

# Phytochemical Examination (Qualitative Estimation) of Leafy Extract of *Hibiscus rosa sinensis*

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## ABSTRACT

Medicinal plants have been used in healthcare since time immemorial. The empirical knowledge about their beneficial effects was transmitted over the centuries within human communities. Natural products play a pivotal role as a source of drug compounds and, currently, a number of modern drugs which are derived from traditional herbal medicine are used in modern pharmacotherapy. Medicinal plants still have a hopeful future, as the phytochemical composition and the potential health benefits of plants. Medicinal plants play vital roles in disease prevention and their promotion and use fit into all existing prevention strategies. A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. A number of plants have been used in traditional medicine for many years. Such plants should qualify as medicinal plants. Each plant consists of several important ingredients that can be used in medical field, and can be involved in the development of different kind of drugs. The plant kingdom presents a wealth of chemical compounds of pharmaceutical nature. Health benefits of many species have not yet been studied or still need to be more deeply investigated. Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids. Medicinal plants contain some organic compounds which provide definite physiological action on the human body and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids.

**Key Words:** Phytochemicals, Organic, Medicinal, Therapeutic, Screening, Estimation

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## INTRODUCTION

Phytochemical the nonnutritive chemical compounds derived from plants, play a significant role in human disease prevention. Phytochemicals such as secondary metabolites and anti oxidants have important medicinal properties, phytochemicals present in medicinal plants such as alkaloids, flavonoids, tannins, saponins, phenols, steroids etc have several disease prevention activities mainly anti inflammatory, antidiabetic, antiaging, antimicrobial, antidepressant, anticancer, etc Medicinal plants gaining popularity in usage due to a large number of people in search of health remedies with little or no side effects which is the problem of most chemically synthesized drugs. Medicinal plants are very rich in chemical compounds which they produce for their own defence and are known as secondary metabolites(phytochemicals). A medicinal plant may contain a mixture of different phytochemicals, the ability to identify these biologically active compounds in a medicinal plants serve as a guide in its quality control and dose determination.

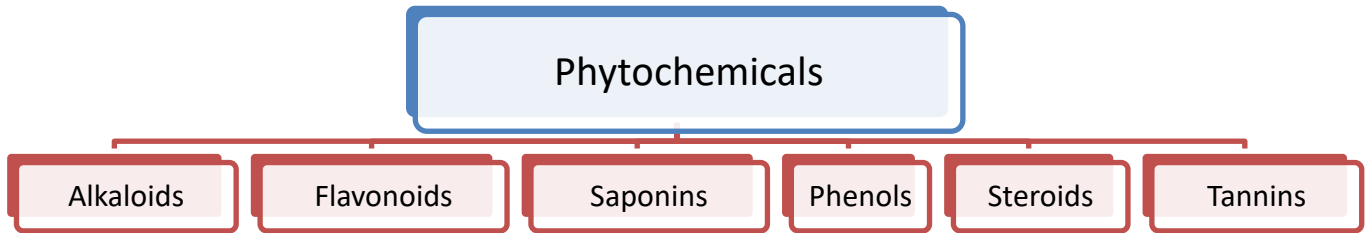


Fig 1: Types of Phytochemicals

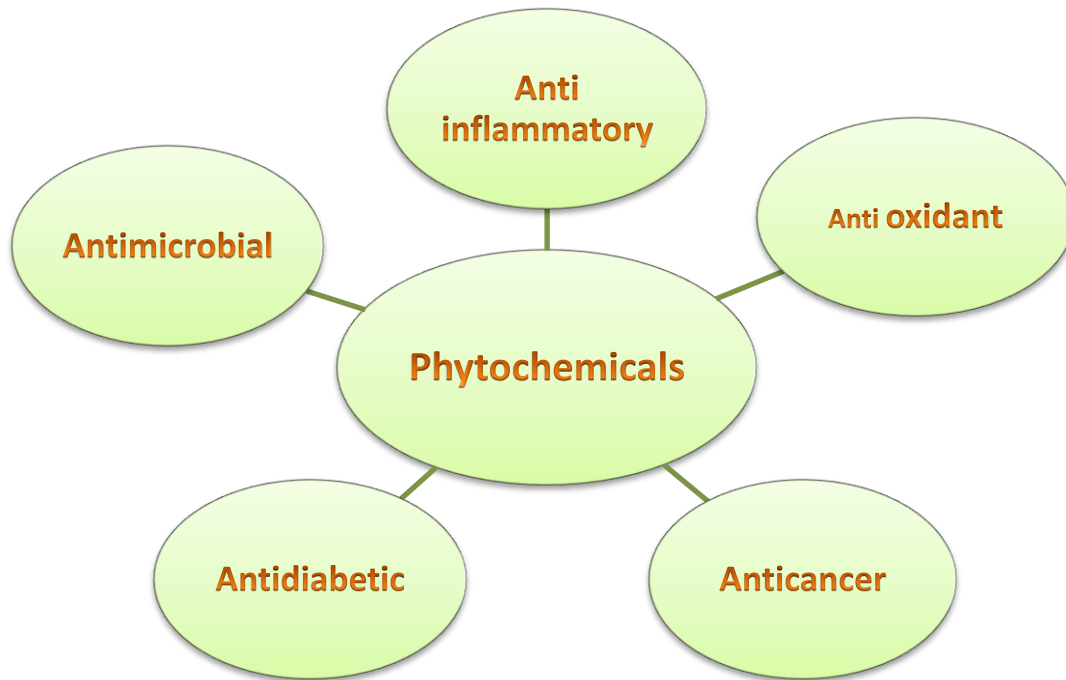


Fig 2: Properties of Phytochemicals

### Material and Methodology

Medicinal plant for Qualitative Estimation (Phytochemical Estimation)

*Hibiscus rosa sinensis*

### Classification of *Hibiscus rosa sinensis*

Kingdom- Plantae

Division- Angiosperms

Class- Dicotyledons

Order - Malvales

Family - Malvaceae

Genus- *Hibiscus*

Species- *rosa sinensis*



Fig 3: Plant of *Hibiscus rosa sinensis*

*Hibiscus*, genus of numerous species of herbs, shrubs, and trees in the mallow family (Malvaceae) that are native to warm temperate and tropical regions. Several are cultivated as ornamentals for their showy flowers, and a number are useful as fibre plants. *Hibiscus rosa sinensis* is a bushy, evergreen shrub or small tree growing 2.5–5 m (8–16 ft) tall and 1.5–3 m (5–10 ft) wide, with glossy leaves and solitary, brilliant red flowers in summer and autumn. The 5-petaled flowers are 10 cm (4 in) in diameter, with prominent orange-tipped red anthers. The root is a branched tap root. The stem is erect, green, cylindrical and branched. The leaf is simple, with alternate phyllotaxy and is petiolate. The leaf shape is ovate, the tip is acute and margin is serrated. Venation is unicostate reticulate. (Venation is branched or divergent.) Free lateral stipules are present. Cultivated varieties have red, white, yellow, or orange flowers.

### Collection of Plant Material

Fresh leaves of *Hibiscus* plant is collected from medicinal garden of Sophia Girls' College when the vegetative growth of plant favourable. The plant materials were taxonomically identified and authenticated by The Department of Botany of the college. The plant materials were shade dried until all the water molecules evaporated and plants became well dried for grinding. After drying, the plant materials were ground well using mechanical blender into fine powder and transferred into airtight containers with proper labelling for future use.

### Preparation of Plant Extract

The solvent (250 ml of ethanol) is added to a round bottom flask, which is attached to a Soxhlet extractor and condenser on an isomantle. The crushed plant material is loaded into the thimble, which is placed inside the Soxhlet extractor. The side arm is lagged with glass wool. The solvent is heated using the isomantle and will begin to evaporate, moving through the apparatus to the condenser. The condensate then drips into the reservoir containing the thimble. Once the level of solvent reaches the siphon it pours back into the flask and the cycle begins again then extract was kept in refrigerator when not in use.

### Qualitative Estimation (Phytochemical Analysis)

S.No	Phytoconstituents	Test for Phytoconstituents
1.	Test for Alkaloids	<b>Dragendorff's test</b> - To the sample, few drops of potassium bismuth iodide solution was added Dragendorff reagent. <b>Mayer's Test</b> : Filtrates were treated with Mayer's reagent <b>Wagner's Test</b> : Filtrates were treated with Wagner reagent
2.	Tests for Flavonoids	<b>NaOH test</b> : A small amount of extract was treated with aqueous NaOH and HCl <b>H<sub>2</sub>SO<sub>4</sub> test</b> : A fraction of the extract was treated with Conc.H <sub>2</sub> SO <sub>4</sub>
3.	Tests for Steroids and Terpenoids	<b>Liebermann - Burchard test</b> 4mg of extract was treated with 0.5ml of acetic anhydride and 0.5ml of acetic acid. Then concentrated H <sub>2</sub> SO <sub>4</sub> was added slowly
4	Tests for Saponins	<b>Foam test</b> : About 2g of the plant extract was mixed with 10ml of distilled water and shaken vigorously for a stable persistent froth.
5	Test of Tannins	<b>Ferric chloride test</b> : 0.5g of the dried powdered sample was boiled in 20ml of water in a test tube and then filtered. A few drops of 0.1% FeCl <sub>3</sub> <b>Lead acetate test</b> : 2ml plant extract was combined with 2ml of distilled water. 0.01g lead acetate was added to this combined solution and shaken well.
6	Test for Phenols:	<b>Ferric chloride test</b> : About 2ml plant extract was taken to water and warmed at 45-50°C. Then 2 ml of 0.3% FeCl <sub>3</sub> was added.
7	Test for Glycosides	<b>Fehling's test</b> : 8 drops of plant extract was added. After that it was mixed with 1ml of Fehling's solution and boiled in a water bath for 5 min.

**Table 1: Test for phytochemicals**

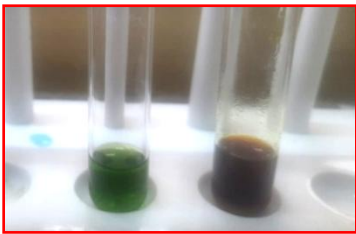

S.No	Phytoconstituents	Test for Phytoconstituents
1.	Test for Alkaloids	<b>Dragendroff's test</b> - Formation of red colour  <b>Wagner's Test</b> : Formation of reddish brown colour
2.	Tests for Flavonoids	<b>NaOH</b> - White ppt is formed <b>H<sub>2</sub>SO<sub>4</sub> test</b> : Reddish Brown ring is formed
3.	Tests for Steroids and Terpenoids	<b>Liebermann - Burchard test</b> – No positive result
4	Tests for Saponins	<b>Foam test</b> : - No Foam formation
5	Test of Tannins	<b>Ferric chloride test</b> : Green Brown colour is formed
6	Test for Phenols:	<b>Ferric chloride test</b> : No ppt formation.

**RESULT AND DISCUSSION**

**Table 2: Result of Phytochemical Analysis of *Hibiscus rosa sinesis***

S.No	Phytochemical	Result
1	Tests for alkaloids	+++
2	Tests for Flavonoids	+++
3	Tests for steroids	++
4	Test for saponins	- -
5	Test for Tannins	++
6	Tests for Phenols	--
7	Test for Glycosides	--

**Table 3: Result of Phytochemicals Estimation**

S.No.	Phytochemicals	Result
1.	<b>Alkaloids</b> <b>Dragendroff Test</b>	
	<b>Wagner Test</b>	

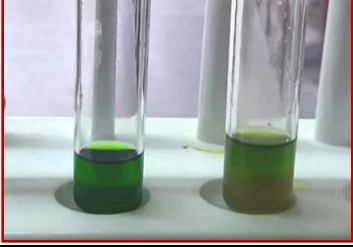
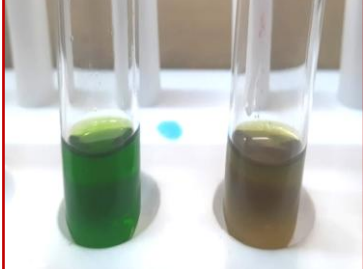
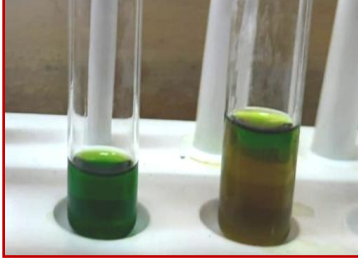

2.	Flavonoids NaOH Test	
	H <sub>2</sub> SO <sub>4</sub> Test	
3.	Tannin	
4.	Steroids	

Table 3: Observation of Phytochemicals in Extract of *Hibiscus rosa sinesis*

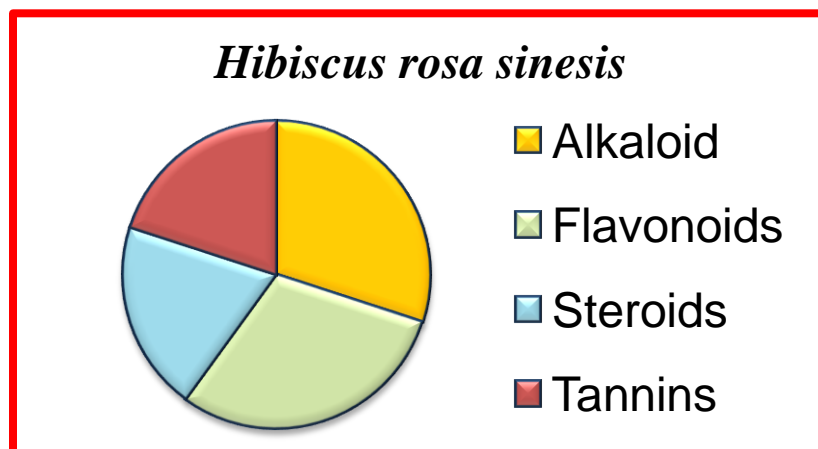


Fig 10: Pie diagram showing phytochemicals in *Hibiscus rosa sinesis*

## DISCUSSION

The study of *Hibiscus rosa sinensis* plant revealed that plant having presence of phytochemicals constituents and showed the presence of alkaloids, flavonoids, steroids and tannins. Results showed that plant contains more amount of alkaloids and flavonoids which is mainly responsible for better medicinal properties. Secondary metabolites which present in this plant shows antioxidant, anticancer, anti microbial, anti bacterial properties which make this plant a better medicinal plant. The various phytochemical compounds detected from hibiscus are known to have beneficial importance in medicinal sciences. Results revealed the presence of alkaloids, flavonoids and tannins. The crude ethanol extract of hibiscus leaves showed very good antibacterial activity against the bacterial species. Since, hibiscus plant is commonly grown in the country; it can serve as cheap source of effective antibacterial agent.

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