



## Qualitative phytochemical analysis of some medicinal plants (leaves) from the surrounding area of Talod Taluka, North Gujarat, India.

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### **Abstract:**

The tremendous biological variety of North-Eastern India has long been recognised. Five medicinal plants were chosen for this study: *Manilkara zapota* (L.) van Royen, *Manilkara hexandra* (Roxb.) Dub., *Mangifera indica* L., *Madhuca indica* J.F. Gmel., and *Annona squamosa* L. The purpose of this study was to look into the existence of Phytochemicals such as Alkaloid, Amino acid, Carbohydrate, Protein, Glycoside, Tannin, Terpenoid, Saponin, Flavonoid, and Steroids in the medicinal plants that were chosen. For the organic solvent extraction, the Soxhlet apparatus was utilized. Water, acetone, and chloroform were utilised as solvents. Our findings show that the examined plants' crude aqueous and organic solvent extracts contain medicinally relevant bioactive components, justifying their usage in traditional medicines for the treatment of various ailments.

**Key Words:** Qualitative phytochemical analysis, *Manilkara zapota*, *M. hexandra*, *Madhuca indica*, *Mangifera indica*, *Annona squamosa*.

### **Introduction:**

Phytochemicals are non-nutritive substances. Chemical compounds are produced naturally on plants during metabolic processes and contain a wide range of proactive and disease-preventive qualities. These compounds are known to be produced by plants in order to defend themselves. Recent study has shown that they can also play a vital role in illness prevention in humans. Even some of these herbs have been used for millennia as traditional medicine. Most phytochemicals, such as flavonoids, carotenoids, and polyphenols, have antibacterial action and can be used to treat infections. The following plant species were studied: *Manilkara zapota* (L.) van Royen, *M. hexandra* (Roxb.) Dub., *Mangifera indica* L., *Madhuca indica* J.F. Gmel., and *Annona squamosa* L.

Plants play a universal function in the treatment of sickness, as seen by their use in every major system of medicine, regardless of philosophical foundation. Plants are vital to the pharmaceutical industry because they are a rich supply of pharmaceuticals and a vast reservoir of chemical variety for drug development screening procedures. The majority of the medications mentioned in the Indian medicinal system are derived from plants.



Medicinal plants have been used to treat disease all across the world for thousands of years. It is generally understood that some plants with active chemicals can limit microbial development. Plants' ability to generate chemicals via secondary metabolism determines their antimicrobial potency. Secondary metabolites emerged as the most important class of chemicals, with a wide spectrum of antibacterial and antifungal properties. When compared to conventional fungicides used to inhibit microbial growth and survival, these plant chemicals have different structures and activities.

Plants are a major source of Traditional medicine and can be used to cure a variety of conditions with little adverse effects. Traditional medical practises are not only beneficial in the treatment of diseases, but they also aid in the discovery of pharmaceutically active compounds in plants, which can aid in the commercial manufacture of pharmaceuticals. From ancient times, the importance of plant diversification in health care has been extensively recognised. According to a literature review, more than 50,000 plant species have been successfully employed for medical purposes globally, with flowering plants accounting for over 13% of these.

### **Material and methods:**

#### ***Plant collection and Identification***

*M. zapota* (L.) van Royen, *M. hexandra* (Roxb.) Dub., *M. indica* L., *M. indica* J.F. Gmel., and *A. squamosa* L. were among the plant species studied. The plants were harvested from the land in the Talod taluka in North Gujarat, India. The washed plant leaves were kept in for drying after being cleaned with tap water around 2-3 times to evaporate the water content. With the use of a mechanical blender, the sample was ground into a fine powder after drying. The powder is then kept in an airtight plastic container for future usage with adequate labelling.

#### ***Extraction technique***

Extraction is the separation of inert plant tissue constituents from medicinally active plant tissue constituents using a conventional extraction process. Menstrum is a selective solvent that is used to eliminate inert material and to obtain the curative part of the procedure through therapy.

***Method and Plant extraction:******Solvent extraction***

The crude plant extract was made using the Soxhlet extraction method. 10 gm of powdered plant material was placed into a thimble, and 300 ml of solvents were extracted separately. Acetone and chloroform were utilized as solvents. In a syphon tube of an extractor, the extraction process continued for 24 hours until the solvent became colourless. The extract was then placed in a beaker. The extract was then retained and cooked on a hot plate at 30- 40 °C until all of the solvent had evaporated. The dried extract was stored at 4°C in a refrigerator for future phytochemical investigation.

***Methods of phytochemical analysis:******Alkaloid***

**Wagner's test:** A few drops of Wagner's reagent were applied to 2mg of extract that had been acidified with 1.5 percent v/v hydrochloric acid. The presence of alkaloids is indicated by a yellow or brown ppt.

***Carbohydrates***

**Molisch's test:** 2mg of ethanolic extract was mixed with 10ml water, filtered, and concentrated. 2ml of conc. sulphuric acid was added to these 2 drops of freshly prepared 20% alcoholic alpha-naphthol solution, forming a layer below the mixture red-violet ring, showing the existence of carbohydrates that disappears when sufficient alkali is added.

***Amino acid***

**Ninhydrin test:** Boil for a few minutes 2ml Ninhydrin reagent + 2ml extract. The production of blue colour indicates the presence of amino acids.

***Steroids***

**Salkowski reaction:** 2mg of dry extract was combined with chloroform, to the chloroform layer sulphuric acid was gently introduced by the sides of the test tube. The emergence of a red colour indicated the presence of steroids.

**Tannin:** A few drops of a 5 percent w/v FeCl<sub>3</sub> solution were added to 1-2 ml of the ethanolic extract. Gallo tannins are shown by a green colour, whereas pseudo tannins are indicated by a brown colour.

**Flavonoids:** After mixing 2ml of each extract with a few drops of 20% sodium hydroxide, a bright yellow colour was seen. A few drops of 70% dilute hydrochloric acid were added to



this, and the yellow coloration disappeared. The presence of flavonoids in the sample extract is shown by the formation and disappearance of yellow colour.

**Saponins:** 6ml distilled water was added to 2 ml of each extract and rapidly shaken; the presence of saponin is indicated by the production of bubbles or persistent foam.

**Proteins:** adding 1 ml of 40 percent sodium hydroxide and a few drops of 1 percent copper sulphate to 2ml of each extract. The production of violet colour shows the presence of peptide linkage molecules in the sample extract.

**Glycosides:** 0.5ml of glacial acetic acid and 3 drops of 1% aqueous ferric chloride solution added in to 1ml of each extract. The creation of a brown ring at the interface shows the presence of glycosides in the sample extract.

**Terpenoids:** 1ml of each solvent is mixed with 0.5ml chloroform and a few drops of strong sulphuric acid to produce a reddish-brown precipitate that confirms the presence of Terpenoid in the extract.

**Table 1: Preliminary Phytochemical analysis**

Class of compounds	<i>Manilkara zapota</i>			<i>Manilkara hexandra</i>			<i>Mangifera indica</i>			<i>Madhuka indica</i>			<i>Annona squamosa</i>		
	AE	CE	WE	AE	CE	WE	AE	CE	WE	AE	CE	WE	AE	CE	WE
<b>Alkaloid</b>	+	+	-	+	-	-	+	+	-	+	-	-	+	-	-
<b>Amino acid</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Carbohydrate</b>	+	+	-	+	-	+	+	-	-	-	-	-	-	-	-
<b>Protein</b>	-	-	+	+	-	+	+	-	+	-	-	-	-	-	+
<b>Glycoside</b>	+	-	-	+	-	+	-	-	-	-	-	+	-	-	-
<b>Tannin</b>	-	-	+	-	-	-	+	+	+	+	-	+	+	+	+
<b>Terpenoid</b>	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-
<b>Saponin</b>	-	+	+	+	-	+	+	-	+	+	-	+	+	-	-
<b>Flavonoid</b>	-	+	+	-	-	+	-	-	+	-	-	+	+	-	-
<b>Steroid</b>	+	-	+	-	-	+	-	-	+	-	-	-	-	-	-

Where, '+' = positive and '-' = negative

AE= Acetone extract, CE= Chloroform extract, WE= Water extract

Alkaloid, carbohydrate, glycoside, and steroid are all found in Acetone extract of *M. zapota* leaves. Chloroform extract of *M. zapota* leaves contains alkaloid, carbohydrate, terpenoid,



saponin, and flavonoid. Protein, Tannin, Saponin, Flavonoid, and Steroid can be found in the aqueous extract of *M. zapota* leaves., alkaloid, carbohydrate, protein, glycoside, and saponin are all found in Acetone extract of *M. hexandra* leaves. All phytochemicals are missing in the chloroform extract of *M. hexandra* leaves. Aqueous extract of *M. hexandra* leaves contains carbohydrate, protein, glycoside, saponin, flavonoid, and steroid. Alkaloid, Carbohydrate, Protein, Tannin, and Saponin are all found in Acetone extract of *M. indica* leaves. Alkaloid and Tannin are found in Chloroform extract of *M. indica* leaves. Protein, Tannin, Saponin, Flavonoid, and Steroid are found in aqueous extract of *M. indica* leaves. Alkaloid and Tannin are found in Acetone extract of *M. indica* leaves. Chloroform extract of *M. indica* leaves is devoid of all phytochemicals. Aqueous extract of *M. indica* leaves contains Glycoside, Tannin, Terpenoid, Saponin, and Flavonoid. Alkaloid, Tannin, Saponin, and Flavonoid are all found in Acetone extract of *A. squamosa* leaves. Aqueous extract of *A. squamosa* leaves contains protein and tannin.

### Discussion:

Plant samples were subjected to phytochemical analysis, which confirmed the existence of elements with medicinal and physiological properties. Phytochemicals such as carbohydrate, amino acid, protein, tannin, flavonoid, saponin, glycoside, steroid, terpenoid, and alkaloids were found in the plant extracts.

Tannins attach to proline-rich proteins, preventing them from being synthesized. Flavonoids are hydroxylated phenolic compounds that plants produce in response to microbial infection and have been discovered to have antibacterial properties in vitro against a wide range of pathogens. Their capacity to combine with extracellular and soluble proteins, as well as the bacterial cell wall, is most likely the reason for their activity. They are also powerful antioxidants with anticancer properties.

Saponins, which are known to have an anti-inflammatory impact, were also discovered in the plant extracts. Saponins have the ability to coagulate and precipitate red blood cells. Saponins are known for their ability to produce foams in aqueous solutions, as well as their hemolytic activity, cholesterol binding capabilities, and bitterness. Steroids have been shown to have antimicrobial characteristics, and they are extremely essential molecules, particularly in regard to sex hormones. For millennia, alkaloids have been associated with medical purposes, and cytotoxicity is one of their most prevalent biological features. Alkaloids have been shown



to have analgesic, antispasmodic, and antibacterial effects by several researchers. Glycosides have been shown to reduce blood pressure in numerous studies. The findings of this study indicate that the detected phytochemical substances may be bioactive constituents, and that these plants are proving to be a valuable reservoir of bioactive compounds with significant medical value.

### **Conclusion:**

The findings demonstrated that the plants investigated contained medicinally essential components. Many previous investigations had accumulated evidence that the discovered phytochemical was bioactive. Several studies have demonstrated that these phytochemicals contribute pharmacological and physiological qualities to the plants researched in the treatment of various illnesses. As a result, extracts from these plants could be considered a valuable source of drugs. Further research should be carried out to separate, purify, and characterize the active ingredients responsible for the activity of these plants, as well as further work to isolate, purify, and characterize the active constituents responsible for the action of these Plants. In addition, more research into the putative mechanisms of action of these extracts is urged.

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