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## Pharmacognostic Investigation Of Psidium Guajava: A Review

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### ABSTRACT :

Psidium guajava is an important fruit crop and medicinal plant available in tropical areas like India, Indonesia, Pakistan, Bangladesh and south Africa. The leaves of guava plant have been studied for their health benefits. Plant contain important phytoconstituents such as tannins, flavonoid, pentacyclic triterpenoid: Saponins, lectins, oleanolic acid, etc. Various part of plant has been used in traditional medicine. Many pharmacological studies have demonstrated the ability of this plant to exhibit antioxidant, hepatoprotective, anti-allergy, antimicrobial, anti-spasmodic, cardioactive, anti-cough, antidiabetic, anti-plasmodic, anti-inflammatory, cytotoxic, supporting its traditional use. The guava has a high source of vitamin C, A, iron, phosphorus and calcium and minerals. It contains high content of organic and inorganic compound like secondary metabolites eg. Antioxidants, polyphenols, antivirals compounds, anti-inflammatory compounds. The phenolic compound in guava help to cure cancerous cells and prevent skin aging before time.

**KEY POINTS :** Psidium guajava, phytochemicals, pharmacological activity, microscopical study, Taxonomy.

### INTRODUCTION :

Guava has different nomenclature as per the local languages of different countries or states, they are as: in English-Guava, Combodia- Trabesksork, Frensh- Araca, Maharashtra-Peru, Gujrat- Jamrud, Assam- Madnuriam, Deccan- Guava or Jam or Laljam, Hindi- Amrud.(1) P. guajava is a traditional plant use in various indigenous system of medicine belonging to the family: Myrtaceace. Guava is widely distributed through out India. It is genus of about 133 genera and more than 3,800 species.(2) Guava is grown and utilized an important fruit in tropical area like Indonesia, Pakistan, South America, Bangladesh.(3) Guava reaches maturity in up to 7m in height and 25cm in diameter of trunk. (4) Every part of Guava plant i.e, Leaves, Fruit, Root, Bark, Stem have been used for treating stomach ache, diabetes, diarrhea and other health ailments in many countries from decades of years: Guava leaves are dark green, elliptical, oval and characterized by their obtuse type apex. Guava leaves along with pulp and seed are employed to treat certain respiratory and gastrointestinal disorder

and to increase in platelets in patients suffering from dengue fever. (5) Guava leaves widely utilize in the treatment if various health problems like cancer, regulating B.P, overcome bowel problem, loosing weight, treat cold and cough, constipation, dysentery and scurvey. (6) Also by chewing its leaves has become a way in therapeutic application. (7) Guava plant has wide spreading network of branches. Mostly its branches are curved that display opposite leaves with the small petiols of about 3-16 cm. Flower bears incurved petals having pleasant fragrance. Flower is structurally arranged as having four to six petals and yellow coloured anther and pollination occurred by insects. Guava fruit ranges from small to medium sized with 3-6 cm length. It having shape like pear and yellow colour in ripened which is strong but pleasant.(8) These fruits are majorly used in jams, cold beverages, food stuff. This fruit can be included in dietary plan as it contain low colories and with dietary fibers and contains large antioxidant vitamins.(9) Guava seeds are easily chewable and it is very small in size. The bark of guava is thin and has green colored spots.(8)

#### **Pictures of Guava flower, fruit, Tree and leaves**



**TAXONOMY:**

Kingdom	Plantae
Order	Myrtales
Family	Myrtaceae
Subfamily	Myrtoideae
Genus	Psidium
Species	Guajava
Binomial	Psidium
Name	Guajava Linn

**CHEMICAL COMPOSITION:**

Guava plant contain many important compound such as lycopene, xanthine, lutein, vitamins, mineral, tannins, saponins, enzyme, alkaloids, glycosides, protein, sesquiterpenoid, alcohol, triterpenoid acid, steroid and flavonoids.(9) Phenolic compound in guava leaf extract changes on the basis of drying of the leaves, what extraction technique are carried out and leaf maturity.(7) Guava leaves carry high amount of essential oil and Penta-o-galloyl-beta-D-glucose(PGG), (-)-epigallocatechin gallate (EGCG) and alleyl gallate such as isoamyl galate(IG) and n-octyl gallate, these are tannin and polyphenols present in guava leaves . It is rich source of Beta-carypyllene.(10) Guava leaf contains flavonoid act as antibacterial activity, while antidiarrheal properties of guava leaf extract caused by quercetin content. Quercetin is most abundantly found in guava leaves. Guava fruit contains vitamins A, C, iron phosphorus and calcium, also contain saponin, oleonic acid, lyxopyranoside, arobopyranoid, guaijavarin, quercetin and flavonoid. The skin of fruit contain ascorbic acid.(11) The carbonyl compound present in fruit gives it a special odour. Bark contains polyphenols, resin and crystals of calcium oxalate. Root contain tannin, leucocyanidin, sterols, gallic acid, carbohydrates, salt, tannic acid. And the seed contain starch, protein, flavonoid compound, etc.(12)

**MEDICINAL USES OF GUAVA**

As Guajava Psidium leaves has major pharmacological activities, it is consumed as well as used as traditional medicine in subtropical region all over the world.(12) The stem, bark, fruit, leaves, root are used in treatment of disease such as Diarrhea, rheumatism, diabetes, digestive problem, laryngitis, ulcer, Malaria, Cough, bacterial infection, wound healing and pain relief.(13) Guava contains large amount of organic and inorganic compound like secondary metabolites that includes anti-oxidant , polyphenols, anti-viral, anti-inflammatory compounds. Guava also posses anti-cancerous activity. They help to cure cancerous cells and helps to prevent

skin aging before time.(14) In Thailand, fresh guava has been traditionally used for hair growth promotion.(15) A water leaf extract is used to reduce blood glucose level in diabetes.(16)

### **ANTI- BACTERIAL ACTIVITY :**

The essential oil of *P. guajava* leaves showed a poor growth preventive activity yet strong antibacterial and anti-fungal activity. (17) The leaves of it have anti-bacterial action because of flavonoids present in guava. (18) The aqueous and antibacterial action against *Staphylococcus aureus*, *Staphylococcus enteritidis*, *Bacillus cereus*, *Proteus* species and *Shigella* species.(19) Guava extract exhibit antibacterial activity against both gram +ve and gram -ve bacteria. In vitro evaluation of the effect of aqueous mixture and water soluble methanol extract from guava leaves and bark against multi drug resistant *Vibrio cholera* and found to possess strong antibacterial activity. (20) The bark also shows to exhibit antibacterial activity. In Villages, for the treatment of infections in childrens generally avoid market medicine and prefer natural remedies like guava leaves to be chewed and swallowed. Guava leaves extract possess good activity against the intestinal microbes, *Vibrio cholera*, causative organism for cholera. (21) The ethanobotanical studies on the leaves and bark of this plant shows that it is used for wound healing and antibacterial activity. It has large amount of tannins. (18)

### **ANTI- DIARRHEAL :**

*P. Guajava* leaves plays anti- bacterial and anti – diarrheal activity. The plant has been broadly evaluated for pharmacological development of its extract and the result show action against diarrhea.(22) Diarrhea is one of the most common and well recognized health problem and a global issue. It is estimated that about 2.2 million people die annually by diarrhea, most of them are children or infants.(8) This activity is explained by spasmolytic, anti-bacteria, anti-amoebic effect and phytochemical such as flavonoids and tannins have been documented to exhibit anti- diarrheal activity by denaturing proteins there by producing protein- tannate interactions that decreases permeability of the intestinal mucosa. Additional guava leaves have quercetin s-arabinoside and quercetin which can be isolated from leaves. Its leaves contain compounds which has morphine like action. Quercetin repressed intestinal concentration encouraged by enhanced absorption of calcium. Quercetin has strong effect on ileum. Quercetin in guava leaves explain spasmolytic activity. Guava has high cytotoxicity.(8)

### **ANTI – INFLAMMATORY :**

The inflammatory reactions usually happens when cell and body tissue are harmed by natural compounds, chemical compound or physical challenges, for example, microorganisms, injury, poisons or heat. It is a champion among the most imperative barrier components, which is gone for the expulsion of the harmful boosts and commencement of the recuperating procedure. Macrophages play an important roles against different incendiary maladies and in reactions where they releases pro-inflammatory mediators and proteins, including interleukin- 6 (IL-6), tumor necrosis factor-  $\alpha$ (TNF- $\alpha$ ), cyclooxygenase-2(COX-2), and inducible nitric oxides synthase(iNOS). (23) Guava extract in ethyl acetate has the potential to destroy the antigens. It can stop the release of the beta- hexosaminidase with histamine into RBL-2H3 cell. Due to this reason the appearance of TNF-  $\alpha$  and IL-4 mRNA stops. In this way the antigen inhibits and I $\kappa$ B- $\alpha$  become spoil.

Benzophenone and flavonoids are important compounds found in guava. These compounds are responsible for the histamine inhibition and nitric acid production.(24) A significant antiinflammatory activity is carried out by the essential oil, alcoholic, methanolic and ethyl acetate extract. For now, Benzophenone glycoside, sesquiterpene and leaf distilled flavonoids are claimed as allergy inhibitor.(25) Guava extract in ethyl acetate has been found to inhibit germ contamination and thymus formation. It has capability of acting as an anti-viral agent. It can enhance the m-RNA expression. Guava can alter the heme oxygenase- 1 proteins work. And due to this reason it can be used as anti-inflammatory agent for skin.(26)

#### Ethnomedicinal Uses:

Plant part	Compound	Ethnomedicinal Use
Seed	Carotenoids, Glycoside	Anti-microbial activity
Pulp	Ascorbic acid, carotenoids (lycopene, beta-cryptoxanthin, beta carotene)	Anti-neoplastic, Antioxidant, Anti-hyperglycemic
Skin	Phenolic Compound	Improvement of food absorption
Leaves	Gallic acid, rutin, isoflavonoids, catechin, naringenin, kaempferol, Phenolic Compound	Anti-inflammatory, Anticancer, Antioxidant, Antimicrobial, Hepatoprotection, Antispasmodic, Anti-hyperglycemic, Analgesic activity
Bark	Phenolic Compound	Stomachache, Strong antibacterial activity and anti-diarrhoeal activity

(27)

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