Tulsi: A Miraculous Plant

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Tulsi is a symbol of the Hindu religious tradition. Although the word 'Tulsi' gives the connotation of the incomparable one, its other name, Vishnupriya means the one that pleases Lord Vishnu. Found in most of the Indian homes and worshipped, its legend has permeated Indian ethos down the ages. Known in English as Holy Basil and botanically called Ocimum sanctum, Tulsi belongs to plant family Lamiaceae. Ocimum sanctum L. (Tulsi), Ocimum gratissium (Ram Tulsi), Ocimum canum (Dulal Tulsi), Ocimum basilicum (BanTulsi), Ocimum kilimandscharicum, Ocimum ammericanum, Ocimum camphora and Ocimum micranthum are examples of known important species of genus Ocimum which grow in different parts of the world and are known to have medicinal properties [1,2,3]

It recently has been shown to hold scientific worth in the areas of medical, Agricultural and pharmacy. Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions [4, 5]. A traditional anti-fertility agent and libido enhancer in Ayurveda, Holy Basil is currently being investigated for these two claims and its health properties. A good source of dietary Ursolic acid, which may cause the anti-fertility aspects [6]. Traditionally, the active ingredient is an oil extract of the leaves, which although traditionally used for a myriad of reasons is most commonly regonized for anti-stress and pro-vitality properties and to defend against attack from predators such as insects, fungi and herbivorous mammals [7,8].

Tulsi is a popular home remedy for many ailments such as wound, bronchitis, liver diseases, hiccough, ophthalmia, gastric disorders, genitourinary disorders, skin diseases, various forms of poisoning and psychosomatic stress disorders1-2. It has also aromatic, stomachic, carminative, demulcent, diaphoretic, diuretic, expectorant, alexiteric, vermifuge and febrifuge properties [9,10,11,12].

Morphology

Tulsi is an erect, tall subshrub with hairy stems having leaves of greenand purple in color, strongly scented and have a decussate phyllotaxy. The purplish flowers are placed in close whorls on elongate racemes.

Active compounds in tulsi

Tulsi leaves contain bright, yellow coloured and pleasant volatile oil (0.1 to 0.9%). The oil content of the drug varies depending upon the type, the place of cultivation and season of its collection. The oil is collected by steam distillation method from the leaves and flowering tops. It contains approximately 7.0% eugenol, carvacrol (3%) and eugenol-methyl ether (20%). It also contains caryophyllin, ursolic acid, rosmaric acid, thymol, methvl chavicol. citral, carvacrol, β -caryophyllene. Seeds contain fixed oil with good drying properties. The plant is also reported to contain alkaloids, glycosides, saponins, tannins, an appreciable amount of vitamin C, and traces of maleic acid, citric and tartaric acid [13,14,15].

Active Ingredient

- Ursolic acid
- ➢ Eugenol,
- > Bioflavonols such as Apigenin and lutein
- > Ocimumosides A and B
- Ocimarin
- Rosmarinic Acid

Traditional uses

Different parts of plant are used in Ayurveda and Siddha Systems of Medicine for prevention and cure of many illnesses and everyday ailments like common cold, headache, cough, flu, earache, fever, colic pain, sore throat, bronchitis, asthma, hepatic diseases, malaria fever, as an antidote for snake bite and scorpion sting, flatulence, migraine headaches, fatigue, skin diseases, wound, insomnia, arthritis, digestive disorders, night blindness, diarrhea and influenza. The leaves are good for nerves and to sharpen memory. Chewing of Tulsi leaves also cures ulcers and infections of mouth [15,16].

Therapeutic Applications

Tulsi is mainly used in the treatment of following disorders like Antidiabetic, Cardiac activity,



Wound healing activity, Radio-protective effect, Genotoxicity, Antioxidant, Hypolipidemic, Antimicrobial, Gastro protective, Antinociceptive (Analgesic), Anti-fertility, Anthelmintic activity, Antiinflammatory, Anticancer, Thyroid activity. Many research articles have given the proofs of its miraculous activity on dying diseases [17,18,19,20].

Neurological Impact Stress and Anxiety

Some components of *ocimum sanctum*, namely ocimarin and the ocimumosides A and B, appear to exert antistress activity when given to rats at the dose of 40mg/kg [5].In otherwise healthy subjects given *ocimum sanctum* twice daily (500mg each time after meals) over the course of two months, supplementation appeared to reduce symptoms of generalized anxiety disorders as assessed by the BPRS[7, 8].

Interactions with Hormones Testosterone

The only noted effects of Holy Basil on testosterone levels are from a rabbit study ingesting 2g of Holy Basil per day. This study and previous onesnoted reductions in sperm count and reproductive potential, which parallels studies with the component of Holy Basil Ursolic Acid.A possible explanation being a possible androgenic analogue in Holy Basil which increases testosterone sufficiently enough to repress luteinizing and follicle-stimulating hormones significantly.

Safety and Toxicity

Toxicity has been reported for the oil extract of Holy Basil (which contains 70+/-3% eugenol content) and has been found to be 42.5ml/kg bodyweight. Whereas the dry plant extract with a normal eugenol content has an LD₅₀ of between 4600-6400mg/kg bodyweight in research animals [10,11].

Genomics

The genome of Tulsi plant has been sequenced and the draft genome has been published independently by research teams from CSIR-Central Institute of Medicinal and Aromatic Plants at Lucknow and National Centre for Biological Sciences at Bengaluru. The genome size was estimated to be 612 mega bases. The metabolite-biosynthesis genesfor Ursolic acid and Eugenol have been identified. These metabolites were shown to have anti-cancerous properties as well. It was further commented that these metabolites could be utilized as anti-cancerous drugs

Conclusion

Tulsi is "the elixirof life" useful against stress; it enhances stamina and increases efficient use of oxygen by body; strengthens immune system; reduces inflammation; protects from radiation; reduces aging; supports the lungs, liver and heart; it exhibits antibiotic, antiviral and antifungal, antioxidant properties. Different parts of plant have been used in Ayurvedic ancient Medicine to cure an array of ailments including common cold, cough, headache, flu, asthma, fever, colic pain, sore throat, bronchitis, hepatic diseases, malaria fever, as an antidote for snake bite, flatulence headaches, fatigue, skin diseases, wound, insomnia, arthritis, influenza, digestive disorders, night blindness, diarrhea. Tulsi acts as an adaptogen that helps the body and mind to encounter different physical, chemical emotional and infectious stresses, and restore physiological and psychological functions. Its having ability to release ozone in minor quantity. In future it may be used in bioremediation technology to get rid from heavy metal pollution.

Its having importance's in activities such as antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmentic, antidiarrhoeal, analgesic, antiinflammatory, antipyretic, antiallergic, antihypertensive, cardioprotective, central nervous system (CNS) depressant, memory enhancer, antihypercholesterolaemic, hepatoprotective, antidiabetic, antiasthmatic, antithyroidic, antioxidant, anticancer, chemopreventive, radioprotective, immunomodulatory, antifertility, antiulcer, antiarthritic, adaptogenic / antistress, anticataract, antileucodermal and anticoagulant activities.

Such significant and health promising potential, in addition to its highly specific therapeutic actions, paved way for the broad range of Tulsi traditional medical uses, and also contributes for its mythological importance and religious sanctity. This review will definitely help for the researchers as well as clinicians dealing with *O. sanctum* to know its



proper usage as this herb is seemed to be highly valuable, possessing many pharmacological / medicinal properties.

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