



## A Review on the Beneficial Properties of Guava Plant

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### Abstract

Guava has much nutritional value throughout the world. Many beneficial compounds from plant such as, isoflavonoids, guaijaverin, gallic acid, catechin, rutin, naringenin, quercetin epicatechin, kaempferol flavonoids, lecithin exhibit good potential activity against different diseases. A diverse and beneficial package of nutrition is present in guava fruit. Carbonyl compounds present in fruit give it a special odor. Fruit contains manganese, thiamine, riboflavin, niacin, iron, vitamins A and C. The leaf, fruits, seeds, bark are very useful against blood pressure, cancer, diabetes and gastrointestinal problems. Various diseases like anorexia, aches, bacterial infections, toothache, ulcers, coughs, diarrhea, worms, spasms, sprains, wounds, boils, menstrual problems, colic, convulsions, colds, dysentery, dyspepsia, nausea, , tonic, bowel disorders, fever, gingivitis, bronchitis, catarrh, hemorrhoids, itch, jaundice, stomach problems, cholera, chorea, edema, epilepsy, nephritis, respiratory problems, rheumatism, scabies, painful or sensitive condition of the throat, swelling, can be cured by guava. The pharmacological potential properties like antimicrobial, antifungal, antioxidant, anticancer, anti-diabetes, and anti-diarrheal of most important parts of Guava plant have been discussed in this review article.

**Keywords:** *Guava; Beneficial; Potential; Activity*

### Introduction

*Psidium guajava* (guava) a well-recognized plant which is used as medicinal purposes (Naseer *et al.*, 2018). It is cultivated foodstuff up to 1500 m in India and also almost in every state (Chaturvedi *et al.*, 2019). This evergreen the plant is planted the world. guava fruits are mostly used in jams, beverages and foodstuff (Irshad *et al.*, 2020). Its fruit is considered among the super-fruits with low calorie and with high dietary fiber, and wealthy in antioxidant vitamins (Kumari *et al.*, 2016). Nature has a full and perfect package to maintain health and to treat all types of diseases in all kinds of animals. Now a day's special consideration are given to the herbal and natural treatment

for different diseases. In natural resources, a no of resources are present for example plants, animals, microbes, marine and minerals. In all of them plants are cheap and easily available sources. For the purpose to maintain health and to treat different diseases from fruits, leaves, barks, roots & seeds of the plant has been used traditionally before extensive research to make pharmaceutical compounds synthetically as shown in Fig 1. Traditionally, guava (*Psidium guajava* L; the family Myrtaceae ) has also been used to treat different types of diseases especially leaves and bark (Kaneria & Chanda, 2011). The Taxonomy of the plant is described in Table1.



**Figure 1.** Guava plant with fruits (Parvez *et al.*, 2018)

**Table 1:** Taxonomy of Guava

Kingdom	Plantae
Order	Myrtales
Family	Myrtaceae
Subfamily	Myrtoideae
Genus	Psidium
Species	Guajava
Binomial Name	<i>Psidium guajava</i> Linn. (Dakappa <i>et al.</i> , 2013)

### Common Name

In English, it is called as Guava and in Nigeria, it also called as gurfa (Yoruba), guava (Hausa), and Gwaibwa (Igbo) (Abubakar, 2009).

Spanish: Guayaba

Arabic: Pear

Mexico: Arryan

Sanskrit: Draksa

Perala: Amaratafalam

Gujarat: Jamrukh

Hindi: Amrood, Amarat

### Distribution

It is an indigenous of Central America. Nowadays it is usually cultured, spread and many people used the fruit of guava as a diet source in the tropics of the world (Nair & Chanda, 2007). Nowadays guava is also extensively cultured in (Kaneria & Chanda, 2011)

### Photochemistry

Guava has many important compounds such as lycopene, xanthine, lutein, vitamins, minerals, tannins, saponins, enzymes, alkaloids, glycosides, proteins, sesquiterpenoid, alcohols, triterpenoid acids, steroids, and flavanoids (Dakappa *et al.*, 2013).

### Leaves

Guava leaves contain a variety of chemical constituents like  $\beta$ -copanene,  $\beta$ -sitosterol, guayavolic acids, farnesene,  $\beta$ -bisabolene, caryophyllene oxide, isopropyl alcohol, longicyclene, ursolic, limonene, caryophyllene,  $\alpha$ -pinene,  $\beta$ -pinenementhol, nerolidiol, crategolic, quercetin, Caryophyllene (1a  $\alpha$ -, 4a  $\alpha$ -, 7  $\alpha$ -, 7a  $\beta$ -, 7b  $\alpha$ -)]-decahydro-1H-cycloprop[e] azulene, Guajavolide (2  $\alpha$ -, 3  $\beta$ -, 6  $\beta$ -, 23-tetrahydroxyurs-12-en-28,20  $\beta$ -olide; 1), 3-L-4-4-arabinofuranoside (avicularin), humulene, selinene, as Terpenyl acetate, Guavenoic acid (2  $\alpha$ -, 3  $\beta$ -, 6  $\beta$ -, 23-tetrahydroxyurs-12,20(30)-dien-28-oic acid, triterpene oleanolic acid, triterpenoids, flavinone-2'-ene, Prenol, Dihydrobenzophenanthridine and Cryptonine, tannin, eugenol, cineol, mallic acids, curcumene, 3-L-4-pyranoside, and and its (essential oil), cardinene resin (Dakappa *et al.*, 2013).

### Fruit

A diverse and beneficial package of nutrition is present in as guava fruit. Carbonyl compounds present in fruit give it a special odor. In young fruit, tannins are present in high quantity. Fruit skin is a major source of

ascorbic acid. Major fruit part contains manganese, thiamine, riboflavin, niacin, iron and vitamins A. Water is also a main constituent of fruit. Lipids, protein and carbohydrates are present in minute quantity (Gutierrez RM, 2008). Chemical constituents present in fruit are glucuronic acid, oleanolic acid, ursolic acid, arjunolic acid (WS., 1982.) lipids, proteins and carbohydrates have very less proportion as compared to water which has major part of

fruit after fibrous content (Gutierrez RM, 2008).

#### Bark`

Bark contains amritoside, ellagic acid, Leucocyanidin, luectic acid, tannins (11-27%). (Begum S, 2004, ).

#### Nutritional Aspects of Guava Fruit

Guava fruit has miscellaneous dietary values that are very much beneficial for all kinds of living organism. It is a great gift of GOD as shown in Table 2 (Kamath *et al.*, 2008).

**Table 2:** Nutritional worth of guava fruit

Nutrients	Content	Nutrients	Content
Niacin	40 I.U.	Vitamins	36-50mg
Fat	0.43-0.7mg	Moisture	2.8-5.5g
Ash	9.5-10mg	Protein	0.1-0.5mg
Riboflavin	0.6-1.068mg	Carotene (Vitamin A)	0.046mg
Phosphorous	0.30-0.70mg	Carbohydrate	9.1-17mg
Calcium	17.8-30mg	Crude fiber	0.9-1.0g
Iron	200-400 I.U	Thiamin	0.03-0.04mg

#### Traditional Uses of Guava

Traditionally, guava is used for the treatment of treatments of different diseases and different parts are used for diverse

purposes. In different countries guava was used for various intentions; as shown in Table 3 (Kamath *et al.*, 2008).

**Table 3:** Use of Guava fruit against different diseases in different countries

Country	Uses
Brazil	For anorexia, digestive disorder, diarrhea, mucous membranes inflammation, Laryngitis, ulcers, vaginal discharge, cholera, diarrhea, swelling of mouth, skin healing, sore throat treatment, gastric insufficiency.
Peru	For cough, diarrhea, lung problems, PMS, digestive problems, vertigo, vomiting, gout, hemorrhages, gastroenteritis, dysentery, ed Gastritis, vaginal ejection, worms, conjunctivitis.
Philippines	The treatment of sore throat, wounds healing & Sour or Acidic
Trinidads	All bacterial infection, diarrhea, purification of blood and diarrhea
Amazonia	Menstrual disorders, vertigo, dysentery, diarrhea, stomach ache.
Mexico	For stomachache, swelling, ulcer, worms, Wounds, scabies, diarrhea, itch, deafness. "
Malaya	Skin disease, hysteria, menstrual problem, diarrhea, epilepsy.
Haiti	For dysentery, diarrhea, skin sores, sore throat, epilepsy, itch, piles, scabies, Stomach ulcer, lesion, germicidal & astringent(pungent)
India	Anorexia, chorea, convulsions, epilepsy, cerebral problems, childbirth, nephritis
Cuba	Cold, dyspepsia, dysentery
Ghana	Coughs, toothache, diarrhea, dysentery.

#### Guava against Different Diseases

For anorexia, aches, bacterial infections, toothache, ulcers, coughs, diarrhea, worms,

spasms, sprains, wounds, boils, menstrual problems, colic, convulsions, colds, dysentery, dyspepsia, nausea, tonic, bowel

disorders, fever, gingivitis, bronchitis, catarrh, hemorrhoids, itch, jaundice, stomach problems, cholera, chorea, edema, epilepsy, nephritis, respiratory problems, rheumatism, scabies, discomfort, pain, or scratchiness in the throat, swelling, and as an antiseptic and astringent (Kamath *et al.*, 2008).

### Pharmacological Uses

#### Antioxidant Properties

A study has been done to identify the antioxidant properties of guava and compared with other fruits like orange and banana. It has been observed by DPPH assay and Fe assay that due to high phenolic compounds presence and ascorbic acid guava has more primary antioxidant potential than other fruits (Jiménez-Escrig *et al.*, 2001; Lim *et al.*, 2006; Thaipong *et al.*, 2006). Anti-oxidant potential of seed extract (acetone, methanol, ethanol, iso-propanol). has been determined (Gamal F. Mohamed\*1, 2011).

#### Anticancer Activity

It has been investigated that guava leaf hexane fraction (GHF) has powerful anticancer activity in mammals. In the review that GHF possess a no of pathways to control cancerous process. In this study it has been evaluated that GHF has cytotoxic and apoptotic effects in PC-3 cells by repression of AKT/mTOR/S6K1 and MAPK signaling pathways and down-directive of a variety of proteins that mediate metastasis, and angiogenesis, cell propagation, cell endurance. Qualitative and quantitative investigation also has been done and observed that GHF has 60 compounds, including (%), phytol (7.95%), caryophylla-3(15),7(14)-dien-6-ol(2.68%), a-patchoulene (3.76%), b-caryophyllene oxide (CPO) (3.63%), b-eudesmol (11.98%), a-copaene (7.97(E)-methyl isoeugenol (1.90%), a-terpineol (1.76%), and octadecane (1.23%) cause to prevent and to treat cancer (Lee & Park, 2010; Ryu *et al.*, 2012; Sato *et al.*, 2010). Anticancer activity of seed extract (Acetone Methanol, Ethanol, Iso-propanol) has been diagnosed (Gamal F. Mohamed\*1, 2011).

#### Anti-diabetic Effect

It has been evaluated that guava leaves extract exhibits a strong anti-diabetic effect on mice suggesting due to inhibition of PTP1B when administered at a dose of 10mg/kg (Oh *et al.*, 2005). Alpha glycosidase inhibitory activity has been observed suggesting due to myricetin, avicularin, guaijaverin, hyperin, quercetin, and kaempferol, of leaf extract of guava leaves (Guo *et al.*, 2013; Hui Wang a, 2010).

#### Antidiarrheal Activity

It has been investigated that leaf extract (aqueous) has strong anti-diarrheal activity castor oil-induced diarrhea in albino rats with comparison to drug Diphenoxylate given intraperitoneally at 5mg/kg (Bala & Adamu, 2008). Guava leaves usually used as medicine to cure diarrhea disease of animals and humans (Sudira *et al.*, 2019) (Gutiérrez *et al.*, 2008).

#### Antitumor Activity

The guava leaf constituents such as triterpenoids, sesquiterpenes, and flavonoids have potential against lung cancer (Jiang *et al.*, 2020).

#### Antimicrobial Activity

A study has been done to evaluate antibacterial activity of four seed extract (acetone, methanol, ethanol, iso-propanol) against five bacterial strains that is Bacillus cerius, Listeria monocytogenes Staphylococcus aureus, Salmonella, E. coli. It has been evaluated that all four samples have killing ability of all five bacterial strain (Gamal F. Mohamed\*1, 2011). Antimicrobial activity of beta pinene enantiomer has been evaluated (Ana Cristina Rivas Da Siliva *et al.*, 2012; Biswas *et al.*, 2013). The oil extract from guava leaves exhibit antimicrobial properties to kill Staphylococcus aureus and Escherichia coli (Rakmai *et al.*, 2018). The tannis extract obtained from guava leaves also has antimicrobial potential against many pathogens (Mailoa *et al.*, 2014).

#### Antipyretic Activity

The extract of the leaves of Guava shows antipyretic effect (Joseph & Priya, 2011).

### Anti-inflammatory Activity

It is also observed that the extract of *Psidium guajava* is very beneficial to treat various inflammatory diseases. The anti-inflammatory action is due the presence of polyphenolics and triterpenoids compounds (Rishika & Sharma, 2012).

### Spermatoprotective Activity

The extract of *Psidium guajava* Linn. leaves has much importance and is able to produce sperms of unproductive males with oligospermia and nonobstructive azoospermia (Akinola *et al.*, 2007).

### Cardioprotective Activity

*P. Guajava* L. is very useful for myocardial ischemia-reperfusion injury hearts containing quercetin and gallic acid that are biological active compounds. The aqueous leaves extract of *Psidium guajava* has a contractile effect and the aqueous extract of *P. guajava* leaf is used to reduce the systemic arterial blood pressure and heart rates. The secondary metabolites such as phenolic compounds, pentacyclic triterpenoids, flavonoids, quercetin, tannins and guajaverin naturally occurring in guava plants are most effective (Lufuluabo *et al.*, 2018).

### Conclusion

Guava is a well-known beneficial tree cultivated in tropical regions for edible fruit. It has high nutritional value and acts as antidiabetic, antibacterial, antidiarrheal, antioxidant, anticancer, antimicrobial, antipyretic, and anti-inflammatory. Its bark contains many phytochemicals and its fruit is also rich in vitamins (A and C), minerals (iron, phosphorus, and calcium). The phenolic compounds in guava plants are very effective against cancer and skin diseases. The leaves contain oxidants that have fungistatic and bacteriostatic agents properties. Quercetin is an antioxidant organic compound contained in the guava leaves and its ethyl acetate extract prevents gums infection and thymus production. Guava is found to be very useful in diarrhea, diabetes, hypertension, dysentery, gastroenteritis, cough, stomach ulcer, and liver inflammation. The plant contains many

beneficial natural compounds that have anti-inflammatory, antinociceptive, anti-mutagenic, anti-viral, and anti-plague properties. Guava can be used for the prevention and treatment of different diseases due to its biological activities. The guava leaves enhance sperm production can also be used in male infertility.

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