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A REVIEW ON MEDICINAL PROPERTIES OF PSIDIUM GUAJAVA

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ABSTRACT
Guava is a tropical fruit native to South America. It belongs to the Myrtaceae family and is a well-liked plant. In contrast to other fruits, guava is untreated with chemicals, making it a healthier option. Nature has endowed Guava with many nutritional and medicinal properties. The fruits are 4-12 cm long with round or oval shape depending on the species (red, strawberry, and off-white). It has long been used as a homoeopathic herb to treat a variety of ailments throughout the globe. Oleanolic acid, tannins, quercetin, ursolic acid, triterpenes, pentacyclic triterpenoid, saponins, carotenoids, amritoside, guajanoic acid, lectins, leucocyanidin, beta-sitosterol and uvaol are among the active components. Guava contains antibacterial, anti-malarial, anti-diarrheal, antiinflammatory, anti-cancer, anti-hyperglycemic, and antioxidant properties, among others. Several studies have revealed that guava contains a number of pharmacological active components that are responsible for a variety of biochemical activities, including antidiabetic, antimicrobial, antidiarrheal, anti-oxidant, anti-pyretic, cardioactive, hepatoprotective, immunomodulatory, spasmolytic, and contractile effects, which are discussed further in the review. This article discusses about pharmacological activities and how they may be used to treat a variety of illnesses and diseases.

KEYWORDS: Psidium guajava, anti-diarrheal, anti-hypertensive, anti-lipedema, anti-cancer, therapeutic benefits.

1. INTRODUCTION

Guava, or Psidium guajava, is endowed by nature with a variety of crucial nutrients. Guava is thought to have been introduced to India by the Portuguese after being commercially grown in South Africa. Guava is a fruit that is fairly widespread in Asian nations, although it is more common in western nations due primarily to its medical qualities. It is a tiny tree in the Myrtaceae family.[2] As long as the soil is fertile and the climate is tropical or subtropical, the tree can be grown there. India currently produces the most guava, followed by China, an adjacent nation.[1] Depending on the species, guava fruits can range in size from 4 to 12 centimetres (1.6 to 4.7 in) long and can be round or oval. The fruit initially has a green tint before turning yellow as it ripens. Apple guava is the variety of guava that is most frequently found on the market.[3] The botanical classification of Psidium guajava is displayed in Table No. 1.

Table 1: Botanical classification of Psidium guajava.

Botanical classification	
Kingdom	Plantae - Plants
Subkingdom	Tracheobionta Vascular plants
Superdivision	Spermatophyta Seed plants
Division	Magnoliophyta Flower plants
Class	Magnoliopsida Dicotyledonous
Subclass	Rosidae
Order	Myrtales
Family	Myrtaceae
Subfamily	Myrtoideae
Tribe	Myrteae
Gender	Psidium
Species	Psidium guajava

Source: https://www.botanical-online.com/english/guava_characteristics.htm

Guava leaves, in addition to the fruit, may provide health advantages. These include helping to prevent cancer, control blood pressure, treat diarrhoea, and alleviate digestive issues, to name a few. Additionally, it aids in weight loss, enhances skin tonicity, and treats cold and flu as well as constipation, dysentery, and scurvy.[4] Apple, cherry, and strawberry guavas are among the varieties of guava that are most popular worldwide. primarily consumed raw in its ripened or semi-ripened form or as juices. It is extremely clear from table number 1 that this well-known fruit is a factory of nutrients. The potential health advantages of guava and its leaves are discussed in this review.

Table 2: Nutritional Value of Psidium guajava.

Nutritional Value Per 100 G Of Guava Fruit	
Energy	285 kJ (68 kcal)
Carbohydrates	14.32 g
Sugars	8.92 g
Dietary fiber	5.4 g
Fat	0.95 g
Protein	2.55 g
Vitamin A equiv.	31 µg
beta-Carotene	374 µg
Thiamine (B1)	0.067 mg
Riboflavin (B2)	0.04 mg
Niacin (B3)	1.084 mg
Pantothenic acid	0.451 mg
Vitamin B6	0.11 mg
Folate (B9)	49 µg
Vitamin C	228.3 mg
Vitamin K	2.2 µg
Iron	0.26 mg
Magnesium	22 mg
Manganese	0.15 mg
Phosphorus	40 mg
Potassium	417 mg
Sodium	2 mg
Zinc	0.23 mg
Lycopene	5204 µg

Source: www.wikipedia.co

Laxatives

Guava leaves and fruits both include an adequate amount of dietary fibre, which is the foundation for the treatment of constipation. For the prevention and treatment of constipation and haemorrhoids, younger, tender leaves are especially rich in fibre and roughage. As much as 36 g of dietary fibre are estimated to be present in 100 grammes of guava fruit.[5] In addition, guava seeds are strong laxatives that aid in colon cleansing and persistent constipation. One guava provides around 12% of the daily recommended intake of fibre, making it one of the fruit's best sources of dietary fibre and vitamin C when compared to other fruits, making it very advantageous for maintaining good digestive health.[6]

Issues Relating to the Oral Cavity

Periodontitis is mostly brought on by dental plaque, which, if not removed or cared for, can progress to gingivitis and periodontitis.[6] Prevotella intermedia, Porphyromonasgingivalis, Fusobacterium nucleatum, and Aggregatibacteractinomycetemcomitans are a few of the prevalent pathogens that cause periodontitis.[7] Quercetin, which has been found to have amazing antibacterial effect against such infections, is abundant in guava. Quercetin's potential mode of action in periodontitis may involve the rupture of cell membranes and the inactivation of essential proteins via the formation of irreversible complexes with the proteins in sensitive bacteria.[8] Without disrupting the homeostasis of the oral cavity, guava extract combats oral diseases. It also stops bacteria from sticking to the mouth cavity, preventing the spread of plague[9] as well. Gum bleeding (scurvy) is the second most typical issue related to buccal cavity. Guava has an extremely high vitamin C concentration; it has been reported that guava has up to four times as much vitamin C as orange, making it a good choice for curing scurvy. Because of its astringent qualities, it can also be used to treat ulcers and toothaches. For immediate toothache treatment, chew on the leaves themselves.[10] Because guava leaves contain folate, they can also be used to treat bad breath. As a result, guava is a fantastic treatment for conditions affecting the oral cavity.

Antidiabetic

Guava leaves are peeled and consumed on an empty stomach in China to combat diabetes. Guava fruits and leaves can lower blood sugar levels when consumed without the skin, according to a study on mice by the Medicinal Research Laboratory in Allahabad.[11] A breakthrough in the treatment of Diabetes (type II) has been suggested by studies conducted by a number of authors on the inhibition of intestinal glycosidases by the actions of Psidium guajava leaves associated to postprandial hyperglycemia. Additionally, the high fibre content of guava slows down the gut's absorption of glucose, preventing the sharp rise in blood sugar levels that occurs shortly after eating. In one study, participants who drank guava tea after consuming white rice saw significantly lower blood sugar spikes than those who drank plain water as a control.[12] Guava (fruit and leaves) also appears to reduce fasting sugar levels. According to a study, Type 2 diabetics who consumed guava leaf decoction with each meal for three months had lower fasting blood glucose levels than they did before the experiment.[13]

Guava for Cold and Cough

Cold and cough symptoms can be treated with guava leaves. Due to its high ascorbic acid and iron content, guava decreases mucus production and lung congestion while also keeping the respiratory tract clear of any harmful pathogens. There have been claims that the ingredients in guava work like a miracle to treat influenza14. Fruit, especially the raw varieties, or a

decoction made from tender, immature leaves, can be quite beneficial for curing a cold or clearing a cough. Because of its astringent characteristics, it keeps the respiratory system, throat, and lungs free of microorganisms and reduces existing microbial activity. It works by causing the dissolution of mucus polymers, easing cough and reducing additional mucus production. Guava has a good concentration of vitamin C, which has been discovered to be very beneficial in curing colds and coughs brought on by viruses or bacteria. In many Indian villages, roasted ripe guava is utilised as a natural cure for severe instances of cough, cold, and congestion. Another investigation claimed that within 15 minutes of administration, a hydro extract of Psidium guajava leaves considerably reduced the frequency of coughing that was brought on by capsaicin aerosol as compared to the control.[15]

Antibacterial

Both Gram-positive and Gram-negative bacteria are resistant to guava extract's antibacterial effects. Guava leaves and bark water-soluble methanol extract was tested in vitro for its effects on multidrug-resistant Vibrio cholera and was reported to have strong antibacterial activity.[16] They came to the conclusion that this plant may be useful in cholera epidemic control. Villagers typically steer clear of market medications for the treatment of childhood infections in favour of alternative cures like chewing and ingesting young, sensitive guava leaves. The majority of commercially available contemporary antibiotics are ineffective against E. coli, although guava extract has been demonstrated to be extremely effective. Guava leaf extract has excellent anti-Vibrio cholera, the organism that causes cholera, activity, therefore it can be utilised in areas where it is difficult to obtain the preferred medications. Researchers evaluated the antimicrobial effects of guava leaf extracts in methanol, hexane, and ethyl acetate against three types of bacteria: Staphylococcus aureus, Salmonella spp., and Escherichia coli. Of all the microorganisms examined, the extract had the highest impact on Staphylococcus aureus, and methanolic extract had the greatest bacterial growth suppression.

Anticancer Activity

Guavas are rich in the antioxidant Lycopene, which is essential for preventing and combating cancer. Prostate cancer and breast cancer are the two that respond best overall. Guavas with red flesh (when dissected) have a higher lycopene content than those with other colours. Free radicals are scavenged by lycopene, which also works to stop them from forming more. Numerous studies concluded that guava budding leaves are a viable anti-androgen-sensitive prostate cancer agent because they exhibit anti-prostate cancer action in a cell line model.[18] Guava also has a healthy amount of carotene, which is believed to protect against oral and lung cancers.

Antihypertensive and Hypolipidemic

Heart disease, excessive cholesterol, and hypertension can all be effectively treated with guava. Additionally, it has a little quantity of potassium, which helps to lower blood pressure by relaxing blood vessels. A daily intake of guava fruit has been discovered to significantly lower blood lipids and blood pressure due to the fruit's greater potassium and fibre content. Additionally, guava has a high concentration of pectin, which delays meal absorption and significantly lowers blood lipids, lowering the risk of cardiovascular disease.[19] Numerous authors have proposed that the gallic acid, catechins, epicatechins, rutin, naringenin, and kaempferol found in the leaves are what inhibit the pancreatic cholesterol esterase, lowering blood cholesterol levels. Catechins play a crucial function in hypercholesterolemia prevention.[20] Quercetin has been linked to lowered heart disease mortality and down stroke occurrence linked to hypertension and hyperlipedema.[21] Guava's modest potassium content is responsible for its beneficial effects on cardiovascular health, stroke prevention, and cholesterol reducing.

Gastrointestinal Problems

It has been discovered that the quercetin and flavonoid content of guava leaves can prevent many ailments that start in the digestive system. Psidium guajava leaves are one example of a plant that is frequently used as traditional medicine for a variety of digestive upsets.[22] Fruits and leaves are alkaline, which inhibits the growth of harmful microorganisms that cause gastroenteritis. Guava helps to bind loose stools because it prevents microbial growth and releases excess mucus from the intestines, both of which are helpful in the treatment of diarrhoea. Guava does include a number of vital nutrients, such as potassium, carotenoids, and vitamin C, which helps to prevent GIT issues. Chewing guava leaves on an empty stomach can effectively reduce the development of extra mucus in the large intestine. Moderate use of guava leaf tea helps keep the stool consistency stable. Due to the quercetin and flavonoids in guava leaf extract, gastrointestinal problems can be treated.[23]

Antidiarrheal

It has been observed that boiling 6–10 new, tender guava leaves in a pot of warm water and drinking the mixture while it is still warm, on an empty stomach, is a very effective way to control diarrhoea. According to studies, P. guajava leaves exhibit a broad spectrum of antimicrobial activity (including antigiardial and antirotaviral activity) that may be utilised to effectively treat diarrhoea of a pathogenic origin. The high flavonoid content of guava leaves is responsible for the antidiarrheal action.[24] Due to its astringent qualities, guava barks are often used to cure diarrhoea in children. A cup of warm water and guava extract can be used to make a tea that will assist you quickly empty your bowels. An article on the effects of guava leaves on the bowel peristalsis of rats was published in the Journal of

Smooth Muscle Research in 2008.[25] The researchers found that the extract of guava leaves could delay the onset of castor oil-induced diarrhoea, reduce the frequency of defecation, and lessen the severity of the diarrhoea in the rats.

Antacid and Ulcer Protectant Activity

The alkaline composition of guava leaves provides an excellent response against stomach hyperacidity. Additionally, it has been discovered that most villages still make and consume guava tea to combat acidity. This mixture is made by boiling 10-15 young guava leaves in 3–4 cups of water. The methanolic extract, out of all the extract solvents, demonstrated the greatest antacid and ulcer healing properties in vitro.[26] Guava fruit and leaves include flavonoids and saponins that have been proven to be an effective treatment for reducing stomach acidity and the subsequent development of ulcers. In doses of 500 and 1000 mg/kg body weight, a methanolic extract of Psidium guajava leaves significantly reduced the ulcer index of ethanol-induced ulcer in the stomach of Wister rats.[27]

Wound Healing

Guava leaves have been applied to wounds frequently throughout human history since the beginning of time. Ancient people from India and China used guava leaf paste to the surface of wounds by pulverising the leaves with a little water or oil. When guava leaf methanolic extract was administered locally twice daily, tannins and flavonoids showed quicker healing of an experimental wound. Numerous studies have demonstrated that guava leaf ointment can heal wounds far more quickly than commercial products. To help with absorption, a vehicle (usually melted candle wax) is added to the extract after the leaves have been washed, crushed, and extracted with oil. Afterward, the final ingredient is given topically to the wound twice daily for the following four days.[28]

Anti-Allergy

Studies on methanol and water extracts of Psidium guajava leaves revealed a significant reduction of mast cell histamine release and prevented IL-10-mediated in vitro activation of T regulatory (Tr) cells from C57BL/6 mouse CD4+ splenocytes. By reducing Tr cell activity directly, the extracts also changed the Th1/Th2 balance to a Th1 dominant state. In mice, guava leaf extracts reduced the allergic reactivity mediated by T cells.[29]

CONCLUSION

Drug resistance has emerged quickly as a result of the increased use of allopathic medications in the diagnosis, treatment, and prevention of illnesses. One of the main factors contributing to the failure of medication therapy is drug resistance. During antimicrobial therapy, drug resistance is a common occurrence. However, natural medicine or Ayurvedic therapy seldom develops resistance, which encouraged patients to transfer from allopathic to Ayurvedic therapy. However, it is exceedingly challenging for researchers to separate the active element from the raw natural compound, so a more straightforward procedure must be created. Natural therapy is not only secure, accessible, and affordable when used in the treatment and prevention of disease. The development of traditional herbal medicine using natural resources must be prioritised because even medical professionals are now searching for alternative medical treatments to cure a variety of ailments.

REFERENCES

1. Manosroi J, Dhumtanom P, Manosroi A. Antiproliferative activity of essential oil extracted from Thai medicinal plants on KB and P388 cell lines. Cancer Letter, 2006; 235.
2. Kenneth S, Brekke L, Johon E, Donald S. Volatile constituents in guava. Journal of Agriculture and Food Chemistry, 1970; 18: 598-599.
3. Chen HY, Yen GC. Antioxidant activity and free radical scavenging capacity of extracts from guava (Psidium guajava L) leaves. Food Chemisty, 2007; 101: 686-694.
4. Palozza P, Krinsky NI. Antioxidant effects of carotenoids in vivo and in vitro: An overview. Methods in Enzylology, Academic Press, 1992; 213: 403-419.
5. Amazing Guava Benifits: Heart Healthy, Weight loss Friendly and More. Retrieved from www. googleweblight.com
6. John NR, Gala VC, Sawant CS. Inhibitory effects of plant extracts on multi-species dental biofilm formation in-vitro. International Journal of Pharma and Bio Sciencese, 2013; 4: 487-95.
7. Razak FA, Othman RY, Rahim ZH. The effect of Piper betle and Psidium guajava extracts on the cell-surface hydrophobicity of selected early settlers of dental plaque. Journal of Oral Science, 2206; 48: 71-75.
8. Bansal S, Rastogi S, Bajpai M. Mechanical, chemical and herbal aspects of periodontitis: A review. International Journal of Pharmaceutical Sciences and Research, 2012; 3: 1260-7.
9. Shu Y, Liu Y, Li L, Feng J, Lou B, Zhou X et al. Antibacterial activity of quercetin on oral infectious pathogens. Afr J Microbiol Res., 2011; 5: 5358-61.
10. NordiniHasnor WI, Fathilah AR, Rahim ZH. Plant extracts of Psidium guajava, Mangifera and Mentha sp. inhibit the growth of the population of single-species oral biofilm. Altern Integr Med., 2013; 2: 102.
11. Grover JK, Yadav S, Vats V. Medicinal plants of India with antidiabetic potential. J Ethnopharmacol, 2002; 81: 81-100.
12. Sharma H, Chandola HM. Prameha in Ayurveda: correlation with obesity, metabolic syndrome, and diabetes mellitus. Part 1-etiology, classification, and pathogenesis. Journal of Alternative and Complementary Medicine, 2011; 17: 491-496.
13. Shen SC, Cheng FC, Wu NJ. Effect of guava (Psidium guajava Linn) leaf soluble solids on

glucose metabolism in type 2 diabetic rats. Phototherapy Research, 2008; 22: 1458-1464.
14. Jaiarj P, Khoohaswan P, Wongkrajang Y, Peungvicha P, Suriyawong P et al. Anticough and antimicrobialactivities of Psidium guajava Linn. leaf extract. J Ethnopharmacol, 1999; 67: 203-212.
15. Malavika athavale. Fruit myths: Basket of wrong beliefs. Retrieved, 2011. from https://completewellbeing.com/article/fruit-myths
16. Shu Y, Liu Y, Li L, Feng J, Lou B, Zhou X et al. Antibacterial activity of quercetin on oral infectious pathogens. African Journal of Microbiology Research, 2011; 5: 5358-61.
17. Prabu GR, Gnanamani A, Sadulla S. Guaijaverin, a plant flavonoid as potential antiplaque agent against Streptococcus mutans. Journal of Applied Microbiology, 2006; 101: 487-495.
18. Yadav VR, Prasad S, Sung B, Kannappan R, Aggarwal BB. Targeting inflammatory pathways by triterpenoids for prevention and treatment of cancer. Toxins, 2010; 2(1): 2428-2466.
19. Singh RB, Rastogi SS, Singh NK, Ghosh S, Gupta S et al. Can guava fruit intake decrease blood pressure and blood lipids. Journal of Human Hypertension, 1993; 7: 33-38.
20. Deguchi Y, Miyazaki K. Anti-hyperglycemic and antihyperlipidemic effects of guava leaf extract. Nutritional Metabolism, 2010; 7: 9.
21. Obarzanek E1, Sacks FM, Vollmer WM, Bray GA, Lin PH, Karanja NM et al. Effects on blood lipids of a blood pressure-lowering diet: the Dietary Approaches to Stop Hypertension (DASH) Trial. Am J Clin Nutr., 2001; 74(1): 80-9.
22. Teixeira R, Camparoto ML, Mantovani MS, Vicentini V. Assessment of two medicinal plants, Psidium guajava L and Achillea millefolium L, in in vitro and in vivo assays. Genet Mol Biol., 2003; 26: 551-555.
23. Arima H, danno G. Isolation of antimicrobial compounds from guava (Psidium guajava L). Biosc Biotech Bioch., 2002; 66: 727-730.
24. Birdi T, Daswani P, Brijesh S, Tetali P, Natu A et al. Newer insights into the mechanism of action of Psidium guajava L. leaves in infectious diarrhoea. BMC Complement Altern Med. 2010; 10: 33.
25. Lozoya X, Reyes-Morales H, Chavez-Soto M, MartínezGarcía Mdel C, Soto-González Y et al. Intestinal antispasmodic effect of a phytodrug of Psidium guajava folia in the treatment of acute diarrheic disease. J Ethnopharmacol, 2002; 83: 19-24.
26. Livingston Raja NR, Sundar K. Psidium guajava Linn confers gastro protective effects on rats. Eur Rev Med Pharmacol Sci., 2006; 16: 151-156.
27. Uduak U, James T, Sunday AM, Wilson OH. Ulceroprotective Effect of Methanol Extract of Psidium guajava Leaves on Ethanol Induced Gastric Ulcer in Adult Wistar Rats. Asian Journal of Medical Sciences, 2012; 4(2): 75-78.
28. Okoli CO, Ezike AC, Akah PA, Udegbunam SO, Okoye TC, Mbanu TP, Ugwu E. Studies on wound healing & antiulcer activities of extract of aerial parts of Phyllanthus niruriL.(Euphorbiaceae).Am J PharmacolToxicol, 2009; 4(4): 118-26.
29. Seo N, Ito T, Wang, NL, Ya XS, Tokura Y, Furukawa F et al. Anti-allergic Psidium guajava extracts exert an antitumor effect by inhibition of T regulatory cells and resultant augmentation of Th1 cells. Anticancer Res., 2005; 25: 3763-3770.