



## Review on Antimicrobial Activity on Plumeria Rubra

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### ABSTRACT:

Plumeria rubra(frangipani) stem cells were extracted using using methanol by soxhlet extraction process of solvent extraction.The stems cells were screened for anti-microbial activities.The stem cells extract shows the presence of tannis,alkaloids, balsam, cardiac glycosides,phenols,terepenes and steriods. The zone of inhibition ranges from 10-28mm and plant extracts showed a broad spectrum of antimicrobial activity aganist gram positive and gram negative bacteria.It was more pronounced on gram negative bacteria especially Escheria coli(E coli),Salmonella typhi and gram positive bacteria like Staphylococcus aureus,Bacillus anthracis.

**KEYWORDS:** Plumeria rubra; Antimicrobial;stems bark; Minimum inhibitory concentration; Minimum bactericidal concentration; Minimum lethal concentration.

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### Introduction:

- Plumeria rubra L. a member of family Apocynaceae is a common ornamental plant.Distributed throughout the tropics and cultivated near gardens.A decidous fleshy stemmed tree grows up up to 15 meters in height.This plant is well known for their religious value ,cosmetic importance and tremndous potential to be used as medical agents to cure infections,digestive disesases,anti inflammatory and antipyretic action,anti tumorpotential,anti oxidant properties.The plant is also mainly grown for its ornamental and fragrant flowers.
- Plumeria is indigenous to tropical america and is found from southern Mexico to northern South America and also most abudant in India.However due to its ease of prpagation through cutting,many species and hybrids of plumeria are now widely cultivated and distributed in the warmer region of world.
- The trees were introduced to Malasia and at least three main species are commonly found *Plumeria obtusa*,*Plumeria rubra* and *Plumeria acuminata*.
- The plant material is widely used as a purgative,febrifuge and remedy for diarrhoea and cure for itch. The leaves were reported to have analgesic-antipyreic,anti inflammatory,and antioxidant properties.Odoemelam et al (2020) indicated that 10 kg of Plumeria rubra leaf meal added to the diet of Hy-line brown birds favours hen day production,egg weight,shell weight and feed efficiency of the tested animals.Uduj et al (2020)however reported that the appreciable level fat in the plumeria rubr flower meal based diets as additives might have accounted for the egg weight of birds fed these diets.The flowers have been reported to be usefl as antioxidant and hypolipidemic.Leaves are simple arranged in a whorl, with prominant veins,crowded at the end of branches .In traditional medicinal system different parts of plant have been mentioned to be useful in a a variety of diseases.
- Flowers are white, reddish pink and bluish with fragrance.The pink flowers of Plumeria is due to phenolic compound and is found to be a good source of natural dye for cloth.The fruit is edible,latex is applied to ulcers,herpes and scabies and seeds possess haemostatic properties. Root is bitter, carminative , and thermogenic. Leaves are useful in inflammation, rheumatism, antibacterial, antifungal, bronchitis and antipyretic

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### OBJECTIVES:

- 1.To study antimicrobial activity of Plumeria Rubra.
- 2.To study chemical constituent present in Plumeria Rubra.
- 3.To study solvent used in Plumeria Rubra.

- 4.To study the microorganisms which shows antimicrobial activity.

**PLAN OF WORK:**

- Literature survey on Plumeria Species.
- Collection of plant.
- Authentication
- Search different species of plumeria species.
- Collect information about chemical constituent present in Plumeria Rubra.
- Identification tests of chemical constituents.
- Soxhlet procedure
- Solvent to be used to be Soxhlet extraction.
- Check antimicrobial activity

**PLANT PROFILE:**

- Plumeria rubra is a popular ornamental tree widely cultivated in gardens, yards and other planned landscapes across tropical and subtropical regions. This species is easy to grow and tolerates drought and salt spray. It spreads by seed and vegetatively by cuttings.

**Botanical Name :** *Plumeria rubra* L.

- **Synonyms :** *Plumeria acutifolia* Poir.
- **Common Name :** Champo, Khad-Champo, Common White Frangipani
- **Plant Family :** [Apocynaceae](#)
- **Plant Form :** [Tree](#)
- **Occurrence (Sectors) :** 1, 2, 4, 10, 13, 15, 17, 22, 26-30
- **Occurrence (Special Areas) :** Gujarat Forestry Research Foundation, Ayurvedic Udyan, Punit Van, Van Chetana Kendra

**About Plumeria rubra Plant :**

- **Habit :** A soft-wooded erect tree with 5-8 m high.
- **Leaves :** Obovate-oblong or lanceolate, acute at the apex, glabrous, stiff, main nerves clear, parallel, joining in an intramarginal one.
- **Inflorescence :** Terminal many flowered cymes.
- **Flowers :**
  - White, pale yellow or rose or reddish, with a yellow centre.
  - Calyx lobes 2-3 mm long retuse at the apex, pubescent outside and ciliate at the margins.
  - Corolla tube 2 cm long, lobes 3-2 cm obovate, pubescent inside, glabrous outside.
- **Fruits :**
  - Follicles rarely produced, in pairs.
  - Seeds large, flat, glabrous.
- **Flowering and Fruiting Time :** November - July
- **Significance :**
  - The bark is a violent purgative.
  - The tree is commonly cultivated for its flowers.



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**Cultivation:**

The species is cultivated around the world in subtropical and tropical climates. In Australia, it is widely seen in cultivation in Sydney and Perth and warmer frost free climates north wards. In the mainland United States, it tolerates USDA Hardiness zones 10B to 11 (southern coastal California and the southern tip of Florida). It is also grown in Hawaii to an altitude of 2000 m. They tolerate a wide variety of soils, from acid to alkaline and sandy to clay. These plants grow best in dry to medium moisture, well-drained soils in full sun and will bloom through most of the year in tropical areas. They do not grow well in wet soils and in areas with temperatures below 10 °C (50 °F) during the winter seasons, the plants will stop blooming and shed their leaves. Established plants are also very salt tolerant and tolerate even salt-laden winds. [Widely available in nurseries, frangipanis are readily propagated by cuttings of branches taken in cooler months and left to dry for a week or more. As well as gardens and street- and park planting, frangipanis are planted in temples and cemeteries.

**Construction and working of Soxhlet Apparatus:**

A Soxhlet extractor is a piece of laboratory apparatus invented in 1879 by Franz von Soxhlet. It was originally designed for an extraction of a lipid from a solid material. However, a Soxhlet extractor is not limited to the extraction of lipids. Typically, a Soxhlet extraction is only required where the desired compound has a limited solubility in a solvent, and the impurity is insoluble in that solvent. If the desired compound has a significant solubility in a solvent then a simple filtration can be used to separate the compound from the insoluble substance.

Powder extraction is in progress. The sample is placed in the thimble. Normally a solid material containing some of the desired compound is placed inside a thimble made from thick filter paper, which is loaded in to the main chamber of the Soxhlet Extractor. The Soxhlet Extractor is placed onto a flask containing the extraction solvent. The Soxhlet is then equipped with a condenser. The solvent is heated to reflux. The solvent vapor travels up a distillation arm, and floods into the chamber housing the thimble of solid. The condenser ensures that any solvent vapor cools, and drips back down into the chamber housing the solid material. The chamber containing the solid material slowly fills with warm solvent. Some of the desired compound will then dissolve in the warm solvent. When the Soxhlet chamber is almost full, the chamber is automatically emptied by a siphon side arm, with the solvent running back down to the distillation flask. Then thimble ensures that the

rapid motion of the solvent does not transport any solid material to the still pot. This cycle may be allowed to repeat many times, over hours or days.

During each cycle, a portion of the non-volatile compounds dissolves in the solvent. After many cycles the desired compound is concentrated in the distillation flask. The advantage of this system is that instead of many portions of warm solvent being passed through the sample, just one batch of solvent is recycled. After extraction the solvent is removed, typically by means of a rotary evaporator, yielding the extracted compound. The non-soluble portion of the extracted solid remains in the thimble, and is usually discarded.

#### **Discussion:**

Antimicrobial activity of the test agent was determined by measuring the diameter of zone of inhibition in term of millimeter with acalibrated scale. Table 3 showed the results of antimicrobial activity. The antimicrobial activity of *Plumeria rubra* was assessed against 4 pathogenic bacterial strains (both gram positive and gram negative) and the results were compared with the activity of the standard drug ciprofloxacin. At 250µg/disc the extract showed activity against the *Esherichia coli*, *salmonella typhi*, *bacillus aureus*, *streptococcus aureus*.

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#### **Conclusion:**

The present review describes the phytochemical and pharmacological screening of *plumeria rubra* for medicinal purpose. The compounds isolated from plant parts species with the structures have been studied along with traditional uses and pharmacological activity. The evaluation needs to be carried out on *Plumeria rubra* in order to use the plant in formulation for their practical and clinical applications, used for the welfare of the mankind.

#### **References**

1. Manisha, K. and Aher, A.N., 2016. Review on traditional medicinal plant: *Plumeria rubra*. *Journal of Medicinal Plants Studies*, 4(6), pp.204-207.
2. Zaheer, Z., Konale, A.G., Patel, K.A., Subur, K.W. and Farooqui, M.N., 2010. *Plumeria Rubra* Linn., An Indian Medicinal Plant. *International Journal of Pharmacy & Therapeutics*, 1(2), pp.116-119.