

A Review on Multipurpose Plant: *Psidium Guajava*

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ABSTRACT

Psidium guajava Linn. (Guava) is used not only as food but also as folk medicine in subtropical areas around the world because of its pharmacologic activities. In particular, the leaf extract of guava has traditionally been used for the treatment of diabetes in East Asia and other countries. Many pharmacological studies have demonstrated the ability of this plant to exhibit antioxidant, hepatoprotective, anti-allergy, antimicrobial, antigenotoxic, antiplasmodial, cytotoxic, antispasmodic, cardioactive, anticough, antidiabetic, antiinflammatory and antinociceptive activities, supporting its traditional uses. Suggesting a wide range of clinical applications for the treatment of infantile rotaviral enteritis, diarrhoea and diabetes.

Key words: Myrtaceae, phytochemical, physicochemical, *Psidium guajava*.

INTRODUCTION

Herbal Medicine: Herbal medicine, or phytotherapy, is the science of using herbal remedies to treat the sick. It therefore covers everything from medicinal plants with powerful actions, such as Digitalis and Belladonna, to those with very gentle action, such as chamomile, mint and many others. It should be noted that 'very gentle' action, when referring to chamomile or mint, does not mean they are more or less ineffective, but rather that one would not expect these plants to produce instant and powerful effects like those seen, for instance, after an injection of digitalis or strophanthin. 'Gentle' action also means that these 'simple' medicinal plants do not as a rule have any appreciable toxic effects, and may therefore be safely taken over an extended period of time^[1].

The use of plants as medicines predates written human history. Ethno botany (the study of traditional human uses of plants) is recognised as an effective way to discover future medicines. In 2001, researchers identified 122 compounds used in modern medicine which were derived from "ethno medical" plant sources, 80% of these have had an ethno medical use identical or related to the current use of the active elements of the plant. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine and opium.

The use of herbs to treat disease is almost universal among non-industrialized societies, and is often more affordable than purchasing expensive modern pharmaceuticals. The World Health Organisation (WHO) estimates that 80% of the population of some Asian and African countries presently uses herbal medicine for some aspect of primary health care. Studies in the United States and Europe have shown that their use is less common in clinical setting

but has become increasingly more in recent years as scientific evidence about the effectiveness of herbal medicine has become more widely available^[2].

Diarrhoea: Diarrhoea is a symptom of various illnesses and bowel disturbances during which someone passes more frequent, loose, watery stools^[3].

Diarrhoea results from hyper peristalsis of the small intestine or colon. Large amounts of Na⁺ and K⁺ and water are washed out of the colon and small intestine in diarrhoeal stools, causing dehydration, hypovolaemia and eventually shock and cardiovascular collapse. The condition of diarrhoea is particularly dangerous in infants and young children because of the rapidity with which serious dehydration may occur^[4].

Causes: Many different problems can cause diarrhoea. Here are the major causes:

- In recent years, emphasis on the treatment of diarrhoea has focused on oral dehydration therapy. However, there is still need for a continuing search for effective antidiarrheal drugs without side effects. A virus, such as rotavirus, winter vomiting disease (Norwalk virus or norovirus), enterovirus, or a hepatitis virus.
- A bacterium, such as *E. coli*, salmonella, shigella, *C. diff* (clostridium), or cholera (*Vibrio cholerae*).

A parasite, such as those that cause giardiasis and amoebiasis^[5].

Symptoms

- Increased frequency of bowel movements.
- Loose, watery stools.
- Urgency (having to go right away).
- Incontinence (leakage of stools).
- Bloating, wind.
- Rectal pain.
- Lower abdominal pain or cramping.

- Nausea, vomiting.
- Fever.
- Blood or flecks of mucus in the stool
- Loss of appetite, weight loss

Prevention: Although some types of diarrhoea, such as those due to other medical conditions, are unavoidable, infectious diarrhoea can be prevented. The most important way to avoid diarrhoea is to avoid coming into contact with infectious agents that can cause it. This means that good hand washing and hygiene are very important. Also, during travel to developing countries, we should take the following precautions:

- Drink only bottled water, even for brushing teeth.
 - Avoid eating food from street vendors.
 - Avoid ice made with tap water.
 - Eat only fruit and vegetables that are cooked or can be peeled.
 - Be sure that all foods are thoroughly cooked and served steaming hot.
 - Never eat raw or undercooked meat or sea food.
- Obtain hepatitis A vaccination prior to travel, if advised, for that region^[5].

Treatment: The most important aspect of treating diarrhoea involves avoiding dehydration. Because plain water does not contain sugar, sodium, or potassium, which is also lost in diarrhoea, it is important to consume plenty of fluids that contain these substances.

Examples of appropriate drinks include diluted fruit juices, prepared rehydration solutions, and chicken and beef soup. Water should also be consumed. In vomiting, try taking tiny amounts of liquid every 15 minutes. Children are often put simple diet of bananas, rice, pureed fruit and toast. Fats, sweets, coffee, and milk products should be avoided. The anti-diarrhoeal medicines can be useful to relieve symptoms and reduce discomfort, but should not be used where there is blood in the stools or a high temperature. Pharmacists can advise on suitable products, but these medicines should not be given to children.

In severe diarrhoea due to infectious bacteria, doctor may advise taking antibiotics to help resolve the symptoms. However, antibiotics won't help with viral diarrhoea, which is the most common type of infectious diarrhoea.

Plant Profile

Description of *Psidium guajava*: *Psidium guajava* the common guava tree is widely distributed as a native plant in America from Mexico to Brazil. The leaves have been used in folk medicine for many years to treat diarrhoea, stomach ache and hepatic problems. *Psidium guajava* is a medium-sized tree, reaching a height of 8m. The bark, leaves, fruit and root have also been evaluated pharmacologically for the treatment of gastrointestinal diseases. This plant possesses antimicrobial, antitumorigenic and hypoglycaemic properties.

Worldwide, the leading guava producers are Brazil, Colombia, Egypt, India, Mexico, Pakistan, South Africa and Venezuela^[6].

Classification^[7]

Kingdom: Plantae
Division: Magnolioph

Class: Magnoliopsida
Subclass: Rosidae
Order: Myrtales
Family: Myrtaceae
Subfamily: Myrtoide
Tribe: Myrteae
Genus: *Psidium*
Species: *guajava*

Common vernacular names^[8]: Common guava, yellow guava, apple guava, *Sans*: Perala; Amaratafalam; Amrutaphalam. *Hind*: Lal sufrium (red); Amrut.. *Ben*: Lal peyara; Goya-pandu. *Tam*: Koyapalam; Koyya. *Mal*: Palamper. *Mah*: Peru; Jamba. *Guj*: Jamrukh. *Assam*: Madhuria. *Nepal*: Amuk. *Arab & pers*: Amrud.. *Punj*: Amrut.

Morphology: It's a low evergreen tree or shrub 6 to 25 feet high, with wide spreading branches and square, downy twigs, is a native of tropical America. It's a common vegetation cover by roads and in waste places in Hawaii. Guava is a tropical and semitropical plant. It is well known in the islands for its edible fruit. It is common in the backyards. The branches are crooked, bringing opposite leaves. The flowers are white, incurved petals, 2 or 3 in the leaf axils; they are fragrant, with four to six petals and yellow anthers. The fruit is small, 3 to 6 cm long, pear-shaped, reddish-yellow when ripe^[9].

Chemical constituent

- The fruit also contain vitamin C, vitamin A, iron, calcium and phosphorus. Manganese is also present in the plant in combination with phosphoric, oxalic and malic acids. The fruit contains saponin combined with oleanolic acid and guajavarin and quercetin^[10].
- The leaves contain essential oil with main components being alfa-pinene, beta-pinene, limonene, menthol, terpenyl acetate, isopropyl alcohol, caryophyllene oxide, curcumene, crategolic and guayavolic acids^[11].
- The bark contains 12-30% of tannin and one source says it contains tannin 27.4%, or polyphenols, resin and crystals of calcium oxalate^[10].
- The roots are also rich in tannin. The plants also contain leukocyanidins, sterols and salts. Root, stem-bark and leaves contain a large percentage of tannic acid. There are a high percentage of carbohydrates and salts^[12].

Traditional uses & Literature Review

- Stem, bark and root-bark are astringent. Unripe fruit is indigestible, causes vomiting and fever. Bark is astringent, febrifuge, antiseptic. Fruit is laxative, leaves are astringent. Indians also employ it for sore throats, vomiting, stomach upsets and for vertigo^[10]
- Antibacterial activity against *E.coli*, *Salmonella typhi*, *Staphylococcus aureus*, *Proteus mirabilis* and *Shigella dysenteria*^[12].
- Leaves shows significant anti-inflammatory activity with percentage of 58.27^[13].
- The young leaves of the guava tree in decoction, it has been used for spasms, fevers, worms, diabetes^[14].
- The cerebral aspects of the plants may be seen in the CNS depressant activity due to the presence of

caryophyllene-oxide and beta-selinene that has been seen for the plant [15].

- Flowers are used as a poultice for conjunctivitis [16].
- Boiled with lemon grass to make a decoction that is drunk for coughs and also used for several other ailments including diabetes [17].
- Fruits are recommended for gout [18].
- They are also as part of the pot herb used in stem treatment for malaria [19].

Reported Activity & Uses

The phytochemical screening showed the presence of alkaloids, carbohydrates, reducing sugars, tannins, anthraquinones, terpenoids, flavonoids, glycosides and saponins which support the numerous claims about its activities [20].

The aqueous leaf extract of *Psidium guajava* contains pharmacologically active substances with anti-diarrhoeal properties, revealed in their inhibitory effect on gastrointestinal propulsion [21].

Reduction in gastric motility as being the mechanism by which many anti-diarrhoeal agents act. Phytochemical analysis work revealed that the presence of saponins, glycosides, tannins, alkaloids and additional presence of anthocyanin's, essential oils phenols, triterpenes, quercetin and vitamin C. Quercetin has been reported as the main active constituent of *Psidium guajava* and has been attributed to be responsible for the spasmolytic and anti-diarrhoeal effects of the leaf extract [22].

Psidium guajava to be potential alternative to the commercial vibriocidal agents for the efficient treatment of cholera that kills many people worldwide [23].

The potential allelopathic effect of *Psidium guajava* leaves on the seed germination and root growth of other species. From an ecological viewpoint, the inhibition of plant development after germination is a selection strategy that ignores the descent. If *Psidium guajava* is a successful exotic invasive species in riparian areas, it can lead to lower diversity, particularly in areas of forest recovery [24].

The plant having potent anti-diarrhoeal, anti-hypertensive, hepatoprotective, antioxidant, antimicrobial, hypoglycaemic and anti-mutagenic activities [25].

The decoction of *Psidium guajava* leaves has anti-giardial and antirotaviral activity and also having a broad spectrum of antimicrobial action and thus could be effective in controlling diarrhoea due to a wide range of pathogen [26].

CONCLUSION

Pharmacological studies of *Psidium guajava* plant are at the preliminary level requiring studies to delineate the mechanism of actions. The study provides an outlook on various aspects that need to be done to carry forward the available information in developing suitable clinical therapeutics out of *Psidium guajava* plant.

Literature survey revealed that *Psidium guajava* possesses nature's solution for painful menses and diarrhoea. Guava leaf is used traditionally for several ailments including diabetes mellitus, diarrhoea, cough and in hypertension. It is also used to treat tooth decay, gum infection, sore throat, to disinfect wounds and also antiseptic. Guava is digestive,

carminative, gives vigor & strength to heart, lungs and whole body. It is an effective aphrodisiac, improves blood circulation and when eaten with seeds it gives roughage to the diet helps in the normal evacuations of the bowels.

Guava is a rich source of antioxidants and fiber. It is a poor man's fruit because they are quite cheap. A guava a day keeps a doctor away.

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