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Review Article

Formulation Prospectives: *Psidium guajava*

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ABSTRACT

Guava, or *Psidium guajava*, is an evergreen tree. It is an evergreen shrub that can grow up to 10 metres tall. The stem has a reddish brown colour and is tough and woody. The bark thins out. It has many tasty pears that are shaped like pears and white flowers that are blooming. It is a tiny tree that resembles a shrub that spreads by branching out in different ways. It is a shade tree that offers cover to a variety of insects and birds. It is grown for its fruits and to provide shade. The fruit has a lot of vitamin C and A. It is a medication for a number of illnesses. Numerous investigations into pharmacology have shown that this plant possesses anti-oxidant, hepatoprotective, anti-allergy, antibacterial, antigenotoxic, antiplasmodial, and cytotoxic properties. Its traditional usage are supported by its antitough, antidiabetic, antiinflammatory, and antinociceptive properties. offering a broad range of therapeutic uses for the management of diabetes, diarrhoea, and infantile rotaviral enteritis. Moreover, blood and immune system disorders are treated with the leaves.

INTRODUCTION

Guava, or *Psidium guajava* L., is a medicinal plant that is a member of the Myrtaceae family. *P. Guajava* is a well-known traditional medicinal herb that is utilised in a number of indigenous medical systems. It is extensively available in India[1]. Wild trees can grow up to 20 metres long and have many branches. The tree is easily recognised by its distinctive thin, smooth, copper-colored bark that reveals a greenish layer underneath. In the tropics, guava plants have proliferated greatly. because they thrive in a range

of soil types, reproduce easily, and produce fruit quickly. Guava seeds are dispersed by birds and monkeys, who also encourage the spontaneous growth of guava saplings in the rainforest.[2] The tree can be cultivated anywhere with fertile soil and a tropical or subtropical environment. The nation of India presently produces the greatest guavas, followed by its neighbour China[3]. The guava tree's roots, leaves, bark, stem, and fruits have all been used in many countries to treat a variety of illnesses, including diabetes, diarrhoea, and stomachaches. Guava leaves (*Psidium guajavae*

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folium; GL), which are oval, dark green, and elliptic in shape, are identified by their obtuse-type apex. Guava leaves are used to cure a variety of respiratory and gastrointestinal ailments when mixed with the pulp and seeds. In addition, to increase platelets in dengue fever sufferers [4]. Animal model studies have also shown the efficacy of GL isolates as potent antitumor, anticancer, and cytotoxic medicines [5,6].



Figure 1: Guava leaves and fruit.

Synonyms:

Psidium pomiferum L., *Psidium Pumilum* Vahl, *Psidium cujavillus* burm., and *Psidium pyriferum* Linn[7]

Common Names:

Guyaba (Cuba), guayaba (Guatemala, Nicaragua, Paraguay), amrood (India), and guava (Egypt, USA, Latin America, Asia, Africa).[8]

Family:-

Myrtaceae

Morphology of plant:

3–10 metres in height.

Spread: at least 30 cm.

Trunk: Hard, smooth, and woody.

Conformity: Non-uniform.

Growth rate: It will take 5-8 years.

Taxonomy:

Plantae is the Kingdom

Family: Myrtaceae;

Order: Myrtales

Category: Myrtoideae

Guajava is the species of *Psidium*.

Psidium Guajava Linn is the binomial name.

Distribution:

Nowadays, it's grown in Bermuda, Southern Florida, and the West Indies, extending from Trinidad and Cuba to the Bahamas and Brazil[9].

1. The study of ethanobotany:

Scientific research has substantiated a good percentage of *P. Guajava*'s lengthy history of traditional use [10]. Crushing the leaves and applying the extract on wounds, boils, skin, and soft tissue infected sites are some of the ethnomedical uses[11]. Astringent are the stem, bark, and root bark. Unripe fruit is indigestible, high un temperature, and produces vomiting. While leaves are astringent, fruit is laxative[12]. Locally, children's prolapsus ani is greatly improved by leaf decoction[13]. Leaf *P. guajava* is utilised as a phytotherapeutic is used as an anti-inflammatory drug and to treat respiratory and digestive issues. There is also proof of its anti-malarial and anti-amoebic properties[14, 15].

Leaves:

In India, the infusion or decoction of the leaves is used for rheumatism, as well as as an antispasmodic and febrifuge [16]. In the USA, the leaves are applied topically or as a decoction to treat toothaches, wounds, and ulcers as an antibiotic[17, 18].

Bark:

In the Philippines, the bark is used as an astringent in the treatment of ulcers, wounds, and diarrhoea; in Panama, Bolivia, and Venezuela, the bark is used to cure skin conditions and dysentery. It is used to remove the placenta during childbirth and in cases of skin infections, vaginal haemorrhage wounds, fever, dehydration, and respiratory disorders. It comes in the form of decoction and poultice[19].

Root:

While the roots are used in the Philippines, Fiji, and South Africa as an astringent for ulcers, they are also used in West Africa as a decoction to treat diarrhoea, coughs, stomachaches, dysentery,

toothaches, indigestion, and constipation. In treating injuries as well as diarrhea[20].

Microscopy:

The transverse section of the midribs shows gutter-shaped xylem and phloem and beneath the phloem Pericycle, which contains collenchymatous cells. The microscopy reveals the presence of abundant Unicellular trichome, paracytic stomata, xylem vessels, Calcium crystals, and few crystal sheath[21,22]. The average stomatal index on upper epidermis is greater than on lower epidermis for mature leaves, and found opposite in the case of young leaves[23]. The transverse section of the midribs reveals gutter-shaped xylem and phloem, as well as the presence of pericycles, which include collenchymatous cells, beneath the phloem[24].

Phytochemistry:

A wide range of phytochemicals, such as minerals, enzymes, and proteins, are found in guavas[25]. Triterpenoid acids and sesquiterpenoid alcohols [26, 27, 28]. Guavas are abundant in lutein, zeaxanthine, lycopene, and antioxidants and vitamins[29].

Pharmacological activity:

Psidium guajava has been utilized as an anticancer/anti-tumor, anti-diabetic from the ancient Time since it is thought to have therapeutic Characteristics.

Anticancer/Antitumor Activity:

Apoptosis or a decrease in cell proliferation are two indicators of cancer, which is a complicated medical problem [30]. It can be caused by a number of internal and environmental factors that lead to the excessive formation of reactive oxygen species (ROS). DNA cross-linkage, nucleic acid degradation, chromosomal disruptions and reorganisations, lipid peroxidation-induced damage to cell membrane integrity, and the emergence of tumours are possible outcomes of this [31]. Additionally, guavas are a good source of

carotene, which may offer protection against oral and lung cancer.[30]

Antidiabetic Activity:

The ethanolic stem bark extract showed statistically significant hypoglycemic activity in rats with hyperglycemia brought on by alloxan, but it had no significant hypoglycemic impact in rats with normal and normal glucose loading (OGTT). In both acute and sub-acute trials, the aqueous extract showed statistically significant hypoglycemic action at an oral dosage of 250 mg/kg[31]. In China, guava leaves are eaten raw to help lower blood sugar levels. A study conducted on mice by the Medicinal Research Laboratory in Allahabad found that guava fruits and leaves can lower blood sugar levels [32]. After eating the apple without its peel. Many writers have looked into the effects of *Psidium guajava* leaf inhibition of intestinal glycosidases on postprandial hyperglycemia, which may represent a breakthrough in the treatment of type II diabetes. Furthermore, guavas' high fibre content reduces the rate at which glucose is absorbed by the stomach, averting the rapid spike in blood sugar that happens right after eating. In one study, those who drank guava tea instead of ordinary water as a control experienced noticeably fewer blood sugar rises after eating white rice [33].

Antioxidant Activity:

P. guajava is a great source of antioxidant phytochemicals, according to recent studies. Methanolic and leaf extract shown high antioxidant activity.[34] Quercetin, quercetin-3-O-glucopyranoside, Morin, ascorbic acid, carotenoids, and polyphenolics are the active ingredients.[35] For aerobes, oxygen is essential because it acts as a terminal electron acceptor during respiration, which is the primary energy-producing mechanism. Nonetheless, free radicals produced during metabolic processes are the cause of the body's inflammatory diseases, ischemic diseases, neurological disorders,

hemochromatosis, emphysema, acquired immunodeficiency syndrome, and many other ailments [36].

Antidiarrheal Activity:

The leaves of *P. guajava* L. The anti-diarrheal activity of phytochemicals like flavonoids and tannins has been shown to occur through denaturing protein, which results in protein-tannate interactions that reduce the permeability of the intestinal mucosa[37]. This activity is explained by spasmolytic, antibacterial, and anti-amoebic effects. Furthermore, the physiologically active medication quercetin's calcium-antagonist properties provide clarification. This well-liked herbal remedy's spasmolytic effect[31]. Guava barks have an astringent quality that makes them a popular remedy for child diarrhoea. To help you swiftly clear your bowels, mix a tea with guava extract and a cup of warm water. A 2008 study that looked at the effect of guava leaves on rat colon peristalsis was published in the *Journal of Smooth Muscle Research*. They found that the guava leaf extract may minimise the severity of the rats' diarrhoea, lower the frequency of faeces, and postpone the onset of castor oil-induced diarrhea[38].

Antimicrobial Activity:

Plant-based bioactive compounds have the potential to be sources of antimicrobials. These compounds function by stifling the synthesis of bacterial toxins, creating reactive oxygen species (ROS), inhibiting the growth, disruption, and lysis of microbial cell walls, preventing the formation of biofilms, suppressing DNA replication and transcription, and preventing the production of adenosine triphosphate (ATP). [39]It was discovered that *Psidium guajava* bark extracts, both methanolic and aqueous, had antibacterial properties. From guava leaves, four antibacterial substances have been identified and extracted.[31]

Wound Healing:

Guava leaves have long been used to treat wounds since the beginning of human history. Guava leaves were mashed into a paste with a little water or oil by the ancient people of China and India, and the mixture was then applied to the surface of wounds. Tanning and flavonoid-rich guava leaf methanolic extract used topically twice daily showed faster wound healing. A plethora of studies has shown that guava leaf ointment can cure wounds significantly faster than products found in stores. After being cleansed, the leaves are crushed and oil is extracted. Melted candle wax is the main vehicle added to the extract to help with absorption. After that, the combined mixture is applied to the incision twice a day for the next four days [40].

Anti cough action:

In Bolivia and Egypt, guava leaf has long been used as a medicine to cure ailments like cough and lung conditions. After the extract was given intraperitoneally, the frequency of coughs brought on by capsaicin aerosol was reduced by the aqueous extract after ten minutes. The LD50 of guava leaf extract was greater than 5 g/kg[41].

Antiulcer activity:

Prostaglandins mediate *P. Guajava*'s acid secretion inhibitory impact of antiulcer activity in the aspirin-induced gastric ulcer model.[42].

Anti-Allergy:

A considerable decrease in mast cell histamine release and prevention of IL-10-mediated in vitro activation of T regulatory (Tr) cells from CD4+ splenocytes of C57BL/6 mice were found in studies on *Psidium guajava* leaf extracts in methanol and water. The extracts also shifted the Th1/Th2 balance to a Th1 dominant state by directly decreasing Tr cell activity. In mice, guava leaf extracts inhibited the T cell-mediated allergic response [43].

CONCLUSION:

The well-known guava tree, *Psidium guajava*, is cultivated for its fruit in tropical climates.



Research has shown that it is beneficial for treating diarrhoea, dysentery, gastroenteritis, hypertension, diabetes, caries, pain alleviation, coughing, mouth ulcers, and to enhance locomotor coordination and inflammation caused by liver damage. Intuits fruit, which is high in calcium, phosphate, iron, and vitamins A and C, has a lot of phytochemicals in its skin. There is proof that readily available natural compounds can be found in GLs. Numerous studies have been conducted on the high concentrations of biological activity, antioxidant, anticancer, and hypoglycemic properties discovered in guava leaf extracts. Numerous bioactive compounds included in guava leaves have been demonstrated to enhance and stabilise a range of physiological and metabolic functions within the human body. In addition to being readily available and safe, natural therapy is also reasonably priced when it comes to illness treatment and prevention.

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