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NUTRITIONAL AND MEDICINAL VALUES OF *PSIDIUM GUAJAVA* FRUIT: A REVIEW

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ABSTRACT

Guava (*Psidium guajava* Linn.) commonly known for its food and nutritional values throughout the world. The medicinal properties of guava fruit are also well known in traditional system of medicine. Since, each part of guava tree possesses economic value; it is grown on commercial scale. Guava plant is considerable process has been achieved regarding the biological activity and medicinal application of guava and the fruit considered as poor man apple of tropics. Guava can also be eaten by diabetics and those suffering from kidney and liver related problems. Guava contains dietary fiber, protein, calcium, phosphorus, potassium, copper, iron, vitamin A, vitamin b1, vitamin C, vitamin b2, vitamin b3 and folic acid. It is rich in antioxidant. In the present review, nutritional value and medicinal properties of guava fruit have been discussed to provide collective information on its multipurpose commercial values.

Keyword: *Psidium guajava*, Antioxidant, vitamin

INTRODUCTION

The World Health Organization reported that 80% of the world population relies chiefly on traditional medicines involving the use of plant extracts or their active constituents. India with its mega-biodiversity and knowledge of rich ancient traditional systems of medicine (Ayurveda, Siddha, Unani, Amchi and local health traditions) provide a strong base for the utilization of a large number of plants in general healthcare and alleviation of common ailments of the people [1]. Guava (*Psidium guajava L.*) is one of such medicinal plants belonging to the family Myrtaceae that is also used as a source of

food. It is a native of central America but is now widely cultivated throughout the tropics. It is one of the most gregarious of fruit trees and is widely known by its common English name or its equivalent in other languages (it is called guava in Hausa and Fulfulde, goyave in French, guava in Malay, gurfa in Yoruba and Gwaibwa in Ibo). It is a genus of about 100 species of tropical shrubs and small trees. Thriving in all types of soils, the guava is widely distributed and the fruits enrich the diets of millions of people in the tropics of the world [2]. Guava trees are small shrubby evergreen trees, with a lot of strong branches. Smooth bark which occasionally flakes off is a characteristic of this tree. The leaves are slightly aromatic when crushed. White flowers appear towards the end of small branches, either as single or in a small cluster. Each flower bears numerous white needle-like stamens, which accommodate creamy anthers. Guava fruit, usually 4 to 12 centimetres (1.6 to 4.7 in) long, are round or oval depending on the species. The outer skin may be rough, often with a bitter taste, or soft and sweet. Varying between species, the skin can be any thickness, is usually green before maturity, but becomes yellow, maroon, or green when ripe. Guava fruit generally have a pronounced and typical fragrance. Guava pulp may be sweet or sour, tasting something between pear and strawberry, off-white ("white" guavas) to deep pink ("red" guavas), with the seeds in the central pulp of variable number and hardness, depending on species. The fruits are fleshy, sweet and emanate a slight but pleasant odor. The fruit contains fiber, proteins, carbohydrates, calcium, phosphorous, iron, vitamin A, vitamin B3, B4, etc. Mature trees of most species are fairly cold hardy and can survive temperatures slightly colder than 25 °F (−4 °C) for short periods of time, but younger plants will likely freeze to the ground [3]. Thus, this review depicts the pharmacological, medicinal and nutritional value of guava fruit in the management of various disorders.

Fig. 1: Tree and fruits of *Psidium guajava*

CHEMICAL CONSTITUENTS

Guava's main plant chemicals include: alanine, alpha-humulene, alpha-hydroxyursolic acid, alpha-linolenic acid, alpha-selinene, amritoside, araban, arabinose, arabopyranosides, arjunolic acid, aromadendrene, ascorbic acid, ascorbigen, asiatic acid, aspartic acid, avicularin, benzaldehyde, butanal, carotenoids, caryophyllene, catechol-tannins, crataegolic acid, D-galactose, D-galacturonic acid, ellagic acid, ethyl octanoate, essential oils, flavonoids, gallic acid, glutamic acid, goreishic acid, guafine, guavacoumaric acid, guaijavarin, guajiverine, guajivolic acid, guajavolide, guavenoic acid, guajavanoic acid, histidine, hyperin, ilelatifol D, isoneriucoumaric acid, isoquercetin, jacoumaric acid, lectins, leucocyanidins, limonene, linoleic acid, linolenic acid, lysine, mecocyanin, myricetin, myristic acid, nerolidiol, obtusinin, octanol, oleanolic acid, oleic acid, oxalic acid, palmitic acid, palmitoleic acid, pectin, polyphenols, psidiolic acid, quercetin, quercitrin, serine, sesquiguavene, tannins, terpenes, and ursolic acid [4].

NUTRITIONAL VALUE

Guavas are often included among superfruits, being rich in dietary fiber, vitamins A and C, folic acid, and the dietary minerals, potassium, copper and manganese. Having a generally broad, low-calorie profile of essential nutrients, a single common guava (*P. guajava*) fruit contains about four times the amount of vitamin C as an orange [5]. The food value and contents of guava fruit is listed in the Table 1. However, nutrient content varies across guava cultivars. Although the strawberry guava (*P.littorale* var. *cattleianum*), notably containing 90 mg of vitamin C per serving, has about 25% of the amount found in more common varieties, its total vitamin C content in one serving still provides 100% of the Dietary Reference Intake for adult males [6]. Guavas contain both carotenoids and polyphenols – the major classes of antioxidant pigments – giving them relatively high potential antioxidant value among plant foods. As these pigments produce the fruit skin and flesh color, guavas that are red-orange have more pigment content as polyphenol, carotenoid and pro-vitamin A, retinoid sources than yellow-green ones [7].

Table 1: Food value of *Psidium guajava* fruit	
Vitamin G4	36-50
Calories	77-86 g
Moisture	2.8-5.5 g
Crude fiber	0.9-1.0 g
Protein	0.1-0.5 g
Fat	0.43-0.7 g
Ash	9.5-10 g
Carbohydrates	9.1-17 mg
Calcium	17.8-30 mg
Phosphorus	0.30-0.70 mg
Iron	200-400 I.U.
Carotene (Vitamin A)	0.046 mg
Thiamine	0.03-0.04 mg
Riboflavin	0.6-1.068 mg
Niacin	40 I.U.
Vitamin B3	35 I.U.

USES OF GUAVA FRUIT:

Fruits are edible; green when raw and yellow on ripening. Guava fruits are very nutritious and low in calorie. These contain more vitamin c compared to citrus fruits. It is rich in antioxidant and protects cell damage. Guava fruits are very good for improving overall health. Since guava fruit is rich in vitamin c, it protects body against bacterial and viral infections by improving body immunity. There are countless health benefits of Guava eating, some of them are as follows:-

1. Gives relief in stress
2. Gives energy, Vitamin C
3. Cures constipation, Indigestion
4. Beneficial in Gastric problem
5. Improves Appetite, liver function
6. Tonic for heart
7. Reduces cholesterol, lipid level
8. Full of lycopene and Antioxidant
9. Reduces recurrnet infections

In two randomized human studies, the consumption of guava fruit for 12 weeks was shown to reduce blood pressure by an average 8%, decrease total cholesterol level by 9%, decrease triglycerides by almost 8% and increase HDL cholesterol by 8%. The effects were attributed to the high potassium and soluble fiber content of the fruit. A randomized, single-blind, controlled trial was conducted to examine the effects of guava fruit intake on blood pressure and blood lipids in patients with essential hypertension. It is possible that an increased consumption of guava fruit can cause a substantial reduction in blood pressure and blood lipids without decreasing HDL cholesterol level [8, 9].

The juice of the **guava fruit** boiled and strained is mixed with one part of pulp and two parts of sugar becoming syrup recommended for diarrhea.

MEDICINAL PROPERTIES:

Studies indicate that number of pharmacological active components is present in the *Psidium guajava* which are responsible for the various biological activities [10].

1. Anti-Diabetic Activity: *Psidium guajava* has been reported to lower the blood glucose level. Guava fruit extract has been shown to significantly restore the loss of body weight and reduces the blood glucose level in the diabetic condition. In STZ induced diabetic's guava fruit extract, when administered at a dose of 125 and 250mg/kg. Fruit extract of guava protects the pancreatic tissues, including islet beta cells, against lipid per oxidation and thus reduces the loss of insulin-positive beta cells and insulin secretion. The ethanolic stem bark extract exhibited significant hypoglycaemic activity in alloxan-induced hyperglycaemic rats at an oral dose of 250mg/kg.

2. Antidiarrhoeal Activity: Diarrhoea is a major problem in the world. The ripe fruit of guava has been reported as laxative which is used to treat constipation. Studies indicate that guava fruit is more effective Antidiarrhoeal when it is used with the peel, but if taken unripe fruit in large quantity cause indigestion, vomiting.

3. Antimicrobial Activity: Fungicidal action against *Arthrinium sacchari* M001 and *Chaetomium funicola* M002 strains was observed from the methanolic extract of ripe fruit.

4. Antioxidant Activity: Oxidative stress occurs when free radical production exceeds the antioxidant capacity of a cell which can damage crucial cellular compounds, such as lipids, carbohydrates, proteins, and DNA. Many studies have reported significant alterations in plasma antioxidant enzyme systems, including superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx), and in lipid peroxidation. It has been well reported that *Psidium guajava* (PG) exhibit its antioxidant effect through the inhibition of Nuclear factor-kappa B (NF-kB) activation and restoration of enzymatic antioxidants. Studies have been reported that guava fruits with a red-coloured pulp flesh contained a significant amount of carotenoids, especially lycopene, and a high concentration of phenolic compounds. These compounds were largely responsible for the antioxidant activity. *Psidium guajava* contains phenolic phytochemical which inhibit peroxidation reaction in the living body and thus prevent various types of chronic disease such as diabetes, cancer and heart disease. These antioxidant properties

are associated with its phenolic compounds such as protocatechunic acid, ferulic acid, quercetin, guavin, ascorbic acid, gallic acid and caffeic acid.

5. Anticancer Effect: Various studies showed that 17 Thai medicinal Plants of *psidium guajava* have antiproliferative effects on human mouth epidermal carcinoma and murine leukemia cells.

CONCLUSION

Psidium guajava (Linn.) is popularly known as 'poor man's apple of the tropics', has a long history of traditional use for a wide range of diseases. The fruit as well as its juice is freely consumed for its great taste and nutritional benefits. Much of the traditional uses have been validated by scientific research. This review attempts to shed light on the therapeutic potential of guava as an adjunct in treating periodontal disease. As an excellent antimicrobial, antioxidant agent guava hopefully will be considered in the future for more clinical evaluations and possible applications as an adjunct to conventional periodontal therapy.

Nevertheless, we should emphasize the importance of experimental and clinical studies with emphasis on bioavailability of compounds, effective and safe doses to be used.

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