



# A REVIEW ON PLUMERIA ALBA AND ITS MEDICINAL PROPERTIES

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## ABSTRACT:-

Plants have varieties of compounds like glycosides, alkaloids, terpenoids, steroids, which possess important diverse pharmacological activities to alleviate various diseases and disorders. Plants are vital source of drugs from the ancient time asset the scenario of the Indian system of medicine. The medicinal value of Plumeria species in the treatment of various human ailments is mentioned in Ayurveda, Charaka Samhita, and Sushrita Samhita. This alternative system of medicine is gaining increasing popularity worldwide. Plumeria alba Linn. (Apocynaceae) is an important shrub and widely used in perfumery and used in different traditional systems of medicine in the treatment of various diseases. The plant is mainly grown for its ornamental and fragrant flowers.

The P. alba is small laticiferous tree or shrub is a native of tropical America, commonly known as White Champa. Leaves arrangement is lanceolate to oblanceolate with white flowers, fragrant in corymbose fascicles and fruit is edible. Leaves and stem were tested for its phytoconstituents, which are used in several traditional medicines to cure various diseases like purgative, cardiogenic, diuretic, and hypotensive. Their medicinal actions are often due to their latex which is commonly drastic and corrosive. Latex is applied to ulcers, herpes, and scabies. Seeds possess hemostatic actions and bark is bruised and applied as plaster over hard tumors.

**Keywords:-** Plantica, ferric, alba, pharmacognostical plant.



**Introduction:-**

**Plumeria alba** is a species of flowering plant in the genus *Plumeria* native to Puerto Rico and the Lesser Antilles in the Caribbean. It has been planted in tropical regions worldwide.

*Plumeria alba*, commonly known as frangipani or West Indian jasmine, is a traditional and ancient folklore medicine known for its antimicrobial, anti-inflammatory, and antioxidant properties. The extracts from *P. alba* obtained from the leaves, bark, and flowers, are commonly used to manage bacterial, fungal, and viral infections such as herpes, scabies, and fungal infections. The constituents of the *P. alba* plant have shown promising antihelmintic, antipyretic, and antirheumatic properties. Although studies have confirmed that extracts from *Plumeria* species are effective against microbial infections and cancer, its role in managing oral diseases, particularly the chronic inflammatory disease of the gums (gingivitis and periodontitis), has never been explored.



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**Figure.1:- Plumeria alba tree**

India perhaps the largest producer of medicinal herbs. Medicinal herbs have been in use for thousands of years, under the indigenous systems of medicine like Ayurveda, Sidha and Unani. In earth, about 3.6 lakh species of medicinal plants are present among these about 1.4 lakh species are present in India (Mehrola, 1990) and about 70000 plants are used in traditional systems of medicines. All over the world, plants were used as main source of medicines by ancestors (Mukherjee, 2001; Jadhav, 2006). The workers have made valuable contributions towards the ethnobotanical knowledge of primitive men, tribes and other folk healers of the state. The natural and traditional relationship between human societies and plants has brings to light



various (Dwivedi, 2008). Even today the rural and aboriginal folks are very much in harmony with nature and bio resources (Shah and Singh, 1990). An obvious advantage of the present study is to create awareness towards the species and enumerate their traditional uses. Some interesting information on *Plumeria alba*. *Plumeria* or frangipani in a genus of flowering plant, family Apocynaceae. It contains primarily deciduous shrubs and small trees (Goyal et al., 2012). The flowers are native to Central America, Mexico, Caribbean and South America but can be grown in tropical and sub-tropical regions (Henry et al., 1987). *P. alba* is a small laticiferous shrub, 4.5 m high, occasionally grown in the gardens. The plant is mainly grown for its ornamental and fragrant flowers. Leaves are lanceolate to oblanceolate, flowers white, fragrant in corymbose fascicles (Chopra et al., 1956). The fruit is edible; latex is applied to ulcers, herpes and scabies and seeds possess hemostatic properties. Its bark is bruised and applied as plaster over hard tumors (Hartwell. 1982). The latter taxon finds use as purgative, cardiotoxic, diuretic, and hypotensive (Kirtikar and Basu. 1935).

Methanolic extract showed antimicrobial activity against *Bacillus anthracis*, *Pseudomonas aeruginosa* (Asolkar et al., 1992). The plant contain amyriacetate, mixture of amyriins,  $\beta$ -sitosterol, scopotetin, plumieride, plumieride coumerate, the iriddoids isoplumericin, and plumieride coumerate glucoside (Nargis et al., 1993; Rengaswami and Venkatarao. 1960; Choudhary et al., 2014).



Figure 2. Leaves of *Plumeria alba*



Figure 3. Flowers of *Plumeria*

### **Phytoconstitutes:-**

*P. alba* possesses various bioactive constituents such as sterols, carbohydrates, tannins, triterpenoids, and iridoid glycosides. The aerial part of the plant, i.e., leaves stems, etc., are reported to contain steroids, flavonoids, and alkaloids. The plant is reported to contain mixture of amyryns,  $\beta$ -sitosterols copotein, iriddoids isoplumericin, plumeride, plumeride coumerate, and plumeride coumerate glucoside. The fresh leaves and bark contain pluierride, resinic acid, and fulvoplumierin, a mixture of terpenoids, sterols, and plumieride. Bark of the plant contains cytotoxic iridoids, fulvoplumierin, Allamcin, Allamandin, 2,5-dimethoxy-p-benzoquinone, plumericin, and lignin lirioidinndrin. The root bark of *P. alba* shows the presence of iridioids, tannins, and alkaloids. *P. alba* bark containing alkaloids, carbohydrates, flavonoids, phenolic compounds, and tannins (Siddiqui et al., 1994). The plant is reported as medicinal which contains amyryn acetate, mixture of amyryns,  $\beta$ -sitosterol, scopotetin, the iriddoids isoplumericin, plumieride, plumieride coumerate, and plumieride coumerate glucoside (Gilman and Watson.



1994). The flower oil mainly consists of primary alcohol, viz. Geraniol, citronellol, farnesol and phenyl ethyl alcohol and some linalool. The flowers contain quercetin and kaempferol (Anonymous. 2005). Rangaswami (1960) reported that the chemical constituent amyryn acetate (210-15°) was derived from powdered bark of *P. alba*. It was extracted with cold pet ether, ether and hot alcoholic residue (58g) from evaporation of pet ether extract. The component was chromatographed on alumina, and eluted with pet ether to give 45.8 g semisolid, from which amyryn acetate 0.3 g was obtained. John (1983) has examined the presence of iridoids such as isoplumericin, plumericin, plumieride, plumieride coumarate and plumieride coumarate glucoside from *Plumeria obtusa*. The study revealed that isoplumericin and plumiericin were rarely found in aerial parts, remaining components highly concentrate in root bark only. Bramadhayalaselvam (1997) isolated ursolic acid (0.06%) and  $\alpha$ -amyryn acetate (0.01%) from bark and plumieride (0.02%) and plumieride-p-coumarate (0.025%) from the leaves of *P. alba*. Kalita (2004) has documented the presence of chemical constituents and energy content in the presence of some latex bearing plants including *P. alba*. The plant parts (leaf, stem, bark) were analysed for elemental composition, oil, polyphenol, hydrocarbons, crude protein, alpha cellulose, lignin and ash. The plant species might be suitable as alternative source of hydrocarbons and other phytochemicals. The bark of *P. alba* containing alkaloids, carbohydrates, flavonoids, phenolic compounds, and tannins (Gilman and Watson. 1994). The plant is a medicinally important being having amyryn acetate, mixture of amyryns,  $\beta$ -sitosterol, scopotetin, plumieride, plumieride, coumarate, the iridoids isoplumericin and plumieride coumarate glucoside (Anonymous. 2005). The flower oil mainly consists of primary alcohol, such as geraniol, citronellol, farnesol and phenyl ethyl alcohol, and some linalool. The flowers contain quercetin and kaempferol (Siddiqui et al., 1994).



Figure 4:- Ursolic acid

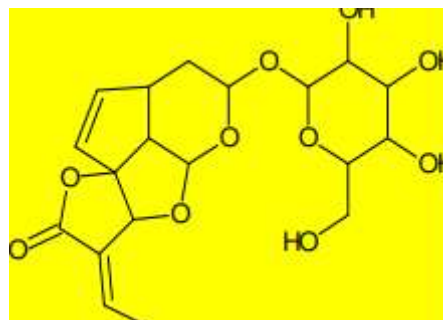


Figure 5:- Allamacin Glycoside

## **Conclusion**

Medicinal plants are rich sources of therapeutic agents without serious side effects, for prevention and cure of various ailments of human being. The immense use of medicinal plant and their utility in various medicinal systems of the world in general and India in particular, has prompted this research work on known plant source for certain drugs. Herbal medicines are generally perceived as safe products. Hence, Apocynaceae was chosen and a brief review on the existing chemical data of this family was carried out, which is of academic interest. This review brings to light the biological activities of the various compounds isolated from different members of this family. Potential anti-bacterial, anti-fungal, antioxidant and anti-cancerous compounds were found to be present in many members of Apocynaceae. The demonstration of the presence of natural products viz., polyphenols, alkaloids, triterpenoids, flavonoids and other secondary metabolites in medicinal plants will provide a scientific validation for their popular use and serve as guides which may help in the selection of the plants with anticancer activity. So far, the cytotoxic and anti-tumour properties of the medicinal plant namely *P. alba* L. has not been



reported. The presence of a variety of compounds in the various species of Plumeria but very few of them have been reported in *P. alba*.

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