiotics being gentamicin, tetracycline and streptomycin. At 10 to 50 ml concentration, methanol and ethanol recorded a maximum inhibition of 32.2 mm and 31.3 mm against *Streptococcus pneumonia* and *Escherichia coli*. This research supports the use of the ethanol extract in treating bacterial infections. Research into the actions of *Mimusops elengi* in the control of diarrhea and dysentery has found the extract from the tree to be an effective treatment due to the actions of the extracts being antimicrobial.

There have been many health claims associated with *Mimusops elengi* throughout history. One such claim is its ability to cure a person of intestinal worms and parasites. This claim was put to the test in 2013 by researchers from India. Their results did indeed support this claim. The findings showed that the aqueous (water) extract made from the roots was more effective than the standard drug piperazine citrate. As a result, intestinal worms and similar parasitic conditions may be effectively treated with a tisane made from its roots.

Further research from India in 2011 sought to assess the antipyretic (fever reducing) and analgesic (pain relieving) potential of the methanol extract. In this research it was shown that at doses of 200 mg/kg body weight the tree had the same or slightly less potential as that of aspirin in the control of pain. In regard the fever reducing potential of *Mimusops elengi* the researchers found that a dose of 200 mg/kg had the same results as that of the standard drug being paracetamol.

Further research has shown that the methanol extract derived from the leaves of the tree stimulate the immune system and as such may play a more significant role in the treatment of disease, especially when the antibacterial nature of the extract is considered. This research into the immune stimulatory actions of the extract from the tree was conducted in 2014. It has also been found that *Mimusops elengi* has significant antioxidant actions and has similar results to that of the standard drug ascorbic acid.

In 2010 it was also shown that *Mimusops elengi* did indeed possess anti-inflammatory actions and therefore may be employed in the management of degenerative diseases such as rheumatoid arthritis and muscular pain. The results from the research showed that at doses of 200 mg/kg body weight the tree extract was slightly lower than diclofenac in action.

Finally, there has been various papers written on the anticancer potential of the leaf and bark extract from the tree. In 2014, it was shown that the leaf and bark extract significantly reduced cervical cancer cell lines. Other research has shown the leaf and bark extracts from the tree to be tumour reducing. Therefore, it may be considered that the extract of the tree may aid in the management of various cancers.

Mitragyna speciosa from.wikicommons.com

Mitragyna speciosa

Primary Functions:	Chronic fatigue
Secondary Functions:	Opiate addiction withdrawal
Other Functions:	Pain management, Antidepression, Antimalarial
Common Names:	Kra-tom, Korth, Ketum, Krathom, Kakuam, Ithang, Thom, Biak-biak, Mambog
Description:	It is a large evergreen tree up to 20-30 meters with a straight broad trunk covered in smooth grey bark. The leaves are large (up to 20 cm) and dark green positioned opposite each other and ovate in shape with pronounced veins. The flowers grow at the ends of the branches in clusters of three or less.
Classification:	| Order: Gentianales | Family: Rubiaceae | Genus: Mytragina
Origin:	The tree is found throughout tropical and subtropical Asia; Malaysia and Thailand.
Soil Requirements:	The tree prefers wet humid sites with deep soils with full sun exposure.
Timber Quality:	The timber of the tree is reported to be fine grained and easy to work. Further reports say that it is used in furniture making and sculpting. It may be assumed in its traditional regions such as Thailand, where Kratom was offered to the Gods and spirits in the temples that the wood may also have been used for religious carvings.

Medical Overview:

Mitragyna speciosa has been used for centuries in its native region as a traditional medicine. It has been used as a stimulant where it is reported to enable the user to undergo strenuous and demanding work for hours. In essence by chewing the leaf or by making a simple tisane, a person feels stronger and more powerful.

There exists a great deal of controversy over this tree with claim and counterclaim. For it to be included in this text the value of the tree must therefore outweigh the controversy surrounding it. In the case of *Mitragyna speciosa* it is either illegal or controlled in many countries as it is considered an opiate and dangerous, however few deaths, if any, have been recorded from the eating of its leaves, but rather from adulterating the leaves with other drugs and controlled substances, or even distilling the main ingredient, mitragynine, to a dangerously potent level. The benefits of *Mitragyna speciosa* far outweigh the abuse of its potential. Human use of *Mitragyna speciosa* was first reported in 1836 in Malaysia. In the early 20th century, it was used as an opium replacement in the treatment of opium addiction. In Thailand it has been used to aid in the treatment of morphine addiction.

The main compounds are mitraginyne (66%), paynantheine (9%) and speciogynine (7%).

Research undertaken to test the claims of antibacterial properties of the ethanol leaf extract in 2009 found that the leaf extract did have significant antibacterial results against two bacteria, *S.typhi* and *B.subtilis*, to a greater extent than the standard antibiotic drug used as a control chloramphenicol. The extract was not effective against the other test bacteria. Therefore, this research has shown that the leaf extract may be used in the treatment of typhoid fever. Within the same research paper, the researchers also showed that the leaf extract displayed strong antioxidant properties and may be beneficial in other health applications.

Mitragynine, the main compound in *Mitragyna speciosa* has also been shown to possess antidepressant effects in research conducted in 2011.

It has been shown that *Mitragyna speciosa* has a cardiac effect. This has been studied in relation to any potential damaging effects on the heart. The results from this research did show that *Mitragyna speciosa* does influence the cardiac function, however not in a conclusive manner to draw a definitive conclusion as to whether the tree caused cardiac arrest. However, the research did show that *Mitragyna speciosa* does suppress the cardiac function and in so doing supports traditional use of the extract for anxiety, a hypertension.

Users of the extract or leaf powder claim that it enhances their sexual desire and therefore *Mitragyna speciosa* may be considered and aphrodisiac. Other medical actions attributed to the extract derived from the tree are analgesic (pain relief) and anti-inflammatory.

In 2011 research was conducted as to whether the leaf extract from *Mitragyna speciosa* had either mutagenic (agent that permanently changes genetic material) or anti-mutagenic properties. The results from this research showed that the extract had no mutagenic actions. However, it did have strong anti-mutagenic actions.

Mitragyna speciosa was named by the Dutch botanist Pieter Willem Korthals (which may explain the common name). The leaves and stigmas of the flowers reminded him of a bishop's miter.

Morinda citrifolia by Michael Hermann from commons.wikimedia.org

Morinda citrifolia

Primary Functions:	Anti-obesity
Secondary Functions:	Antioxidant, Antiviral
Other Functions:	Anticancer
Common Names:	Noni, Indian mulberry, Great morinda, Cheesefruit, Bangkuro, Morinde, Bengkudu, Nhoo baanz, Mengkudu jantan, Yo ban, Nhau
Description:	It is a small evergreen tree with a conical crown, up to 8 meters tall, with a deep tap root; the bark is greyish or yellowish-brown. Leaves are opposite and ovoid 50 cm x 17 cm. Fruit an ovoid body of pale green when young and when mature they are a yellow-white colour 3-10 cm x 2-3 cm. The flowers are small white tubules.
Classification:	| Order: Gentianales | Family: Rubiaceae | Genus: Morinda
Origin:	Southeast Asia, South Pacific and Australasia.
Soil Requirements:	The tree appears on infertile, degenerated soils, sometimes badly drained or soil with a very low water-retention capacity and a deep-water table.
Timber Quality:	The wood splits excessively in drying and its uses are restricted to fuel and poles.

Medical Overview:

Morinda citrifolia is one of the most well-known Polynesian, Micronesian and Melanesian herbs and is now gaining global attention as not simply a traditional medicine, but also as a beauty product and general health tonic. It is reported that the Polynesian and also the south Asian people have been utilizing *Morinda citrifolia* for approximately 2000 years. A great deal of the research into the health and medicinal benefits are confusing at best and contradictory at worst. In spite of this confusion, its use is expanding in already established markets and being rapidly introduced into new markets such as China and Korea.

The Polynesians throughout the South Pacific have used the roots to dye their tapa or fala mats red or yellow. Unravelling competing claims made on behalf of the tree requires a closer look at the chemistry of the different sections of the plant. The leaves are high in quercetin (antioxidant), ursolic acid (anticancer, muscle builder and anti-obesity), sitosterol (prostate, steroid), kaempferol (anticancer potential), scopoletin (antihypertensive, anti-anxiety, anti-inflammatory), and americanin A (potent antioxidant).

Also found in the leaves are compounds unique to *Morinda citrifolia* such as citrifolinoside B and morindicin, however the health effects of these compounds are still being debated.

In the fruit of the tree are found hexanoic acid and octanoic acid. These acids give the fruit its famous unpleasant odor. Yet it is octanoic acid (caprylic acid) that is the most beneficial for human health as it is an antimicrobial, and its presence supports claims that the fruit is antibiotic and antifungal.

Also found in the fruit is compounds known as americanin A (antioxidant) and damnacanthal (hepaprotective, antiviral and anticancer). It is this last compound that gives Noni or *Morinda citrifolia* its largest piece of evidence supporting its health benefits. In research from 2012 it was found that the bacteria known as *Klebsiella pneumoniae* is the most susceptible to the ethanol leaf extract. Further, the ripe or mature fruits should be used as they have the most potential for medicinal use. In research from 2013 the ethanol extract was shown to be similar in effectiveness when compared to the standard antibiotic tetracycline. This research also tested the extract as a possible anthelmintic (de-worming agent) and found that the ethanol extract was the most effective with results just below the standard drug piperazine citrate.

The roots of the tree have the anthraquinone rubidian which has been studied for its antiviral potential. The findings however are not clear on its effectiveness in this area. It is the presence of damnacanthal which is the effective antiviral in *Morinda citrifolia* and in research from 2000 has shown it to be 72% effective in protection from the HIV virus.

Damnacanthal has been shown to be effective in the management of liver cancer and colorectal cancer. Therefore, in this area science has supported its use as a possible anticancer agent. A paper from 2007 highlights the anticancer findings of many of these papers. In a study from 2001 conducted in Honolulu Hawaii found that Noni juice given to 50 cancer patients had a beneficial effect on their treatments.

The extract from the tree has also been shown to reduce pain and inflammation.

As for the claims that the fruit and leaves are strong antioxidants has also been supported in research. One such paper from 2007 discussed these claims and also found the use of the tree safe and non-toxic.

The extracts from the leaves and fruit have significant levels of vitamin E, C and niacin which support its use as a nutritional supplement.

Moringa oleifera by Iskandar Ab. Rashid from Pixabay

Moringa oleifera

Primary Functions:	Malnutrition
Secondary Functions:	Dysentery
Other Functions:	Anti-inflammatory
Common Names:	Benzolive, Drumstick tree, Kelor, Marango, Saijtian, Sajna zogale
Description:	It is a fast-growing deciduous tree which can reach heights of up to 12 meters and a diameter of approximately 50 cm. The bark is a pale grey colour. The leaves are tripinnate and form an open crown. The flowers are fragrant with five petals of 1.5 cm in length and 2 cm wide. The flowers grow in drooping clusters.
Classification:	| Order: Brassicales | Family: Moringaceae | Genus: Moringa (13 species)
Origin:	It is reported that the tree is native to India, especially the West Himalayan region. However due to its widespread cultivation it is difficult to pinpoint precisely the origin of the tree. Therefore, it is referred to as pan tropical.
Soil Requirements:	The tree is grown on many different soil types throughout the world, however it performs badly in clay and water-logged soils.
Timber Quality:	The wood, soft and of medium to low quality. It may be used as a veneer, yet it is a general rule that the timber of the tree has minimal commercial value.

Medical Overview:

References to the use of *Moringa oleifera* go far back in history to the Egyptians who used the plant to obtain oils they applied as medicine and in perfumery. The tree is also cited in the Ayurvedic medicinal texts of India as a cure all, where it is reported to cure almost 300 ailments. Such claims of universal cure need science to reveal the true nature of a tree or plant remedy and in the instance of *Moringa oleifera* various health claims are indeed supported whereas others are not.

Moringa oleifera is sometimes called the Miracle Tree, due to the many medicinal uses people claim to use it for as well as being a highly nutritious food source. Indeed, research has shown that the leaves contain approximately 19%+ protein and 53%+ carbohydrate as well as high levels of calcium and ascorbic acid, vitamin A and a wealth of other essential minerals and vitamins. As a result, *Moringa oleifera* has a unique place in the treatment of malnutrition in poor developing countries.

The seeds of *Moringa oleifera* are rich in oil and may contain between 30-40% oil by weight.

Additional research showed that laboratory testing proved that after one week on a simple water extract of the leaves of *Moringa oleifera* 88% of the test subjects (Wistar rats) had their sugar levels return to normal. Therefore, substantiating the claims that the tree is useful in diabetes management.

The claims that *Moringa oleifera* also aided in the control of inflammation have also been substantiated in further research. In this research it was shown that both the aqueous and ethanol extracts of the seeds displayed anti-inflammatory effects, thereby showing that the active principle is simple to withdraw from the seeds.

It is claimed that *Moringa oleifera* is a valuable antibiotic, antibacterial agent, yet some research has shown the ethanol leaf extract is not the most effective in this area and other trees should be chosen for this purpose.

Nauclea latifolia by scott.zona from commons.wikimedia.org

Nauclea latifolia

Primary Functions:	Analgesic, Diabetes type II
Secondary Functions:	Antipyretic, Antibacterial
Other Functions:	Hypotensive, Dysentery. Antimalaria, Antiviral
Common Names:	Pincushion tree, Koma, Badi, Baro, Edjik, Monleuth, Kibuki-lingi, Dundarkhe, Nandok, Kulundo, Lianeafraises, Koumkouma, African Peach
Description:	It is a small to medium tree with elliptical dark green leaves. It rarely grows over 7 meters in height, however there are reports that in closed forests it may attain up to 30 meters in height. The flowers are round and approximately 2 mm in diameter. The fruits are round and may attain 7.5 cm in size.
Classification:	| Order: Gentiales | Family: Rubiaceae | Genus: Nauclea
Origin:	Equatorial East Africa.
Soil Requirements:	Various soil types.
Timber Quality:	Its timber is hard and durable however rarely attains a size large enough for milling. The timber is used for posts and pilings of houses due to its durability.

Medical Overview:

Nauclea latifolia has been used in its native region to aid in the management of diabetes type II. The leaf extract showed the promising results in research undertaken in 1995.

Recent research has shown that *Nauclea latifolia* possesses chemical triggers in a similar structure to that of tamadol, a universal pain management drug. Further research from 2002 through to 2009 also supported the traditional use of the tree's roots and bark in the treatment of acute pain. The resulting findings show that in rural populations, where medical services are limited, a tree such as *Nauclea latifolia* may serve to replace the pharmaceutical equivalent medicine. It was found that doses of 160 mg/kg and greater had a similar or comparable pain reduction in the test animals to that of morphine. In hot plate pain testing the extract from *Nauclea latifolia* was slightly less than that of morphine. The findings from this research show that *Nauclea latifolia* is effective on both the central and peripheral nervous systems.

Claims that *Nauclea latifolia* can be used to reduce fever have also been supported, where tests showed that doses of 40, 80 and 160 mg/kg had significant body temperature reductions in a dose dependent manner.

Research conducted in 1994 proved that the methanol leaf extract had a distinct effect on the cardiovascular system. A reduction in heart rate, and blood pressure by approximately a third. Showing that the leaf extract may be a valuable tool in hypertension and heart disease. Yet, it is of interest to note that the methanol extract, used in the same study, increased the blood pressure.

In research carried out in 2012 it was shown that *Nauclea latifolia* displayed antimicrobial attributes. The stem bark was used to make a chloroform extract which had significant effect on *Shigella dysenteriae*, the bacteria largely responsible for dysentery. When compared to the standard antibiotic augmentin *Nauclea latifolia* achieved an 81.6% reduction of *Shigella dysenteriae* where augmentin achieved a 100% reduction. Therefore, *Nauclea latifolia* may be considered an effective replacement for the standard drug. In the same research other bacteria were also tested, however the standard drug was much more effective in control of these.

The traditional claims that *Nauclea latifolia* is effective in the treatment of malaria have been supported by recent research into the extracts derived from the leaf of the tree. Doses of 200 and 300 mg/kg were delivered to mice infected with the parasite *Plasmodium berghei*. *Nauclea latifolia* treatment eliminated the parasites in tissues and protected them from oxidative damage even better than chloroquine treatment did, whose antimalarial potency also cleared tissue parasites.

Research into the claims that *Nauclea latifolia* is an effective antiviral agent have been studied in research from 2013 did substantiate the traditional uses of the root bark as an antiviral. In this research the root bark extract was effective in retarding herpes virus type 2. Some of the active compounds cited in the research were strictosamide, vincosamide and pumiloside were tentatively identified together with quinovic acid glycoside.

Acute toxicity has been studied for *Nauclea latifolia* with doses ranging from 100 mg/kg up to 1,400 mg/kg. The findings from this study showed no adverse effects in any of the test animals being administered via an aqueous decoction (water) in mice. In addition, one paper reported the traditional use of the tree to prolong menstrual flow and therefore until more information is obtained through additional research on this claim it is recommended that the tree not be used by expectant mothers.

Oncoba spinosa by Jeppestown from commons.wikimedia.org

Oncoba spinosa

Primary Functions:	Antibacterial
Secondary Functions:	Diabetes
Other Functions:	Dysentery, Antiviral
Common Names:	Snuff Box tree, Fried Egg tree
Description:	A small tree rarely growing over 5 meters in height, deciduous and has simple dark leaves. The flower has bright white petals that surround bright yellow stamens which appears to resemble a fried egg, hence the common name. The fruits grow up to 6 cm in diameter and consists of a hard shell that becomes dark-reddish brown when mature with shiny seeds supported in a dry yellowish pulp.
Classification:	| Order: Malpighiales | Family: Salicaceae (1220 species) | Genus: Oncoba
Origin:	Native to the Eastern coast of Africa, from South Africa up to the Red Sea in Arabia.
Soil Requirements:	It grows on a variety of soils from arid region to fertile coastal regions.
Timber Quality:	The wood is light brown in colour and can take a good polish, but the pieces are seldom large enough to be of any commercial value.

Medical Overview:

Oncoba spinosa has long been utilized in Africa as a medical plant. The hard fruit of the tree when dried can be cut in half and used as snuffboxes hence its common name. Its dried nut if not cut in half becomes a rattle due to the inner fruit shrinking and becoming hard. These rattles are used by dancers to enhance music.

There have been many claims as to its healing powers, yet one aspect of the tree is that the ethanol extract from its leaves have significant antioxidant attributes and it has displayed antioxidant activity approximately half that of ascorbic acid in a controlled experiment.

The ethanolic extract which showed highest α-amylase and α-glucosidase inhibition in the control of hyperglycemia (diabetes) via the reduction of carbohydrate absorption in the intestines. The study found that at a dose of 400 mg/kg of the ethanol root extract had similar amylase inhibitory as that of the standard drug acarbose. Therefore, the root extract may be considered a valuable tool in the management of diabetes.

Within the same research as the management of diabetes the researchers also sought to show the role of the root extract in the control of dysentery or diarrhea. This condition is responsible for countless deaths globally and is easily treatable with modern medicine however the continuing difficulties in getting medicines to remote rural areas plague the eradication of this symptom. Therefore, the findings that *Oncoba spinosa* does indeed slow and retard fluid and electrolyte loss caused by diarrhea in a significant manner. At doses of up to 400 mg/kg the researchers found that the ethanol extract of the root reduced bowel movements up to 74% which is slightly below the standard drug atropine.

One supporting piece of research that may explain the potent results in the control of diarrhea comes from 2015 where the antimicrobial, antibacterial and antifungal properties of *Oncoba spinosa* were tested. It was found that the methanol extract derived from the leaves did indeed have strong antibacterial actions and therefore supports the use of the tree in the treatment of bacterial infections and diseases such as diarrhea. The bacteria used in the study were *Enterobacter aerogenes*, *Escherichia coli*, *Klebsiella pneumoniae* whilst the fungal pathogens used were *Candida albicans* and *Cryptococcus neoformans*. It was found that the extract from *Oncoba spinosa* had comparable results with the standard control drugs chloramphenicol (antibiotic) and nystatin (fungicide). Therefore, the extract derived from either its leaves and or roots may be used to treat bacterial and fungal disease and conditions.

Claims that *Oncoba spinosa* may be a treatment for viral diseases with special emphasis on HIV/AIDS have insufficient data and findings to support such claims other than traditional use and oral testimony.

Traditional healers in Southern Africa have used *Oncoba spinosa* to treat arthritis, and research into the tree has indeed shown that it has unusually high levels of calcium (180 mg / 100 g) as well as phosphorous (150 mg / 100 g). Therefore, whilst the tree is a valuable source of calcium and may be used as a vitamin supplement, the use of the tree in all forms of arthritic conditions and causes may only be recommended as a supplement and not a cure.

Research undertaken to ascertain whether the aqueous extract of its leaves did prevent or manage cancer cell lines. The results were mild and as such *Oncoba spinosa* has some cytotoxic attributes but cannot be recommended as a cancer management medication.

Research into the toxicity of the extracts have found the tree to be completely safe.

Oroxylum indicum by Vinayaraj from commons.wikimedia.org

Oroxylum indicum

Primary Functions:	Rheumatoid arthritis
Secondary Functions:	Anti-inflammatory, Analgesic
Other Functions:	Cancer management
Common Names:	Midnight Horror tree, Indian Trumpet tree, Oroxylum, Sonapatha, Tree of Damocles
Description:	It is a large tropical tree with unique flowers that bloom at nighttime in order to be pollinated by bats. The seed pods are enormous and may reach 1.5 meters in length. The names given to this tree refer to the tree flowering at nighttime when bats fly around it high flowers whilst the seed pods hang down like swords and around the base of the trunk the fallen seed pods and leaves appear like the bones of the dead.
Classification:	| Order: Lamiales | Family: Bignoniaceae | Genus: Oroxylum
Origin:	India, Southern China, Malaysia, Philippines Vietnam.
Soil Requirements:	Grows on a wide range of soils.
Timber Quality:	The wood is primarily used as a fuel and few if any reports on other uses have been found.

Medical Overview:

Oroxylum indicum has been used for centuries in traditional medicinal systems of southern Asia and has a significant role in the Ayurvedic system of medicine. The large seed pods are also utilized as a vegetable in the various cuisines of Southern Asia. Due to the demand of the tree for both a food and a medicine it is now shown to be overharvested and on the critically threatened list of species.

As for the medicinal attributes of the tree, many research papers have been published and various claims have been verified by the science. One such claim is the ability of the ethanol extract derived from the bark of the tree having analgesic and anti-inflammatory properties. This has been endorsed by science and when compared to the standard drug diclofenac at a dose of 300 mg/kg body weight had similar therapeutic results in the management of inflammation and pain. Thereby proving the use of the mature bark of the tree with these disease states.

Further research into the management of rheumatoid arthritis supports and expands on the prior research in so far as the management and control of the damage and pain experienced by sufferers of rheumatoid arthritis. In this research the root bark was utilized instead of the stem bark. Yet the inflammation and tissue damage were controlled. Sadly, in this research the beneficial dosage amount was not reported. The anti-inflammatory attributes of *Oroxylum indicum* also support its use as a cure for stomach and intestinal ulceration or inflammatory conditions such as irritable bowel or Crohn's disease.

Claims that *Oroxylum indicum* possesses anticancer properties have also been supported via research. Studies have confirmed that the stem bark extract has antioxidant properties similar to that of ascorbic acid, and hence was further studied in regard its potential to be cytotoxic to various cancer cell lines. Cancers such as colon, melanoma, leukemia, breast and liver have all been studied as to their sensitivity to various extraction methods of the stem bark with the finding that the methanol and ethanol extracts were the most positive. Phytochemical analysis has shown the presence of chrysine, baicalein and oroxylin-A.

The testing of its antimicrobial attributes has also delivered support for the use of the stem bark as well as the root bark in extract form as being an effective control for both gram(+) and gram(-) bacteria. Testing of the antimicrobial activity of the fruit of the tree had less than impressive results in the control of bacteria. As a result, *Oroxylum indicum* displays a broad range of therapeutic and medicinal applications.

The common name is Midnight Horror tree and is a colorful reference to the tree only flowering during the night hours and being pollinated primarily by bats.

Ougeinia oojeinensi Public Domain, commons.wikimedia.org

Ougeinia oojeinensi

Primary Functions:	Antidepression
Secondary Functions:	Obesity, Diabetes
Other Functions:	Antibacterial wound treatment, Anthelmintic
Common Names:	Chariot tree, Sandan, Black Palash, Desmodium Oojeinensis, Tinsa, Jinghini, Atimukta
Description:	It is a large deciduous tree that can grow up to 40 meter in height. The bark is dark brown and deeply cracked. Leaves pinnately 3 foliolate, often reaching 30 cm long. Flowers are bunched in numerous clusters and may be either white or pink. The fruit pods can be up to 7-8 cm in length.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Desmodium
Origin:	Outer and inner Himalayan regions, Northern and Southern India, Bhutan.
Soil Requirements:	It grows on a wide variety of soils and thrives even on poor dry ground however the tree does not like wet or waterlogged sites.
Timber Quality:	Its timber is commonly referred to as Sandan timber and is highly prized for its strength and elasticity. The sapwood is thin light grey with the heartwood having a golden honey appearance. It has been used for farm implement handles as well as fine furniture.

Medical Overview:

Ougeinia oojeinensi is has been used in traditional medicinal systems of Eastern Asia and India for centuries. Decoction of *Ougeinia oojeinensi* is one of the eight remedies for kustha, a chapter in the Ayurvedic literature dealing with skin diseases and used as topical as well as oral medicine. Decoction of *Ougeinia oojeinensi* should be taken according to the method as prescribed in case of nagabala, another Ayurvedic herb used for rasayana (rejuvenation) action.

The bio-active constituents isolated from *Ougeinia oojeinensi* are genistein, ougenin, dalbergioidin, kaempferol, lupeol, ferreirin, neophellamuretin, orobol, wedelolactone, homoferririn isoflavanone and botulin.

The importance of *Ougeinia oojeinensi* is significant as it elicits several health and medicinal outcomes. Such actions that promote health in not just the physical body but also the mind of the patient.

In research conducted in 2008 it has been shown that the ethanol extract derived from the bark of the *Ougeinia oojeinensi* tree possessed significant antidepressant effects. When compared to the standard drug escitalopram, the bark extract had slightly less or as good results in the research. As a result, *Ougeinia oojeinensi* may be used as an antidepressant.

In research in to claims that the bark extract is beneficial in the management of diabetes it was also shown that at doses of approximately 200 gm/kg there was a significant reduction in the lipid profile and an increase in HDL cholesterols. As a result, the bark extract may be used as a tool for obesity and diabetes management.

Additional research conducted on the bark extract resulted in confirming the use of the bark as an antibacterial and also antifungal medicine. This research undertaken in 2014 emphasizes the use of the bark extract in the control of *Salmonella* and also *Candida* infections. Therefore, this research supports the traditional claims of using the bark and other parts of the tree for the treatment of wounds.

Additionally, the bark extract proved effective in the management of intestinal worms. Research has shown that the extract caused paralysis in round worm, tapeworm and earthworms with comparable effects similar to the standard drug albendazole.

Ougeinia oojeinensi has been shown to be very safe in its use as a phytomedicine where levels up to 2000 mg/kg had been shown to have no toxicity to the recipient or patient. Of interest is of some reports that the bark from the tree has been used as a fish poison, yet the tree is considered very safe for human consumption and use.

Parkia biglobosa by Marco Schmidt from commons.wikimedia.org

Parkia biglobosa

Primary Functions:	Antimalarial
Secondary Functions:	Antioxidant
Common Names:	Calabash nutmeg, African locust bean, African nutmeg, Jamaican nutmeg, Ehuru, Ariwo, Awerewa, Ehiri, Airama, African orchid nutmeg, Muscadier de Calabash, Lubushi
Description:	It is a deciduous perennial that grows to between 20 meters high, in some cases up to 30 meters. The tree is a fire-resistant heliophyte characterized by a thick dark gray and brown bark. The pods of the tree, commonly referred to as locust beans, are pink in the beginning and turn dark brown when fully mature. They are 30-40 cm long on average, with some reaching lengths of about 45 cm. Each pod can contain up to 30 seeds.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Parkia
Origin:	West Africa from Senegal to southern Nigeria and to Sudan.
Soil Requirements:	It is able to grow on a wide range of soil types.
Timber Quality:	Wood is whitish, moderately heavy, 580-640 kg/m³ when air seasoned, relatively hard and solid. It smells unpleasant when newly felled, but seasoning does not take long and only occasionally causes shape distortion; easily worked by hand or power tools; nails, glues, varnishes and paints well; mainly useful as a light structural timber, for example, for vehicle bodies, agricultural implements, boxes, crates and barrels, furniture, mortars and pestles, bowls, planks and carvings.

Medical Overview:

Parkia biglobosa was named after the explorer Mungo Park who made expeditions into Africa in the 1700's. Today the bean from the tree is a major commercial crop in West Africa with an estimated annual traded volume of in excess of 200,000 tons. The beans from the tree are used in the making of various traditional dishes such as dawadawa for which the sweet pulp surrounding the seeds in the fruit pod is used.

The real beneficial medicinal attribute of *Parkia biglobosa* is in the treatment of malaria. It was found in research from 2014 that the bark extract displayed a 79% reduction in levels of *Plasmodium berghei*, the malarial parasite. This is similar to the control used in this research which were chloroquine and artemisinin. Therefore, the use of the bark extract in the prevention and treatment of malaria is well founded by research. Other research from 2011 showed the leaf extract at doses of 600 mg/kg body weight had similar antimalarial actions.

The bark from the tree is used in the treatment of inflammation, and in research conducted in 2013 it was shown that the alcohol extract made from the bark of the tree displayed hypoglycemic actions (lower of blood sugar). In this study it was shown that the bark extract had no negative effects on liver function yet showed changes in kidney function which may be negative.

The bark extract at doses of 300 mg/kg body weight showed similar antioxidant results as that of ascorbic acid. In traditional use it is claimed that the bark and leaf extract is useful in treating bacterial infections. However, results from research conducted in 2010 and 2012 arrived at results that whilst supporting some antibacterial actions did not show impressive inhibition of bacterial strains when compared to the standard drug streptomycin. In the research from 2010 it was also shown that the bark extract had a mild antifungal action which was far less than the control used, being ketoconazole. Yet, research conducted in 2009 did show antibacterial actions of the bark and root extracts, however no standards control was used in this research and as a result the comparable actions obtained are uncertain. Therefore, there may be better choices of tree to use in the treatment of bacterial infections.

It has been shown in some research that doses of the bark extract higher than 500 mg/kg body weight resulted in fatality in some test animals. Yet other research showed that the leaf extract was not lethal at doses under 5000 mg/kg. Therefore, there appears to be uncertainty on the toxicity of the tree.

Pausinystalia johimbe bark by DM Trott from Wikimedia

Pausinystalia johimbe

Primary Functions:	Erectile dysfunction
Secondary Functions:	Antihypertension
Other Functions:	Antifungal, Stimulant, Obesity reduction
Common Names:	Yohimbe, Johimbe, Liebesbaum, Lustholz, Potenzbaum, Yoruba, Yocon, Dankamaru
Description:	The tree grows about 30 m tall, with a straight bole that is rarely larger than 50–60 cm in diameter. The bark is grey to reddish-brown, with longitudinal fissures, easy to peel and bitter tasting. The inner bark is pinkish and fibrous. The leaves grow in groups of three, with short (about 2 cm) petioles. The blades are oval-shaped, 11–47 cm long and 5 – 17 cm wide.
Classification:	| Order: Gentianales | Family: Rubiaceae | Genus: Pausinystalia
Origin:	West and Central Africa in lowland forests.
Soil Requirements:	Dark forest loam to clays.
Timber Quality:	The sapwood is yellowish, and the heartwood is ochre-yellow. The wood is fine-grained and relatively dense and moderately hard. It has reportedly been used as railway sleepers. The harvesting of the bark of the tree is done by felling the entire tree and leaving the heartwood in the forest.

Medical Overview:

Pausinystalia johimbe is one of the few controversial trees in regard its health benefits and effects. This is due largely to the claims of it being the herbal Viagra which has created significant issues in the health industry. Whilst the traditional uses of the tree as a hypertensive and general tonic (increases energy levels) have been supported in clinical research, care is recommended in other more exaggerated claims. The main indole alkaloid found primarily in the bark and leaves of the tree is yohimbine (+/-15%) which is similar in structure to mitragynine and ibogaine. It is this compound that is believed responsible for the vasodilatory effects of the tree.

In June of 2012 researchers sought to understand the method of action of *Pausinystalia johimbe* in the treatment of erectile dysfunction. They found that the main compound yohimbine did relax epithelial cells in smooth muscle obtained from rabbits. This is in keeping with the vasodilatory effects associated with the compound. Therefore, when considering the vasodilation and also the ability of *Pausinystalia johimbe* to increase blood flow it can be assumed that the use of bark extract will help in the alleviation of erectile dysfunction.

Further research from 2007 conducted at the Institute of Urology and Nephrology, London, had a 55% success rate in a group of 29 men suffering from impotence. As a result, the claims that *P. johimbe* appear to be well supported.

In clinical research from 2016 found the ethanol extract derived from the leaves to be anti-inflammatory, anticancer, antihypertensive and antifungal. The main compounds discussed in this research were linoleic acid, stearic acid, phenylundecanoic acid and palmitic acid. It is interesting to note that the presence of phenylundecanoic acid which acts as an androgen receptor (male hormone activator) and also yohimbine indicate that this tree maybe best for men primarily.

Various compounds found within the bark and leaf extracts, such as linoleic acid, have been well documented in possible cancer treatment.

Pausinystalia johimbe has been attributed with obesity reduction. This was discussed and it found this claim to be plausible due to the ability of its bark extract to act as a stimulant and reduce lipid levels in blood serum.

The use of the *Pausinystalia johimbe* should be carefully administered as it has been found that too high a dose of the tree may create the exact opposite of the expected outcomes. This tree and its effects are in some ways contradictory as it is both a relaxant and a stimulant. In clinical research it has been found that the blood pressure lowering actions may reverse and create significant increase in blood pressure should a higher dose be given. Much of the scientific literature refers to doses of the pure compound johimbine in the clinical trials and not of the plant extract. As a result, dose levels are not clear.

Yohimbine is contra indicated in people with high blood pressure, heart problems, anxiety and panic attacks, all these worsen with adrenergic activity. Yohimbine has been associated with side effects like kidney disease, peptic ulcer, pregnancy as well as breast feeding mother, should not use yohimbine due to its androgen attributes.


Peltophorum pterocarpum by SKsiddhartthan from commons.wikimedia.org

Peltophorum pterocarpum

Primary Functions:	Kidney and bladder stones, Liver protection
Secondary Functions:	Antifungal
Other Functions:	Antimicrobial
Common Names:	Copper pod, Yellow-flamboyant, Yellow flame tree, Yellow poinciana, Yellow flame, Raintree, Golden flame, Rusty shield bearer, Sagabark peltophorum, Yellow gold mohur, Jamerelang laut, Siar, Perungondrai, Kondacinta, Ivalvagai, Bonmeza, Soga jambal, Soga, Jemerelang laut, Batai, Batailaut, Flamboyán Amarillo, Iyalvagi, Iya vakai, Krathin paa, No see, Nonsi, Saan ngoen, Braziletto wood, Trac vang, Lim set
Description:	It is a broad spreading leguminous tree with vibrant yellow flowers. Leaves are pinnate 30-60 cm long with 8-10 pinnae each with 10–20 oblong green leaves. Seed pods are a dark rusty red in colour which gives the tree its common name of Copper pod and contain three to four seeds in each. The tree is deciduous and therefore loses its leaves once every year.
Classification:	| Family: Fabaceae | Genus: Peltophorum | Order: Fabales
Origin:	Th origin of the tree is the greater part of Southeast Asia down to the islands just off the Northern Territory of Australia.
Soil Requirements:	It is found on lowlands near mangrove forests and along rivers. It does not grow at altitude of more than 1600 meters. The tree prefers light to medium free draining soils however it is also found in clay soils however in these soils it may grow slower.
Timber Quality:	Its timber traded throughout Asia as a fine furniture timber. It is a medium to heavy timber and as can be seen in the image the timber can have unique and lustrous properties. The sap wood is a greyish white maturing over time into a dull brown. The heart wood can be golden to dark reddish brown.

Medical Overview:

Peltophorum pterocarpum has a long history as a traditional medicinal tree. However, the recent interest in the tree has occurred as science looks for solutions to the emerging antibiotic resistant bacteria that are challenging scientists and medical professionals globally. Sadly, it has been shown that both the stembark and the flower extract possess antibiotic properties, however these are mild and not significant enough to have this tree recommended for such applications.

Of particular interest with this tree is its potent antioxidant potential as well as its antihemolytic actions. Studies have shown that the methanol extract of the seeds and pods was more effective that tocopherol (vitamin E) and ascorbic acid (vitamin C). As a result, the pod extract may be a powerful adjunct to cancer management.

In addition to the antioxidant and antihemolytic properties of the seed pods, additional research has shown that the leaf extract has been proved to display pronounced liver protection properties and as a result indicates the tree can be used in the management of liver damaging conditions such as hepatitis.

Further research has been done on the reported analgesic properties of the flowers and indeed they have been shown to have mild analgesic actions in the research carried out in the laboratory. A dose of approximately 400 mg/kg began to have similar effects as that of the standard anti-inflammatory drug indomethacin.

Other research has confirmed that the extract of the leaves displays effective management against the formation of calcium stones in the kidney and bladder. Therefore, the leaf extract is recommended for those people who have a history of such a condition. The research also displayed that the aqueous (water) extract was better than the methanol and also aided in the dissolving of existing stones. As a result, the most useful application of the tree *Peltophorum pterocarpum* is in the treatment of kidney and bladder stones.

The use of the tree has been shown to be nontoxic.

Prunus africana by Ji-Elle from commons.wikimedia.org

Prunus africana

Primary Functions:	Prostate cancer, Benign prostatic hyperplasia (BPH)
Secondary Functions:	Anticarcinogenic
Other Functions:	Antimutagenic
Common Names:	Pygeum, Kirah, African Cherry
Description:	The tree can grow at 600-3000 meters above sea level, up to a height of 40 m. It has creamy white flowers and produces black fleshy fruits resembling a cherry when ripe, which are eaten by monkeys and squirrels. It is long lived, up to 100 years, and is one of the critical species.
Classification:	| Order: Rosales | Family: Rosaceae | Genus: Prunus
Origin:	Eastern and Southern Africa.
Soil Requirements:	It is mainly distributed in the patchily rainy high altitude mixed forest ecosystems.
Timber Quality:	The timber is considered highly durable and has properties similar to Mahogany. It is used for tool handles, farm implements and furniture.

Medical Overview:

In the 1700's the European travelers learned from South African tribes how to soothe bladder discomfort and treat old man's disease with the bark of *Prunus africana*. Its bark extract has been used in Europe to treat men suffering from being Benign Prostatic Hyperplasia (BPH), a noncancerous enlargement of the prostate gland)). The active constituents of *Prunus africana* extract include phytosterols that have anti-inflammatory effects by inhibiting production of pro-inflammatory prostaglandins in the prostate. *Pygeum africanum* also contains pentacyclic triterpenes (ursolic and oleanic acids) that have anti-edema properties, and ferulic acid esters (n-docosanol and tetracosanol) that reduce prolactin levels and block the accumulation of cholesterol in the prostate. Prolactin is purported to increase the uptake of testosterone by the prostate, and cholesterol increases binding sites for dihydrotesterone (DHT).

In another study, *Prunus africana* extract was used either alone or in a combination with antibiotics to treat 18 patients suffering from sexual disturbances due to either BPH or chronic prostatitis. *Pygeum africana* improved all the urinary parameters investigated by medical history and prostatic transrectal echography and improved sexual function despite the fact there were no significant differences found between hormonal levels and nocturnal penile tumescence and rigidity monitoring before and after therapy. It has been suggested that *Prunus africana* extract maybe beneficial in the treatment of patients with sexual/reproductive dysfunction.

A study suggested that the extract had no effect on fertility in male rats and rabbits at dose up to 80 mg/kg/day a safety margin of 50 times the therapeutic dose. Furthermore, in vivo and in vitro mutagenicity studies showed a complete absence of mutagenic or clastogenic potential. In fact, many of the constituents of *Pygeum africanum* have anticarcinogenic and antimutagenic properties in vitro and in vivo.

In further research the methanol extract of the bark of *Prunus africana* was compared to penicillin as an antibacterial agent. The findings of the research proved that the bark extract did possess attributes that controlled bacterial strains such as *Serratia marcescens*, *Salmonella typhi*, *Proteus vulgaris*, *Bacillus cereus* and *Escherichia coli,* however it was not as effective as the control being penicillin.

Quercus robur by RegalShave from Pixabay

Quercus robur

Primary Functions:	Antioxidant, Gastrointestinal support, Diarrhea
Other Functions:	Cardiovascular tonic, Wound healing
Common Names:	English Oak
Description:	The leaves of the tree are dark green on top and have a sinuous edge with alternating lobes or fingers. The trunk of the tree can grow into majestic size over time with the largest passing ten-meter circumference. The branches spread in haphazard directions forming a wide crown. The fruits or nuts of the tree are approximately 2 centimeters long and are pedunculate
Classification:	| Order: Fagales | Family: Fagaceae | Genus: Quercus (500 members)
Origin:	Western Europe and the Caucasus.
Soil Requirements:	Grows readily on a range of moist loam soils.
Timber Quality:	Oak timber has been known throughout European history as one of the most durable and long-lasting timber. Used in boat and building construction as well as for fine furniture. The timber is approximately 720 kilograms per cubic meter when dried.

Medical Overview:

Quercus robur is known as the English Oak yet it is found all over Europe and well into the eastern region of central Europe. It is one of over 500 members of this genus *Quercus and* has been used since the earliest civilizations of Europe as a medicinal tree. However, the main use of the tree that it has consistently been used for is the tanning of hides or leather due to the very high levels of tannins in the leaves bark and wood of the tree. The compounds known as tannins have been so named precisely because they were identified as being the active principle from the Oak timber that tanned or cured leather.

The English Oak has been found to possess many common phytochemicals that other members of *Quercus* all have, and also some unique compounds such as roburgenic acid, which has been shown to aid in the management of breast cancer. Other compounds are gallic acid (anti-inflammatory, cardiovascular tonic, neuropsychological), caffeic acid (anticancer), ferulic acid (skin toner), vanillic acid (reducing inflammatory pain), syringic acid (anti-inflammatory, anticancer, antidiabetic and antimicrobial). All of these compounds combined makes an oak extract a very powerful antioxidant. The tree has also been shown to possess resveratrol and anthocyanins which amplify the antioxidant potential as well as enhance the cardiovascular support. Further research has shown the oak leaf and bark extracts aid in the reducing inflammation in the gastrointestinal tract and also help manage diarrhea.

Employed in a safe and measured dosage the extract from the leaves, bark and timber of Oak have been shown to have various positive health benefits. Due to the high levels of tannins the extracts from the tree have been shown to be anti-inflammatory, antidiabetic, reduce swelling, management of hemorrhoids, cardiovascular tonic and central nervous system support. Perhaps the most common use of an extract made from the tree is in treating wounds as various compounds from the tree act as antibacterial as well as slowing blood loss by constricting blood vessels.

Recently research into the nut or acorns of the tree as a food source has been undertaken and it has been found that the oil from the nut is similar to olive oil as a beneficial health food. Acorn oil is high in tocopherol (vitamin E) as well as oleic, linoleic and palmitic acids. By using acorn oil in a daily diet, the same health benefits as discussed above for the extracts can be achieved.

There has been some controversy over the safe use of tannins as a cure or dietary supplement. However, science has found that doses over 1.5 -2.5 grams will pose a risk and may inhibit nutrient absorption in the gut or more seriously, they have been linked to various types of cancer. Yet, in order to achieve such dangerous levels a person needs to actively abuse any extract made from *Quercus robur*.

Salix alba by Jochen Schaft from Pixabay

Salix alba

Primary Functions:	Analgesic, Arthritis, Antiviral, Osteoporosis, Rheumatoid arthritis, Anti-inflammatory, Skin diseases
Other Functions:	Antifungal, Antibiotic
Common Names:	White willow, Catkins willow, European willow, Salicin willow, Withe withy, Weidenrinde, Fieberweidenrinde, Maiholzrinde; Ecorce de saule
Description:	A deciduous tree that grows from 6-18 meters in height with supple branches and the leaves alternately, pale linear with 5-15 leaflets. The male flowers are yellow, and the female flowers are green on separate plants. The Catkins are cylindrical, approximately 6-7 cm long. The bark range in colour from yellowish green to brown-gray and from smooth texture to faint longitudinal situations.
Classification:	| Order: | Family: Salicaceae | Genus: Salix
Origin:	The tree is native to Europe and Central and Western Asia but now cultivated in India, China and the Caribbean.
Soil Requirements:	The tree is found in temperate and arctic zones, but some species can be located in subtropical and tropical zones.
Timber Quality:	The wood has a low density and low transverse compressive strength. It is well known for the making of Cricket bats.

Medical overview:

Salix alba is the original source of salicin and has been used worldwide as an antipyretic and analgesic by the ancient people including the Egyptians, Chinese, Greek and Roman civilization. Chemically, salicin is closely related to asprin as they have similar actions to the human body. The botanical name *Salix alba* was taken from the Celtic word '*sal*' meaning near, and *'lis'* meaning water. The use of salicin was recorded back about 4000 years ago to the Sumerians who noted the pain remedies of the willow tree on clay tablets. *Salix alba* has been long used by ancient civilizations, the ancient Egyptians used the bark of the tree to treat pain and inflammation. Hippocrates and Dioscorides recommended willow bark as a remedy for gout and rheumatic joint diseases, but it fell into disuse in Europe during the Middle Ages. Kuan-Yin, the bodhisattva of compassion, is often depicted holding a willow branch as a symbol of healing.

Research has focused on the anticancer potential of the extracts made from the tree and found that it prevents by 35% breast, colon, pancreas and prostate cancers. Suppresses the proliferation in leukemia, and melanoma in human cancer cells. A report found that willow extract killed 75% to 80% of abnormal cells harvested from 7 patients with acute lymphoblastic leukemia and 13 patients with acute myeloid leukemia.

Research has uncovered a broad range of health benefits from the use of *Salix alba*. The most common use of the tree is to alleviate pain, fever and inflammation. However, the cardio protective actions of the extract made from either the leaves or the bark of the tree are even more pronounced. The extract from the tree prevents platelet aggregation and stops thrombosis. Further the extract also retards the build-up of plaque in the arteries and acts as a general cardiac tonic reducing the risk of heart attack. Due to its effects on the cardiovascular system, it has been found useful in the management of vascular dementia.

Interestingly *Salix alba* is also useful for dandruff and other mild skin complaints as it promotes the shedding of dead skin via it being a keratolytic agent.

Additional research has shown that *Salix alba* also aids in balancing blood sugar levels and thereby being useful in the management of diabetes.

Salicylic acid and jasmonic acid act as ribonucleic acid (RNA) silencing mechanisms systemic response, as they can block virus replication and the extract can activate systemic immune response.

The aqueous extracts of dried willow bark extract showed antifungal activity against *Botrytis cincerea, Penicillium digitatum*, *Candida guilliermondii, Candida albicans, Candida tropicalis, Candida glabrata* and *Candida parapsilosis.* Recent studies showed the bark extract from the plant *Salix alba* was found to possess antimicrobial activity against the oral bacteria. Results showed antimicrobial activity against Streptococcus mutans, *Lactobacillus*, *Staphylococcus aureus* but the least activity was shown in *E. coli*.

Samanea saman by Primejyothi from commons.wikimedia.org

Samanea saman

Primary Functions:	Mild skin conditions
Secondary Functions:	Anti-inflammatory
Other Functions:	Cancer management
Common Names:	Raintree, Five O'Clock tree, Monkey Pod, Giant Thibet, Ingasaman, Cow Tamarind, East Indian Walnut, Coco Tamarind, French Tamarind, Campano, Algarrobo, Carreto, Soar, Suar, Carabeli, Couji, Lara, Saman, Dormilon, Genizaro, Zarza, Arbreappluie, Chorona, Regenbaum, Goango, Albizia saman
Description:	A wide-canopied tree with a large symmetrical umbrella-shaped crown. It usually reaches a height of 15–25 meters and a diameter of 3 meters. The leaves fold in rainy weather and in the evening, hence the name Raintree and Five O'clock tree in Malay. The tree has pinkish flowers with white and red stamens, set on heads with around 12–25 flowers per head.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Samanea
Origin:	South America.
Soil Requirements:	Easily adapts to a wide range of soils.
Timber Quality:	The timber is much sought after and commands high prices. The red, brown, and tan colouring throughout the heartwood allow the timber to display beautiful textures and patterns. The heartwood is considered to be highly durable, however the sap wood is susceptible to borer and termite. It is used as flooring and for fine furniture. In Hawaii it is used to make musical instruments such as ukulele and guitars.

Medical Overview:

Samanea saman has been transported from its natural range in South America to all parts of the tropical world. This has been largely due to the size and beauty of the tree and not due to the medicinal claims. One such geographic area is the Hawaiian Islands where it has become to be thought of as naturalized, which is incorrect. The main specialized timber in Hawaii is Koa and second to this in importance in *Samanea saman* which is called Monkey Pod in this region. The timber of the tree is considered to be more valuable than mahogany and is therefore regulated by government agencies and is planted as a plantation species.

A great deal of research has been conducted on *Samanea saman* in regard the traditional claims made about this tree. The antibacterial actions of the leaf, bark and mature pod in research conducted in 2014 and also 2010 found these claims established as a mild antibacterial for the ethanol extract, as well as other methods of extractive agents. However, the results were far lower than the comparative antibiotics used in the research. Therefore, the extract from the tree may be considered to be a gentle antibacterial and suitable for minor skin conditions. In this research the claims of the extracts being antifungal were also tested and these two were found to mild ineffectiveness. Whilst the results from the experiments were underwhelming the use of the tree is still supported as a tisane (tea) to aid in the alleviation of intestinal bacteria as well as *Candida albicans*. Yet it must be stressed that the tree is a mild alternative to other more robust tree extracts.

The presence of lupeol and epilupeol in the bark extract supports the antibacterial and antifungal potential of the tree. These compounds are also considered to be anticancer and anti-inflammatory. This research from 2014 further establish the ethanol bark extract as an effective traditional remedy. However, once again the results from the extracts derived from the tree are mild and gentle as a result when considering a tree for cancer therapy a more effective tree is recommended to be chosen ahead of *Samanea saman*.

Sandoricum koetjape by Steve originally posted to Flickr as Gratorn from commons.wikimedia.org

Sandoricum koetjape

Primary Functions:	Anticancer
Secondary Functions:	Antibacterial (including MRSA), Antiviral (including Epstein-Barr virus)
Other Functions:	Anti-inflammatory
Common Names:	Santol, Kraond, Sentol, Klampu, Thitto, Suanmingkou, Suanmingguo, Faux mangoustan, Sandorique, Mangoustanier sauvage, Sandoribaum, Falschemangostane, Sandoriebaum, Santor, Kecapi, Ketuat, Kompiingriech, Tong, Toongz, Donka, Sayai, Sevai, Katon, Kra thon, Sa Thon, Satawn, Sau chua, Sau tia, Sau do
Description:	It is an evergreen tree that grows 15-45 meters tall in fast manner, as the plant gets older the trunk gets buttressed close to the ground. The leaves are compound, elliptic to oblong-ovate, blunt at the base and pointed at the apex.
Classification:	| Order: Sapindales | Family: Meliaceae | Genus: Sandoricum
Origin:	It is native to Indonesia and Malaysia.
Soil Requirements:	Prefers podzolic soils in both humid and seasonal climates.
Timber Quality:	The heartwood is pale red, pale yellow or pale brown depending. The heartwood is distinct from the sapwood. The timber is considered easy to work and is suitable for lamination. It has a low durability rating. It is used in furniture making as well as used in making musical instruments.

Medical Overview:

Sandoricum koetjape is known as Santol more widely and this is also the name given to the fruit from the tree. The fruit comes in two varieties being either yellow or red, with the red being the most common variety. The fruit is eaten raw straight from the tree or used to make juice, candied fruit or jams.

The tree has been used for centuries in its native region in the traditional medicinal systems. More recently the research into the medicinal properties of the tree have both supported the traditional claims, and also found additional health benefits hidden within its chemistry. One such new compound derived from the tree is known as koetjapic acid which has shown great promise in the treatment of cancer. Also found in the tree tissue is another anticancer compound known as katonic acid. Both of these compounds are believed to be the main chemical compounds that enable the *Sandoricum koetjape* extract to be considered a useful tool in the management of various cancer types. More specifically, in research from 2011 it was found that the tree was significantly useful in retarding murine lymphocytic leukemia. Other compounds found in the stembark and leaf extract are sandoripin, bryonic acid, indicic acid, sandrapin, sandorinic acid and sentulic acid. Further research has shown that koetjapic acid inhibits the progression of the Epstein-Barr virus. In doing so the extract has shown antiviral properties.

The antibacterial properties of the tree were tested in the laboratory in 2000. In this research the extract was highly effective at inhibiting the growth of Methicillin Resistant *Staphylococcus aureus* (MRSA) as well as other bacteria.

With the extensive research conducted on the health benefits from the tree it has supported the traditional use of the leaves and bark of the tree in controlling and treating diarrhea by retarding bacterial growth in the gut and also reducing fever by its anti-inflammatory properties.

In 2004 the extract from the tree displayed potent anti-inflammatory affects. In this study the extract reduced inflammation by up to 94%.

Sclerocarya birrea by Nicolas Raymond Bethesda from commons.wikimedia.org

Sclerocarya birrea

Primary Functions:	Antimalarial
Secondary Functions:	Antihyperglycemic
Other Functions:	Antibacterial, Analgesic
Common Names:	Marula tree
Description:	The tree is a single stemmed tree with a wide spreading crown. It is characterized by a grey mottled bark. The tree grows up to 18 m tall mostly in low altitudes and open woodlands. The fruits, which ripen between December and March, have a light-yellow skin, with white flesh.
Classification:	| Order: Sapindales | Family: Anacardiaceae | Genus: Sclerocarya
Origin:	It is native to the Miombo woodlands of Southern Africa, the Sudano-Sahelian range of West Africa, and Madagascar.
Soil Requirements:	It grows naturally in various types of woodland, and sandy soil or occasionally on sandy loam soil.
Timber Quality:	The wood is preferred for mortars, pestles, bowls and various local crafts, saddles, furniture and heavy crates.

Medical Overview:

Sclerocarya birrea is a popular African wild tree distributed in many African countries where the leaves, stembark, root, and fruits are used in food and traditional medicine. Especially the Bantu peoples of southern Africa have used the tree for thousands of years, also as a timber. Its fruit is rich in ascorbic acid (vitamin C), up to eight times higher than oranges. Today a cream liqueur is made from the fruits and called Amarula.

The most exciting aspect of the leaf extract from the tree is that it was shown, in a 2014 study, to be 100% effective in controlling *Plasmodium berghi* (malarial parasite). In this research both the aqueous and ethanol extract from the leaves had the same effect on the parasite. The results from this research show the antimicrobial, antiparasitic and possibly the anthelmintic uses of the tree.

Traditional claims that the stembark from the tree is an effective hyperglycemic agent and therefore useful in the management of diabetes type II was studied in 2014. In this research it was shown that at doses of 35 mg/kg body weight prior to sugar intake reduced blood sugar levels by 40%. As a result the traditional use was authenticated. Research from a decade before (2004), acts as a foundation for the more recent study and within this paper it was established that doses ranging from 100 – 800 mg/kg body weight once again displayed significant antihyperglycemic actions (reduces high levels of sugar, or glucose, in the blood).

In the traditional folklore about the uses of the tree it is claimed that the leaf extract will reduce blood pressure or be antihypertensive. Yet, in research from 2012 the opposite was found, as the leaf extract in doses ranging from 50 – 400 mg/kg bodyweight resulted in significant increase in cardiac function and pressure. As a result, the extract should not be used on patients who suffer hypertension but rather the extract will be useful for patients who suffer from an abnormal low blood pressure.

In the paper from 2004 the claims that the bark extracts are also pain reducing (analgesic) and anti-inflammatory were reviewed. The conclusion was that the bark extract was both analgesic and anti-inflammatory, but these effects were far below the standard drugs, diclofenac and chlorpropamide. Therefore, the traditional use is supported yet not to a satisfactory level. This was the same result when the leaf, bark and fruit extracts were researched for the antibacterial actions and the findings showed that whilst they did possess mild antibacterial properties more effective choices should be made in the regard of infection and bacterial conditions.

Sclerocarya birrea is considered to be nontoxic and doses of up to 800 mg/kg were at the upper limit of safety.

Spathodea campanulata by zoosnow from Pixabay

Spathodea campanulata

Primary Functions:	Antidiabetic
Secondary Functions:	Antimalarial
Other Functions:	Antioxidant, Anticonvulsant
Common Names:	Fakkelboom, Afrika-vlamboom, Neerukayi, Mara, African tulip tree, Fountain tree, Nandi flame, Nile flame, Squirt tree, Tulip tree, Uganda flame, Immortelétranger, Rugtoora, Kifabakazi Muzurio, Panchut-panchut, Kudaellagaha, Kuduluamapola, Espatodea, Mampolo, Tulipán africano, Meaíto, Kibobakasi, Kifabakazi, Patadi, Omwatanshare.
Description:	The tree grows up to 25 meters tall. The flower bud is ampule-shaped and holds water through the day after rains or heavy dew, making the tree a haven for birds who drink from the flowers. The open flowers are cup-shaped and have a brilliant red colour. The seeds are contained in a fine filament which makes them easy to distribute over a wide area even with a light breeze.
Classification:	| Order: Lamiales | Family: Bignoniaceae | Genus: Spathodea
Origin:	Dry tropical forests of Africa.
Soil Requirements:	The tree is able to grow on a wide range of soils and ecosystems.
Timber Quality:	The timber from the tree is light and structurally weak and has few uses. In its native range the traditional peoples made drums from the wood. It is aslo recommended to make crates of.

Medical Overview:

Spathodea campanulata has become an invasive plant in most of the new regions where it has been planted. Once admired for its flamboyant and profuse red or yellow flowers, it is now being eradicated in several regions of the world. However, in the Philippines it is considered to be a tree of importance and has been included in the recognized government journal of medicinal plants. Clinical research into the medicinal claims of the tree has been ongoing for many years.

In studies conducted in Uganda in 2016 found that the stembark extract displayed similar results in the reduction of hyperglycemia (diabetes) when compared to the standard drug metformin. In this study the researchers used a methanol extraction method and found that doses of 200 mg/kg body weight are an effective control in laboratory induced diabetes, however the response time was slower than that of the standard drug. These findings were conducted after a research team found similar results in test from 2010 where doses of 600 mg/kg body weight reduced hyperglycemia by approximately 66%.

In one paper from 2008 in India the leaves of the tree were studied for the possible antimalarial actions of the tree. In this research it was established that the ethanol extract made from the leaves showed good antimalarial action against both sensitive *Plasmodium falciparum* as well as chloroquine resistant *Plasmodium falciparum* which is the microbe or parasite responsible for malaria. Additional research found that the extract was equally effective in controlling other Plasmodium species of parasites.

The extract derived from the leaves, stem bark and flowers show significant antioxidant properties.

Interesting research was conducted in 2010 into the claims that the leaf extract from the tree is useful in the treatment of epilepsy and convulsions. In this research doses of up to 1000 mg/kg body weight showed a 100% protective result in test animals. It was also shown that the use of the extract did not affect brain function in anyway and therefore the researchers showed that it has no psychotic side effects nor is it sedating.

It has also been claimed that the tree has antibacterial actions. Therefore, a study was conducted in 2010 to ascertain if these claims were true. Whilst the paper showed findings that the flower and leaf extract both displayed antibacterial actions, they were not sufficient when compared to gentamycin and streptomycin. Other research however contradicts this finding and claims the extract is effective in the control of bacteria. It is therefore recommended that other trees are more effect for bacterial infections.

It has been shown that doses of *Spathodea campanulate* is safe up to doses of 4000 mg/kg body weight and therefore may be considered non-toxic.

Stelechocarpus burahol by Sogellize from commons.wikimedia.org

Stelechocarpus burahol

Primary Functions:	Antihyperuricemic (gout), Rheumatoid arthritis
Secondary Functions:	Kidney function
Other Functions:	Antioxidant
Common Names:	Kepel fruit, Kepel apple
Description:	The tree may have fluting at the base of the trunk with numerous of characteristically arranged lateral branches, monopodium, dark grey-brown colour. Leaves are oval long dark green mid-rib raised on upper and lower surfaces. Flowers are unisexual, grow on the lower part of the trunk close to the ground in large numbers in cluster.
Classification:	| Family: Annonaceae | Genus: Stelochocarpus | Order: Magnoliids
Origin:	The tree is only found and grown in Central Java, Indonesia.
Soil Requirements:	Clay and deep loam soils.
Timber Quality:	The wood has been reported to have a high durability and hardness and is used in the manufacture of furniture and tools. The timber is reported to be termite resistant.

Medical Overview:

Stelechocarpus burahol is a well-known Javanese tree. It produces an edible fruit and is used for its various medicinally qualities. The flavor of the fruit is reported to be a mix between coconut and mango. In Indonesia, the fruit is rare as it was traditionally reserved for Javanese aristocracy such as the Sultans and especially for the Javanese princesses due to the tree and its fruit believed to have a symbolic meaning of unity and promote mental and physical integrity. Common people were not permitted to eat the fruit because of its value, and they could be punished if a tree were found in the grounds of common houses. As a result, it was not widely cultivated and this has resulted in the rarity of the tree. The legend of the tree and its use reports that it makes the breath, sweat and urine smell of violets.

Traditionally it is used for treating gout and to prevent renal inflammation, and as a contraceptive.

A study results showed that the ethanol extract from the leaves decreased plasma uric acid levels which supports the claim that the tree has anti-hyperuricemic activity and an antioxidant activity. Hyperuricemia is not only a known risk factor for gout but has been strongly linked with other diseases such as hypertension and kidney failure.

Further studies conducted in 2000, 2002, 2007 and 2010 further supported these findings It has been experimentally proven from the ethanol extract that the inhibitory activity is due to the presence of flavonoid compounds.

Results showed that the ethanol and hexane leave extracts of Kepel possess significant anti-hyperuricemic potency. The anti-hyperuricemic activity of the ethanol (60.86 to 78.33%) and hexane extracts (78.23 to 88.52%) are almost equivalent to that of the allopurinol (50.82 to 91.16%). While in vitro study showed that the ethanol extracts had an inhibitory activity lower than the standard drug allopurinol. Therefore, the use of the leaf extract in the treatment of gout and rheumatoid arthritis is supported.

The leaves are believed to have an oral deodorant and also it reduces the odor of feces by activating the probiotic bacteria Bifidobacterium. In research from 2017 a group of scientists studied the effects of the ethanol extract from the fruit of the tree in reducing halitosis (bad breath). This research showed that the fruit extract did reduce the volatile sulphur compounds that are created by oral bacteria. Therefore, they proved that the consumption of the fruit does indeed sweeten breath and this research may also support the traditional claims that the fruit does reduce body odor.

The timber extract is also used in treatments to lower cholesterol. It has been shown to reduce the build-up of HDL and LDL cholesterol in laboratory tests. Therefore, it may be considered to be a valuable tool for non-communicable diseases.

A study into the toxicity of *Stelechocarpus burahol* found it to be non-toxic and safe in doses up to 5000 mg/kg body weight.

Swietenia macrophylla by Dick Culbert from commons.wikimedia.org

Swietenia macrophylla

Primary Functions:	Antibacterial
Secondary Functions:	Antifungal
Other Functions:	Antihypertension, Anticancer
Common Names:	Big leaf mahogany, Large-leaved mahogany, Brazilian mahogany, Acajouà grandes feuilles, Acajoudu Honduras, Caoba, Mara, Mogno, Mahogany, Thenkani, Mahagani, Peddakulamaghani, Mahogani
Description:	A mature mahogany tree may reach heights of 60 meters. It has a dark brown, flaky bark which has a sweet odour, and the tree bears a pendulous grey-brown fruit and small white flowers. With leaves that can reach lengths of 10 centimeters
Classification:	| Order: Sapindales | Family: Meliaceae | Genus: Swietenia
Origin:	It is native to South America and Mexico.
Soil Requirements:	It can grow in a variety of soils.
Timber Quality:	Mahogany is one of the pre-eminent timbers of the world. When freshly milled it has a pale reddish ochre colour and fine grain. The colour deepens over time to a deep dark red. The sapwood is thin and pale. The timber is used in high end furniture and boat building. The timber is considered to be durable and resistant to insect attack.

Medical Overview:

Mahogany is severely overharvested in its native range resulting in most of the world's supply of timber coming from plantations in Asia and the Pacific Islands.

In research conducted in 2016 from India the claims of the leaf and fruit extract having antibacterial and antifungal properties were tested in the laboratory. The results indicated that the ethanol extract of both the leaves and the fruit does have antibacterial actions, yet it was the antifungal results that were significant at doses of 50ul/ml. As a result, the use of *Swietenia macrophylla* as an antibacterial and antifungal medication is supported. Some of the compounds found in *Swietenia macrophylla* are limonoids which is developed by plants to protect themselves from insect attack. Yet, the additional actions of these compounds are their antibacterial and antifungal properties.

The traditional use of *Swietenia macrophylla* in the treatment of diarrhea can be attributed to the antibacterial actions of the tree.

Research from Luzon state in 2016 found that a basic hot aqueous extract made from the leaves of *Swietenia macrophylla* was as effective as the insecticide solignum, which has as it's the active principle permethrin. The researchers found that the water extract from the leaves killed termites within 30 seconds of application and had a 100% mortality rate.

Research into the anti-hypoglycemic claims made for the use of the tree have been studied and the findings were not conclusive and therefore *Swietenia macrophylla* should not be used in the management of diabetes type II as other trees show greater promise in this area.

Research from 2018 has supported the use of the seed extract in the control and management of hypertension. The ethanol-based extract from the seeds showed significant results in vasodilation and resulting lessening of blood pressure.

Due to the presence of the limonoids in *Swietenia macrophylla* it is currently being assessed for its antimalarial actions. *Swietenia macrophylla* contains 45 limonoids such as swietenolide, 2-hydroxy-3-O-tigloylswietenolide, swiemahogins A and B belonging to the structural classes Andirobin, gendunin, mexicanolide and phragmalin, triterpens, tetranortriterpenes, and chlorogenic acid. Many of these compounds are novel and as yet not fully understood. Yet in clinical research the extract from the leaves, bark and fruit of *Swietenia macrophylla* is showing promise in all aspects of pathogen control.

Limonoids have been researched for their potential in the treatment of various cancers. Whilst the laboratory tests were highly positive in this area further research has been sparse over the past decade or so. Albeit the findings do support the use of limonoids in the treatment of cancer and *Swietenia macrophylla* is a rich source of these compounds.

Swietenia macrophylla is considered to be non-toxic and therefore safe.

Tamarindus indica by Tau'olunga from commons.wikimedia.org

Tamarindus indica

Primary Functions:	Anti-inflammatory, Anti-emetic (delay vomiting)
Secondary Functions:	Analgesic, Antipyretic, Hepatoprotective
Other Functions:	Laxative
Common Names:	Tetuli, Amli, Nuli, Textili, Tentul, Amali, Ambali, Ambli, Amli, Imli, Puli, Chinch, Chitz, Koya, Chinta
Description:	The tree is able to grow to a height of 18 to 24 meters and has an irregular crown. The evergreen leaves are alternately arranged and pinnately lobed. The leaflets are bright green, elliptic-ovular, pinnately veined, and less than 5 cm in length. The flowers are elongated, 2.5 cm wide, five-petalled, borne in small racemes, and yellow with orange or red streaks.
Classification:	| Order: Fabales | Family: Fabaceae | Genus: Tamarindus
Origin:	As Tamarind has been cultivated for centuries its origins are disputed however the tree is probably originating from tropical Africa.
Soil Requirements:	It can grow on a wide variety of soils, yet the main soil types cited are loam, sandy, clay and acidic soil types in full sun.
Timber Quality:	Its timber has a thick sap wood encasing a deep red- dish-brown heartwood. The heartwood is considered to be highly durable and resistant to insect and borer, however the sap is not. Most of its timber traded is the sapwood as the heartwood is narrow. Older trees tend to hollow out over time thereby restricting larger dimensional timber. It is used for furniture and wood turning.

Medical Overview:

A multitude of uses of *Tamarindus indica* have been reported over several thousand years. It has been stated that Marco Polo mentioned *Tamarindus indica* in his memoirs. Its main use today is the fruit pulp in food technology. The health benefits and medicinal uses of the tree are expansive and have elicited many research papers into these medicinal claims.

Research has shown in 2005 that the ethanol leaf extract displayed significant antiemetic (delay vomiting) actions. The extract from the leaves also has anti-inflammatory benefits. Research conducted in 2010 showed that the leaf extract reduced histamine response in test animals, therefore supporting the use of the extract in the treatment of asthma and other autoimmune disorders.

The analgesic (pain) management as well as the antipyretic (fever reduction) actions of the fruit pulp extract has also been supported in clinical testing in 2005, 2007 and 2010. The extract has been shown to be beneficial in uptake or absorption of other drugs such as aspirin and ibuprofen therefore the extract acts as a support to other methods of pain and fever management.

In traditional medicinal systems in both Africa and Asia the fruit pulp extract is used in the management of diabetes. This has been supported in clinical trials in 2004 and 2007 where the blood sugar levels were significantly reduced in test animals fed a dose of 15 mg/kg body weight over 10 weeks. Also, from this research it was shown that the cholesterol levels (LDL) were reduced significantly.

In 2007 research was conducted into the hepatoprotective (liver) benefits from the fruit pulp extract. At doses above 305 mg/kg body weight significant liver protection against paracetamol poisoning was witnessed. The resulting findings from this research has endorsed the leaf and fruit pulp extracts in disorders of the liver.

Due to the high tannin content of the tree, it has been found in other research that the leaf and fruit extract act as a powerful antioxidant.

The fruit pulp has been used as a mild laxative for centuries and modern research has shown this is a correct claim as the findings attribute the laxative actions to the high levels of tartaric acid and malic acid as well as potassium salts.

Various research papers have focused on the antimicrobial and antibacterial actions of the fruit, bark and leaf extracts. It was found in one research paper from Africa in 2011 that the fruit pulp extracts displayed the highest antibacterial actions, however less than the standard drug ciprofloxacin. Another research paper from India also focused on the antibacterial nature of the bark extract and found moderate results being half of that as the control drug used in this clinical testing which as ampicillin. Therefore, the use of the tree in wound healing has been supported yet other trees may be considered more effective.

Tectona grandis by Forest & Kim Starr from Wikimedia Commons

Tectona grandis

Primary Functions:	Anti-inflammatory, Hypertension
Secondary Functions:	Antioxidant, Antitumor, Diabetes
Other Functions:	Antibacterial, Antifungal
Common Names	Teak, Teca, Teck, Kyun, Teca Jati, Deleg Y Kulidawa, Sak, Saka, Mai-Sak, Sagun, Sagwan
Description:	It is a large, deciduous tree up to 40 meters tall with gray to grayish brown branches. Leaves are ovate-elliptic to ovate. Fragrant white flowers are borne on 25–40 cm long by 30 cm wide panicles from June to August. It sets fruit from September to December; fruits are globose.
Classification:	| Order: Lamiales | Family: Lamiaceae | Genus: Tectona
Origin:	It is native to South and Southeast Asia, mainly India, Sri Lanka, Indonesia, Malaysia, Thailand, Myanmar and Bangladesh.
Soil Requirements:	Most suitable soil is deep, well-drained, fertile alluvial-colluvial soil.
Timber Quality:	Its wood is highly valued for its durability and water resistance, and is used for boat building, exterior construction, veneer, furniture, carving, turnings, and other small wood projects.

Medical Overview:

Various research papers have been written on the anti-inflammatory and analgesic attributes of its stembark extracts. It has been verified that the stembark extract in doses ranging from 200 to 500 mg/kg body weight displayed significant pain relief and anti-inflammatory results. Claims that the stembark is a potent anti-asthmatic medication is also supported by this research as the extract relaxes the mucosa of the airways and reduces inflammation thereby reducing the impact of asthma. Allied to the research described above is the finding from other research that the leaf, stem and flower extracts possess significant antioxidant properties.
Research into the antibacterial actions of the stembark extract from *Tectona grandis* has found the properties of the tree to be highly antibacterial. Research from 2004 showed that one of the compounds found in its extract is betulinic acid which has been known for its antibacterial actions. Lapachol is also found in the tree's tissues. Both of these compounds have been known for their antibacterial actions. Research showed that stembark extract from the tree was effective in controlling *Listeria monocytogenes* and also Methicillin Resistant *Staphylococcus aureus* (MRSA) .
Research presented 2015 showed that the ethanol stembark extract from the tree showed positive results in controlling small cell carcinoma which are typical of breast cancer. The findings based the effect on a unique compound found in Teak called tectoquinone. This research is supported by other papers on this issue and therefore supports the antitumor actions found when using the extracts from both the bark and the leaves. Yet the bark extract has been found to be more effective. In other research the anticancer actions of the extract were attributed to another compound found in the bark extract called juglone, which has been extensively studied for its anticancer potential.
The antifungal activity of teak leaf extract was tested against *Arthrinium phaeospermum*, the cause of wood decay. The air-dried leaves of *Tectona grandis* were extracted with methanol and evaporated in a rotary evaporator. The result at a concentration as low as 0.5% (w/v) significantly suppressed the growth of *A.phaeospermum* by 81.4%.
The hypoglycemic (low blood sugar) activity of methanolic extract of *Tectona grandis* root in alloxan induced diabetic rats. A comparison was made between the action of its methanolic extract and a known antidiabetic drug glibenclamide (0.5 mg/kg). The methanolic extract of its root was administered orally at different doses to normal rats. The methanolic extract at 500 mg/kg dose level exhibited significant reduction in blood glucose levels. In 2011, research showed that the methanol extract made from its flowers had similar actions in the reduction of blood sugar and this research supplied additional support in the use of Teak for diabetes type II.
It is of interest that a study conducted in 2010 sought to verify the traditional claim that the oil extracted from the seeds of *Tectona grandis* reversed hair loss and increased hair thickness in both men and women. The study may be considered to have been undertaken in formal scientific method and therefore the findings may be relied upon. The results showed stimulation of the hair follicle itself so that the hair growth from the follicles improved over time much faster than the control group.
Further the study compared the seed extract to the standard drug minoxidil (against high blood pressure) and found that the Teak seed oil far superior.

Terminalia bellirica by A. J. T. Johnsingh, WWF-India and NCF from commons.wikimedia.org

Terminalia bellirica

Primary Functions:	Antipsychotic, Antidepressant, Antioxidant
Secondary Functions:	Atherosclerosis, Antidiabetic, Analgesic
Other Functions:	Fever reduction
Common Names:	Bahera, Beleric, Bibhitaki, Beleric myrobalan, Myrobalan beleric, Bedda nut tree, Jahakebo, Namkiengdam, Samo-phiphek, Haen-khao, Heen, Sramar pipheek, Thitsein, Simar kulihap, Jelawai, Elu belu, Haen-ton
Description:	The tree has a thick brownish-gray trunk that can grow up to 12 meters in height. The leaves are crowded around the ends of the branches which is the reason why it is called Terminalia, alternately arranged and elliptic obovate.
Classification:	| Order: Myrtales | Family: Combretaceae | Genus: Terminalia
Origin:	It grows throughout India.
Soil Requirements:	Deciduous forest of tropical regions that develop in areas with alternating seasons of heavy rainfall and prolonged drought.
Timber Quality:	The wood is whitish, rather soft with a density of 675-900 kg/m³ at 12% moisture content. Its sapwood and heartwood are not distinct with straight grains. The wood is steeped in water to make it more durable then used for making boxes, furniture and construction.

Medical Overview:

Terminalia bellirica has been used for centuries for medicinal purposes. However, the Hindu people of northern India shun the tree and will not sit underneath it as they believe that it is inhabited by demons. As with trees of this genus there is a crossover of claims as it can be confused with *Terminalia catappa.* It is claimed that in the Charaka Samhita, the ancient Ayurvedic text, the Bibhitaki fruits are mentioned as having qualities to alleviate disease, and bestow longevity, intellectual prowess and strength.

The claim that *Terminalia bellirica* is a potent antibiotic was studied in research published in 2014 and found the extract from the tree had mild antibacterial properties. Within the same research paper however it was shown that the leaf extract did display significant antifungal properties and had similar results when compared to the standard drugs bifonazole and ketoconazole. Further research conducted on its antibiotic properties in Egypt in 2014 found that the extract derived from the leaves of the tree did possess antibacterial actions against various bacteria however far less than the standard drugs streptomycin and ampicillin. Therefore, the leaf extract of the tree can be used in the management of fungal diseases and other trees would be a better choice when dealing with bacterial infections and diseases. It was also found that the leaf extract displayed similar antioxidant results when compared to ascorbic acid.

One of the main compounds found within *Terminalia bellirica* is Gallic acid. This compound is thought to be the main reason for the antipsychotic and antidepressant effects displayed by the fruit extract. In 2012 it was shown that the fruit extract had a positive effect in the reduction of depressive conditions in vivo. Whilst another research paper from 2014 showed that the extract from the tree reduced or balanced dopamine levels in the brain. These research papers therefore supported the traditional use of the tree in the treatment of psychiatric conditions through the elevation of serotonin and balancing of dopamine. Gallic acid has also been shown to be cytotoxic and is used as an astringent in the control of internal bleeding.

When compared to pentazocine, an opioid pain management drug, the ethanol extract from its fruit, it was found that at doses of 300 mg/kg body weight had similar pain reduction times when compared to the pentazocine. This research (2010) also sought to verify the antipyretic actions of the fruit extract and found the fever reduction was similar to that of paracetamol when given in doses of 200 mg/kg body weight doses.

Research has shown that the extract from the tree may not be an effective cancer management adjunct.

It was found in research undertaken in India in 2009 that the methanol fruit extract mixed into the normal water source and a normal diet in mice a significant sugar lowering effects were witnessed by up to 54% after the sixth day of treatment. This therefore supports the antidiabetic claims.

More recent research from Japan in 2016 has shown that the fruit extract from the tree maybe a significant agent in retarding plaque buildup on the arterial wall, atherosclerosis.

Various claims that the extract from the tree may help in the management of HIV virus have been disputed in clinical research as the 70% alcohol extract was the only solution that had a noticeable effect in the control of the virus and even then, it was mild in effect.

Terminalia catappa by Nguyen from Pixabay

Terminalia catappa

Primary Functions:	Anaemia (sickle cell anaemia)
Secondary Functions:	Antibacterial, Alzheimer's decease
Other Functions:	Hepatoprotective, Cancer, Premature ejaculation
Common Names:	Umbrella tree, Deshi-badam, Tavola tree, Vedam, Vathakottai, Thallithenga, Tercat, Taree, Talisi, Talihai, Taisai, Savidug, Sanideng, Salisai, Salaie, Sai, Sa-ket, Pattibadam, Natto-vudumay, Natbadam, Magtalisai, Logo, Kottamba, Janglibadam, Indian almond wood, Hindi badam, Deshibadam, Dao, Dalisai, Catappa, Castana, Bulao, Bengalibadam, Bengal almond, Bastard almond, Banglabadam, Badami, Badambo, Badam, Amendoeira, Amandier, Amanda, Almond tree, Almond, Almendro, Alita, Al-calessi; Adamarram, Bang, Badamier, Ketapang, Jelawaiketapang, Dalinsi,Hukwang, Badan, Houkouang, Somz moox dong, Hu Kwang, Pareang prang, Chambak barang, Almendras, Reddish-brown terminalia, Kapang
Description:	The tree grows to 35 meters tall. It has corky, light fruit that are dispersed by water. The seed within the fruit is edible when fully ripe, tasting almost like almond. As the tree gets older, its crown becomes more flattened to form a spreading, vase shape. The leaves are large, broad glossy dark green, and leathery. They are dry-season deciduous; before falling, they turn pinkish-reddish or yellow-brown, due to pigments such as violaxanthin, lutein, and zeaxanthin.
Classification:	| Order: Myrtales | Family: Combretaceae | Genus: Terminalia
Origin:	Is naturally widespread in subtropical and tropical zones of Indian and Pacific Oceans.
Soil Requirements:	Grows best in moist tropical climates. The tree is well adapted to sandy and rocky coasts and flourishes on oolitic limestone.
Timber Quality:	It is strong and pliable and is used for the construction of buildings, boats, bridges, floors, boxes, crates, planks, carts, wheelbarrows, barrels and water troughs. It is not considered durable and is susceptible to insect attack.

Medical Overview:

In research conducted in 2011 the ethanol extract derived from the leaves was assessed in its reported abilities to aid the body in the production of red blood cells. When compared to the standard drug folic acid, it was found that the extract had the same effect on the production of red blood cells and hemoglobin. As a result, the researchers from Nigeria have endorsed the use of the leaf extract in the treatment of anemia and more importantly in the management of sickle cell anemia.

In other research also in 2011, this time in India, it was found that the methanol leaf extract from the tree was as effective as piperacillin, a broad-spectrum antibiotic, in the control of gram(+) bacteria and less effective in the control of gram(-) bacteria. As a result, the leaf extract may be considered to be an effective antibacterial. However, in the research it was found the leaf extract to less effective when compared with gentamicin. In the same research the scientists assessed the antifungal abilities of the leaf extract and found the extract to far less effective when compared against the standard antifungal drugs.

Research has found that significant levels of both ursolic acid and asiatic acid can be found in the extracts derived from the tree, more specifically the leaf extract. The presence of these two triterpenoid acids may form the base for many of the health benefits associated with the tree. Ursolic acid has been found to be both anti-inflammatory as well as hepatoprotective (liver). Whilst asiatic acid has been found to be useful in the management of various cancer lines as well as stimulating the production of collagen for wound healing and skin health. Additional research has found asiatic acid displaying positive results in the treatment of Alzheimer's. Therefore, the traditional uses of the tree in the treatment of hepatitis, dementia and cancer have been supported in clinical research.

Claims that the seeds of the *Terminalia catappa* tree possess aphrodisiac properties were tested in clinical trials in 2000. The researchers found that the extract from the seeds did not increase libido but rather prolonged or delayed ejaculation. As a result, it may not be claimed that the seeds or nuts from the tree have aphrodisiac properties but rather may be a supplement in other sexual conditions such as premature ejaculation. Doses of the extract were in excess of 1500 mg/kg body weight.

The extract from the tree also contains the compounds kaempferol, quercetin, punicalin, punicalagin and tercatin. *Terminalia catappa* has been found to be non-toxic.

Terminalia chebula by Bishnu Sarangi from Pixabay

Terminalia chebula

Primary Functions:	Antimicrobial, Antiviral
Secondary Functions:	Antidiabetic
Other Functions:	Antioxidant
Common Names:	Yellow-chebulic myrobalan, Harade, Almond tree, Chebu, Havitaki, Samaotchet, Sramo, Samo-thai, Manjapatut, Manjaputeri, Manja lawai, Myrobalan noir, Chebulic myrabolan, Panga, Abhaya
Description:	It is a medium to large deciduous tree growing to 30 meters tall, with a trunk up to 1 meter in diameter. The leaves are alternate to sub-opposite in arrangement, oval, petiole they have an acute tip, cordate at the base, margins entire, glabrous above with a yellowish pubescence below. Fruit is drupe-like, broad, blackish, with five longitudinal ridges. The dull white to yellow flowers are monoecious, and have a strong, unpleasant odour. They are borne in terminal spikes or short panicles. The fruits are smooth ellipsoid to ovoid drupes, yellow to orange-brown in colour, with a single angled stone.
Classification:	| Order: Myrtales | Family: Combretaceae | Genus: Terminalia
Origin:	It is native to South-West Asia and also in India.
Soil Requirements:	It grows in sunny forests and thickets.
Timber Quality:	The timber is straight grained, and the texture is fine to medium with a luster. It is used in construction and is moderately durable however it takes preservative treatment well.

Medical Overview:

One of the Sanskrit names for *Terminalia chebula* is Abhaya which means fearlessness. One research paper claims that it has been given this name due to its fearless fight against disease.

In 2010, 2012 and 2013 the fruit extract was studied for antimicrobial and antibacterial potential. In this research the methanol and ethanol extract of the fruit was highly successful in retarding the growth of various bacteria and fungi and yeasts, such as *Aspergillus fumigatus, B. amyloliquefaciens, Staphylococcus epidermidis, Salmonella enterica, Salmonella Typhi, Staphylococcus aureus, Streptococcus mutans, Lactobacillus acidophilus, Streptococcus salivarius, Candida albicans, Clostridium perfringens, Helicobacter pylori,* Methicillin Resistant *Staphylococcus aureus, Klebsiella pneumoniae*, and finally *Shigella*. Therefore, the research conducted on the antimicrobial aspects of the fruit extract has shown that *Terminalia chebula* plays great promise as a natural antibiotic. The testing of the extract was compared to the standard antibiotics tetracycline, ampicillin and the antifungal medications ketoconazole and fluconazole. As a result of such research, it is therefore acceptable to support the claims that the extract from the tree is useful in the treatment of dysentery.

It is interesting that in light of the research described above that the extract from the tree is also employed as a laxative as averse to its ability to halt dysentery. The laxative nature of the extracts from the tree was compared to the standard drug bisacodyl and showed comparable results. The extract was made from the dried fruit of the tree in a water extract form. It may be found that a more effective extract medium such as ethanol would have greater results. The dosage range was from 100 mg – 200 mg/kg body weight. The research was conducted in 2013.

A traditional claim or use for the extract from this tree is for the treatment of the common cold. In research from 2013 two compounds were identified, chebulagic acid and punicalagin, that displayed significant antiviral actions in clinical testing and therefore the research claimed that the extract from the tree may be used in the treatment of various viral conditions such as herpes, HIV, influenza, severe onset respiratory syndrome (SARS), West Nile virus and measles. As a result, *Terminalia chebula* shows great promise in the treatment of viral conditions.

Various research papers have been written on the antidiabetic properties (2006, 2009 and 2018), and all the papers supported the use of the ethanol extract of the tree The research from 2018 showed that doses of 300 mg/kg body weight significantly lowered blood sugar levels and was comparable to the standard drug glibenclamide. Once again, the extract was derived from the fruits.

Further support has been shown in research for extracts of this tree supporting the kidneys and renal system. The fruit extract has also been shown to be a highly effective antioxidant.

Thespesia populnea by Filo gèn&#039 from commons.wikimedia.org

Thespesia populnea

Primary Functions:	Psoriasis, Dermatitis, Anti-inflammatory (celiac disease and Crohn's disease)
Secondary Functions:	Muscular aches
Other Functions:	Migraine, Menstrual cramps
Common Names:	Portia, Indian tulip tree, Pacific rosewood, Seaside mahoe, Milo, Plaksa, Poovarasu, Puvarasugansooriya, Bebaru, Barubaru, Miro, Makoi, Gangaraavi, Poovarasu, Buguri mara, Pakur, Surina
Description:	The tree reaches a height of 6-10 meters tall and a trunk diameter of 20-30 cm. Flowers are confused with the Hibiscus hence it is often thought to be *Hibiscus tiliaceus.* The flowers are a yellow proud display. The young branches and trunks have a smooth appearance, however over time these mature into course barked attributes. The leaves are ovate and dark to pale green.
Classification:	| Order: Malvales | Family: Malvaceae | Genus: Thespesia
Origin:	It is believed that the tree was spread by the early Polynesians to all corners of the Pacific. Yet the origin of the tree is assumed to be India, yet this is unclear as it factors in many cultures religious and folklore learning.
Soil Requirements:	Is able to grow up to altitudes of approximately 300 meters above sea level, however it is usually found close the beaches and lowlands of the Pacific. It can grow on a range of soils however prefers neutral Ph soils.
Timber Quality:	The fine-grained, strong, hard and durable wood is used for light construction, flooring molds, musical instruments, utensils and vehicle bodies. As it is very durable underwater, popular for boat building and religious carvings in the rest of the Pacific region, and carved items for tourists. The wood is light to medium in weight and resistant to insect attacks.

Medical Overview:

Thespesia populnea has had along folklore medicinal tradition throughout Asia and the pacific. Many temple carvings are made from its wood and the Polynesian people favored it highly, which may explain its dispersal throughout the pacific region into areas such as Hawaii and Easter Island. The timber from the tree is used to make drums and other musical instruments, such as guitars and ukuleles in Hawaii.

The main scientific attribute of the tree is the use of it for dermatitis conditions such as psoriasis and skin conditions. Traditionally the stembark and rootbark have been infused into coconut oil which was then applied to the affected areas. Yet today oil may be made from the entire plant and thereby create a stronger medication for these conditions. The bark extract was compared to that of the over-the-counter medication retinol A.

It has been further claimed that *Thespesia populnea* has a strong antioxidant potential however research has shown that when compared to ascorbic acid (vitamin C) it displayed a weak effect and therefore is not recommended as such.

In further research when the roots bark was compared to the standard mild anti-inflammatory drug diclofenac the methanol extract had twice the effect in reducing inflammatory response and also increase in body weight attributed to the gastrointestinal tract being able to absorb more nutrient as it was unimpeded by the inflammatory response. Therefore, *Thespesia populnea* may be considered for those suffering from celiac disease and Crohn's disease.

Further supporting evidence shows that *Thespesia populnea* root/bark extract may be used as a replacement for Voltaren in situations of muscular aches and cramps. Also, it may be useful in the treatment in some cases of migraine and menstrual cramps.

Ulmus rubra by Pexibear from Pixabay

Ulmus rubra

Primary Functions:	Anti-inflammatory
Secondary Functions:	Gastrointestinal protection, Ulcers, Irritable bowel syndrome, Crohn's disease, Laryngitis
Other Functions:	Skin conditions, Acid reflux
Common Names:	Slippery Elm, Red Elm
Description:	It is a medium-sized deciduous tree with a spreading head of branches, growing to an average of 12–19 meters in height. The broad obovate leaves are 10–20 cm long, rough above but velvety below, with coarse double-serrate margins, acuminate apices and oblique bases; the petioles are 6–12 mm long. The leaves are often red tinged on emergence, turning dark green by summer, and then a dull yellow in the fall. The reddish-brown fruit is an oval winged samara that is slightly notched at the top, 12–18 mm long with a single central seed.
Classification:	| Order: Rosales | Family: Ulmaceae | Genus: Ulmus
Origin:	Eastern region of the United States of America.
Soil Requirements:	Various.
Timber Quality:	Its heartwood is reddish-brown, giving the tree its alternative common name Red Elm. The sap wood and heart wood are moderately durable once cured. The wood has been used as wagon wheel spokes as the interlocking grain of the timber make it resistant to continuous shocks. It is also used to make bows for archery.

Medical Overview:

Slippery Elm has long been used by the First Nations people of North America to treat inflammatory conditions and also edema. The inner bark of the tree is rich in mucilage and tannins and are the primary components of the tree for health purposes. The inner bark is dried and then powdered from which either it is used as a food supplement or as a tisane (tea).

The demulcent qualities of the mucilage (thick, gluey substance of the tree) are highly useful in coating the lining of the gastrointestinal tract from the mouth to the anus, and thereby protecting the tissue from irritants and conditions that develop into inflammatory concerns such as ulcers, irritable bowel syndrome (IBS) Crohn's disease, laryngitis, and mouth ulcers.

The main chemical compounds found in the mucilage from the tree are uronic acid (36%), pentose (6.5%), hexose, rhamnose, galactose and tannins. The combined effect of the mucilage with the tannins made the Indians employ the bark of the tree as a common poultice to treat skin conditions such as rashes and burns. The mucilage would seal of the affected area whilst the tannins would act as antibacterial and toners.

Another health benefit derived from the tree is in the treatment of acid reflux as the mucilage retards the acids from the stomach attacking the upper esophagus.

Today many thousands of tons of the bark are sold and used as lozenges, cough syrups, tisanes and dietary supplements to such an extent that concerns have been raised as the viability of the volumes harvested and the threat this possesses to the wild populations of the tree.

The other aspect of the tree is the traditional use of the inner bark and the long tough fibers this contains to make bow strings, ropes and clothing.

Vitex agnus-castus by H Zell from wikicommons

Vitex agnus-castus

Primary Functions:	Support for female endocrine system
Secondary Functions:	Menopause support, Regulates testosterone
Other Functions:	Antimicrobial, Antifungal
Common Names:	Chaste tree berry, Abraham's balm, Lilac chaste tree, Monk's berry
Description:	It is a small tree with delicate textured pungent leafage and butterfly and bee attracting spikes of lavender like flowers. It grows to up to 4.5 meters high. Its attractiveness has seen it cultivated in the Americas and temperate zones of Europe.
Classification:	| Family: Lamiaceae | Genus: Vitex | Order: Lamiales
Origin:	Although native of the Mediterranean region, it is now found and used throughout Asia minor, Arabia and Asia.
Soil Requirements:	The tree requires full sun or partial shade and well-drained soil.
Timber Quality:	While the tree is not used for timber, this family is well known for basket weaving as the long flexible branches have been used throughout history for this purpose.

Medical Overview:

Use of the tree is recorded by Pliny the Elder (Rome, AD 23/24 – 79), and is sacred to the goddess Hestia/Vesta. Vitex is derived from the Greek '*vieo*' which means to tie up.

Vitex agnus-castus has earned its various names because of two main claims associated with the tree. The first is the belief that the extract of the tree is an an-aphrodisiac (reducing of sexual desire and performance) hence its name Chaste Tree or Monks Berry. The other claim is solely for the use of women as it has been long used for menstrual, hormonal, fertility problems. Clinical studies demonstrated that extract of *Vitex agnus-castus* dried fruits are beneficial in the treatment of premenstrual syndrome, abnormal menstrual cycle, amenorrhea, mastodynia (breast pain), and hyperprolactinemia (high levels of prolactin in the blood leading to increased and uncontrolled breast milk flow), however it has also been shown to regulate testosterone levels in men.

The extract derived from the berries of the tree is considered better than extracts of the leaves. A novel compound found in the tree has been named casticin and is believed to be responsible for the endocrine influencing results.

The German Commission E monograph recommends a daily intake of 30-40 mg per day for infertility until such a time that pregnancy occurs.

The flavonoid apigenin has been shown to be responsible for the estrogenic nature of *Vitex agnus-castus* with doses in the range of 0.6 g/kg and 1.2 gm/kg. As this is the main sexual hormone for women it is obvious that the claim of its being an an-aphrodisiac for the female is not supported. However, the presence of dopaminergic compounds is thought to modify libido. Low doses of *Vitex agnus-castus* had significant and beneficial effects on post menstrual disorders.

As a hormonal regulator, *Vitex agnus-castus* has been shown to be a strong modifier of an increase in estrogen and progesterone while reducing prolactin. In research conducted in Egypt the extract derived from the berries displayed similar actions to the control drug estradiol which is a hormone regulating steroid. As a result, it has shown that not only is the berry from this tree useful in balancing endocrine issues but also to reduce the negative sensations of menopause.

Due to the proven influence of *Vitex agnus-castus* on the posterior pituitary gland, the extract of the tree has been shown to be beneficial for men with erectile dysfunction and with inhibition of testosterone levels.

Research on the essential oil derived from the berries and leaves has shown significant antibacterial properties and especially against the pathogens of *Bacillus subtilis* and *Escherichia coli*, but the leaf extract alone did not.

Antioxidant and antimicrobial activities of methanolic extract of *Vitex agnus-castus* were studied. Its high oxidant activity is due to variation of different phenolic compounds. *Vitex agnus-castus*, rich in phenolics, is a new naturally potential antioxidant source. It possesses noticeable antifungal activity against *Candida albicans* when compared with standard and strong antimicrobial compounds such as ampicillin and penicillin.

While *Vitex agnus-castus* is considered safe, low toxicology material it is recommended that pregnant women avoid its use as it may create complications. Also, due the presence of dopamine receptor diterpenes the extract may influence medications being used for mental conditions.


Trees too dangerous to use

Whilst all of these trees are used in one manner or another in traditional health systems, they possess compounds that pose a serious risk and, in most cases, may be fatal and therefore should be avoided.

Annona muricata

Commonly known as Soursop, this tree has received a great deal of attention in the alternative health industry as a potential anticancer fruit. However, some doubt has been raised over its use as it has been stated that a unique compound found in the fruit, leaves and bark, called annonacin, may have neurotoxic properties, and may exacerbate Parkinson's and or Alzheimer's. Until this debate is resolved it is cautioned not to use this tree.

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Barringtonia asiatica

Also known as Sea poison tree or Fish poison tree it is used by the coastal people of Asia and to poison fish in coastal pools. The seed has been known to survive floating on the oceans for fifteen years and still be viable. It has been recorded as the first tree to colonize the island of Krakatoa after it was formed by the eruption of a volcano. All parts of the tree are toxic.

Cinnamomum camphora

Even though the Camphor laurel tree has been used in traditional medicine for centuries there are significant risks in its use. Especially for young children and pregnant women. In young children the ingestion of Camphor has been shown to induce encephalopathy (rain damage) as well as liver damage. Cases of toxicity have occurred from topical application of camphor containing products as well. Therefore, due to the risks associated with the tree, even when considering its long historical use, Cinnamomum camphora should not be used

Casimiroa edulis

White Sapote originates in central to South America and is used in alternative medicine as well as a food. However, the seeds contained in the fruit have a powerful narcotic within them and dosage is critical as overdose is frequent. It is reported that the Aztecs used the seeds as a poison. The leaves also contain the narcotic, however the pulp of the fruit does not. The name of the tree in Nahuati is cochitzapotl which means sleep sapote. The active compound is named after the tree is casimirose.

Cebera odollum

Commonly called the Murder tree or the Suicide tree. All parts of this tree are poisonous. Native to India and southeast Asia this tree has been used, as the common names suggests, for murder and also suicide in India. The active principles are a digitoxin type glycoside that interrupts the heart muscle leading to cardiac arrest. Strangely the tree is used as a deodorant as well as an insecticide.

Cinchona officianal

The famous antimalarial drug quinine is derived from the bark of this south American tree. The first mass produced tonic water was released in 1858 and is now a global product. However, due to the toxicity of the compound it is now found in minute doses in this water. A dose of 500 mg/kg is considered the lowest dose to be effective in managing malaria, however the side effects from this tree are many and severe. It is relatively easy to overdose.

Euphorbia ingens

The Candelabra tree is native to Southern Africa and used as a cure for ulcers and purgative by the Sotho and Venda people. The milky sap is a strong skin irritant, and all parts of the tree are considered toxic. Once the timber from the tree is dried however, it is used in light construction purposes. Additional uses of the tree have been for poisoning fish.

Exoecaria agallocha

Called Milky Mangrove, Blind Your Eye Mangrove and River Poison tree. This tree has a wide distribution from Asia to most of tropical and sub-tropical Australia. All parts of the tree are poisonous and in the voyages of James Cook it was found that even burning the wood caused poisonous reactions from the smoke. Whilst this tree is used as a traditional medicine in some places, the toxins in the leaves, bark and flowers are too dangerous to use.

Gliricidia sepium

Gliricidia means mouse killer in reference to the traditional use of the toxic seeds and bark and is now pan global as this tree has many uses in agriculture such as live fencing and additional feed for ruminant animals. However, its high levels of the compound coumarin make it unsuitable as a medicinal tree, even though it is employed as such in some regions of the world. The roots are used as a rat poison. This fact gives some indication of why this tree should not be used. Coumarin is a liver toxin to rats whilst it is considered relatively safe for humans it should be avoided.

Hippomane manchinella

Known as the Manchineel and The Little Apple of Death in its native range of South America. It is considered to be one of the most dangerous trees in the world. In addition to the toxins contained in the fruit, leaves, bark and timber, the tree also oozes a highly caustic sap that should it fall on unprotected skin it will cause blistering and severe wounds. The timber is however used once it is dried.

Hura crepitans

Called the Dynamite Tree as its seed pods dry out over time, building tension between the segments of the drying seed pods until the tension becomes so great that they explode, sending seeds hundreds of meters away from the tree. It is cut down by ranchers as the exploding seed pods scare livestock. It is also known as Sandbox tree and Jabillo in its native range of Northern and Southern America. Traditional people made poison arrows from the sap of the tree. All parts of the tree are considered toxic.

Melia azedarach

Is native to Indo Malaya and Australia and is known by common names such as China Berry tree and Syringa Tree. The timber of this tree is much sought after as it shows a deep coffee color with black bands and is resistant to insect such as termites. All parts of the tree are toxic and may be fatal if ingested.

Metopium browneii

Known as the Chechen tree or the Black poison tree is related to *Metopium toxiferum* (above) and has the similar properties. The natural range of this tree is the Northern countries of South America upward to Mexico. The timber of the tree is traded internationally and is well thought of for fine woodwork and flooring. Interestingly a tree that is often found in its same environment is *Bursera simaruba,* and that tree's sap and leaves are used as an antidote to the skin inflammations caused by *Metopium browneii*.

Metopium toxiferum

Has a natural range in the neo-tropics of the Americas and is known by names such as Poison wood and Hogs gum. The sap is caustic and will cause inflammation on the skin and also mucus membranes. The chemical known as urushiol is also found in poison ivy and poison oak.

Pachypodium lealii

Found in Western Africa and especially in the regions around Angola to Namibia this tree is completely poisonous and the sap from the tree is used to make poisonous arrows by the local tribesmen. Should the sap get into the eyes it will produce blindness. Strangely the young saplings are taken to be sold as ornamental trees.

Strychnos nux-vomica

Is a tree native to India and southeast Asia. Known commonly as Venom Orange, Quaker button tree, Nux Vomica and Poison nut is one of the best-known poison trees. It is the tree of which we get strychnine, a powerful poison that causes muscle spasms and death via asphyxiation. Another compound found in the tree is brucine which, while not as poisonous as strychnine, is still deadly. Simply inhaling the vapor from the seeds or flowers may be enough to create a threat to health.

Toxicodendron vernicifluum

Is found throughout Asia, however predominantly in Korea, Japan and China. The sap of the tree is caustic and can causes sever skin inflammation. The compound found in the tree is called urushiol and causes severe allergic reactions in sensitive people and may even be life threatening. For this reason, the tree is not considered safe however it is still used in some herbal preparations. Work has been carried out to remove or limit the urushiol in the material used however as yet this has not been successful.

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Index

Common Names

After thought

In researching for this book there have been many surprises.

There have been expectations met and exceeded on many trees and likewise there have been those that have disappointed and had to be excluded. The task was to deliver the most precise summary of the research in a manner that was easily understood without being too heavy and technical, and whereby the information can be used by a wide range of readers and practitioners. The references to the research are all provided in the back of the book for the reader can access more detailed information should I have been able to entice the interest in the tree. This After Thought came about as I wanted to share what I consider are some of the most important trees for health and beauty. To do this I imagined that I had purchased a section of land to establish my own medicinal forest, and now must decide which trees I would plant for myself, 60 years old, and my family. Not an easy task, but I limited it to eleven trees., not considering its soil requirements and zones.

- Surprisingly, the thought of having a tree that grew my soap and washing detergent is high on my list. *Gymnocladus assimicus* (Coffee bean tree) captured my interest from the start. More research is required on the use of the tree, however the idea that a truly environmentally natural cleanser can be grown is exciting.
- *Lagerstroemia speciosa* became one of my favorites, as the research is compelling, in regard its ability to reduce weight. Its main compound is corosolic acid and has been shown to reduce fat up take, from food, by as much as 99%. A tisane from the leaves has a pleasant green tea flavor.
- Keeping with the modification of the body, *Butea frondosa* must also be included due to its significant increase in brain function with special emphasis on memory. The unfortunate (or fortunate) side effect from this tree is that it acts in the same manner as Viagra.
- Kratom also known as *Mitragyna speciose* would also be planted due to its stimulating actions. A tree such as this is invaluable in post-operative care, depression, pain management and chronic fatigue syndrome. This is some controversy around this tree, but I consider the benefits far outweigh the negative claims made against it.
- *Magnolia officianalis* would be included due to its antidepressant, anti-anxiety and cancer management properties. Such a tree would be a beautiful inclusion into any forest garden.
- Dilo or *Callophylum inophyllum* is a must have tree as the oil derived from the nut is a powerful anti-inflammatory as well as one of nature best oils for skin care. The leaves from this tree have been shown to be a few points less than morphine sulphate in regard to pain management.
- *Syzigium aromaticum* or more commonly known as clove, has its own unique beauty due to the flowers, however as an antiseptic for wounds and abrasions there are few oils equal to it. Not simply as an antiseptic, but the oil is also a powerful antifungal and analgesic.
- For beauty, the tree *Bischofia javanica* would have to be included as the oil from the fruit is a powerful antiaging compound and helps retain the elasticity of the skin.
- *Tectona grandis* has long been used in traditional medicine systems of Asia as a hair tonic to increase hair thickness up to three times. Plus, the timber from the tree is one of the world's most valuable.
- One key surprise came from the tree *Bixa orellana* and its ability to protect the skin from UV damage caused by the sun no matter whether it is used topically or taken orally. In effect a natural sunscreen.
- There is no better tree for women's health than *Vitex agnus castus*. The extract from this tree aids in hormone balancing, with special emphasis on fertility, menopause and mood. The beautiful flowers of this tree hide its powerful active compounds.
- The world's most expensive tree, *Aquilaria crassna*, described as the Smell of Heaven, would have to be included due to its invaluable fragrant oil. This tree may confidently be called one of the most expensive in the world and therefore thought of as a remedy for financial health.

About the author

Paul Evers (née Thompson) has his origins in Sydney Australia, as well as the outback of the New South Wales, in the wheat and rice belt in the central west of the state.

In 1988 he gained his qualifications as a naturopath, a practitioner of herbal medicine, from the mother of Australian traditional medicine Dorothy Hall, who established the Australian Traditional Medicine Society and who published 'Dorothy Hall's Herbal Medicine' that same year.

Road to Damascus moment

During an extended stay in Cape Town, South Africa mid-1990s Paul was asked to help improve the quality of life for terminally ill HIV patients. Whilst Paul was not working as a naturopath as his qualifications were not recognized in South Africa at the time, he did volunteer to share his knowledge. The results he and the team achieved were significant, and this pushed Paul to spend several years researching rare and unique therapies and botanical medicine.

Unlocking the secrets of nature

Years of learning and research commenced with the objective to unleash the hidden medicinal value of growing plants and trees to the benefit of society.

Paul beliefs alternative and traditional medical systems can and must enhance the modern science and technologies of medicine available. He is a longtime advocate of antibiotic restrictions yet he is equally a longtime supporter of vaccine therapies.

His unswerving belief is that alternative and traditional medicines must be rigorously researched in order to deliver the best outcomes, especially for almost half the global population who rely on them, whilst at the same time become more integrated in the daily modern medical practices.

The objective of writing about Tree Medicine is to elevate the knowledge of trees from being a timber resource to a critical asset for population health and wellbeing, and thereby re-connecting humans with their surrounding trees whilst ensuring the protection of trees and forests into the future.

Dedicated to enhancing medical science, one tree at the time

The challenge in condensing the scientific literature for this book was to arrive at a concise and easily understood review of each tree that excluded un-supported claims and included dangerous species.

With more and more people learning about the health benefits of trees, trees close to their homes, along roads and in parks, a new and vibrant interest in the cultivation, management and harvesting of these crucial ecosystems can only grow. This reference book is simply the beginning.

Paul has the gift to connect his research and understanding of the abundant natural properties of plants to the medicinal needs of people, the people surrounding them. He writes in a conversational tone to reach the general public, to inspire readers to curiosity and discovery.