Review: Psidium Guajava – Phytochemical constituents and pharmacological actions.

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Abstract : Psidium guajava, is an important food crop and medicinal plant in tropical and subtropical countries is widely used like food and in folk medicine around of the world. This aims a comprehensive of the chemical constituents, pharmacological, and clinical uses. Different pharmacological experiments in a number of in vitro and in vivo models have been carried out. Also have been identified the medicinally important phyto-constituents. A number of metabolites in good yield and some have been shown to possess useful biological activities belonging mainly to phenolic, flavonoid, carotenoid, terpenoid and triterpene. Extracts and metabolites of this plant, particularly those from leaves and fruits possess useful pharmacological activities. A survey of the literature shows P. guajava is mainly known for its antispasmodic and antimicrobial properties in the treatment of diarrhoea and dysentery. Has also been used extensively as a hypoglycaemic agent. Many pharmacological studies have demonstrated the ability of this plant to exhibit antioxidant, hepatoprotection, anti-allergy, antimicrobial, antigenotoxic, antiplasmodial, cytotoxic, antispasmodic, cardioactive, anticough, antidiabetic, antiinflamatory and antinociceptive activities, supporting its traditional uses. Suggest a wide range of clinical applications for the treatment of infantile rotaviral enteritis, diarrhoea and diabetes.

Key Words **– Myrtaceae, Complementary medicine , clinical ,Pharmacological action, Phytochemical comstituents.**

I. INTRODUCTION

Nature has blessed Guava or P*sidium guajava* with many essential nutrients. Historically, Guava is said to be cultivated in South Africa for commercial purpose and has been brought to country India by the Portuguese. As a fruit, Guava is very common in Asian countries but occupies a greater space in western countries mainly because of its medicinal properties. It is a small tree belonging to family *Myrtaceae* . The tree can be cultivated in any soil provided the climate is tropical or subtropical. India is the largest producer of Guava as on date followed by neighbouring country China . Guava fruits are usually 4 to 12 centimetres (1.6 to 4.7 in) long, round or oval depending on the species. The fruit is basically green in colour which turns to yellow once it is ripened. The most commonly available guava in the market is apple guava .

Apart from the fruit, guava leaves posses potential health benefits as well, some of which are; it help in preventing cancer, regulating blood pressure, treating diarrhoea, solving bowel problems to mention a few. It also helps in loosing weight, improves tonicity of skins, treats cough and cold, constipation, dysentery, and scurvy. The common types of guava around the world includes apple guava, cherry guava, and strawberry guava. Mostly eaten raw in the ripened or semi-ripened form or consumes in the form of juices. This popular fruit is a factory of nutrients which can be very well depicted . This review describes potential health benefits of Guava and its leaves.

Arjun Kafle , Sushree Sangita Mohapatra (2018) - Examine the fruits are 4-12 cm long with round or oval shape depending on the species (red, strawberry, and off-white). The tree, which belongs to the family, *Myrtaceae* is chiefly grown in countries with tropical and subtropical climate. The pink variety of guava (when dissected) has the maximum medicinal values. Fruits as well as leaves has many health benefits viz, antidiarrhoeal, antihypertensive, antilipedemic, anticancer etc.

Table 1 **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

Sandra M. Barbalho1, Flávia M. V. Farinazzi-Machado(2012) -The aim of this review is to present some chemical compounds in *P. guajava* and their pharmacological effects. The main constituents of guava leaves are phenolic compounds, isoflavonoids, gallic acid, catechin, epicathechin, rutin, naringenin, kaempferol. The pulp is rich in ascorbic acid, carotenoids (lycopene, β-carotene and β-cryptoxanthin). The seeds, skin and barks possess glycosids, carotenoids and phenolic compounds. All

parts of the plant have been used for different purposes: hepatoprotection, antioxidant, anti-inflammatory, anti-spasmodic, anti-cancer, antimicrobial, anti-hyperglycemic, analgesic, endothelial progenitor cells, anti-stomachache and anti-diarrhea. *P. guajava* has many effects on health and that it should be researched more extensively in clinical trials. Furthermore leaves, seeds and peel are treated as wastes by the food processing industry and are discarded, so their use may reduce the disposal of these parts of guava as pollutants.

Rohit Kumar Bijauliya , Shashi Alok (2018) an update of pharmacological activity of *psidium guajava* in the treatment of various diseases It contains important phytoconstituents such as tannins, triterpenes, flavonoid: quercetin, pentacyclic triterpenoid, guajanoic acid, saponins, carotenoids, lectins, leucocyanidin, ellagic acid, amritoside, beta-sitosterol, uvaol, oleanolic acid and ursolic acid. It is one of the valuable plant in the Myrtaceae family. *Psidium guajava* which was reported theantibacterial, anti-diarrhoeal, antihyperglycemic, anti-malarial, anti-inflammatory, anti-cancer, antioxidant activity *etc*. The present review is an attempt to generate interest among the masses regarding its immense potential in preventing and treating several common diseases. The plant is show different type of chemical constituents like araban, arabinose, arabopyranosides, arjunolic acid, ascorbigen, asiatic acid, aspartic acid, D-galactose, D-galacturonic acid, ellagic acid, guaijavarin, guajiverine, guajavanoic acid, linoleic acid, myristic acid, octanol, oleanolic acid, palmitoleic acid, pectin, polyphenols, psidiolic acid, quercetin, quercitrin, serine, sesquiguavene, tannins, terpenes, ursolic acid The plant has been extensively studied in terms of pharmacological activity of its major components, and the results indicate potent anti-diarrheal, antihypertensive, hepatoprotective, antioxidant, antimicrobial, hypo-glycaemic and antimutagenic activities. In recent years, emphasis of research has been on utilizing traditional medicines that have a long and proven history of treating various ailments.

FIG. 1: PSIDIUM GUAJAVA

Ana Maria Athayde uchoa-thomaz1, Eldina Castro sousa1, Jose Osvaldo Beserra carioca (2014) - This study aimed to characterize the chemical composition, determine the fatty acid profile, and quantify the bioactive compounds present in guava seed powder (*Psidium guajava* L.). The powder resulted from seeds obtained from guava pulp processing. The agro-industrial seeds from red guava cv. Plum were used, and they were donated by a frozen pulp fruit manufacturer. They contain varying amounts of macronutrients and micronutrients, with a high content of total dietary fiber (63.94 g/100g), protein(11.19 g/100g), iron (13.8 mg/100g), zinc (3.31 mg/100g), and reduced calorie content (182 kcal/100g). Their lipid profile showed a predominance of unsaturated fatty acids (87.06%), especially linoleic acid (n6) and oleic acid (n9). The powder obtained contained significant amounts of bioactive compounds such as ascorbic acid (87.44 mg/100g), total carotenoids (1.25 mg/100g) and insoluble dietary fiber (63.55 g/100g).

Suresh Kumar, Reecha Madaan(2012) Thus, researchers around the globe are searching for newer, effective and safer drugs from natural resources. The present review emphasizes pharmacological reports on anticonvulsant plants, plant products and formulations. Various chemical constituents (with structures) isolated from different plants responsible for anticonvulsant activity and their possible mechanism of actions have been incorporated in this review. The review has been compiled using references from major databases like Chemical Abstracts, Medicinal and Aromatic Plants Abstracts, PubMed, Scirus, Google scholar, Open J Gate, Scopus, Science Direct and Online Journals, and includes 599 references. Preliminary anticonvulsant activity studies have been carried out on crude extracts of traditonally used and medicinally promising plants. Such plants need to be explored properly with a view to isolate anticonvulsant constituents, and to evaluate their possible mode of actions.

Mohammad Asif (2015) Many drugs that increase the brain content of GABA have exhibited anti-convulsant activity against seizure induced by MES, PTZ and lithium Pilocarpine. The MES is probably the best validated method for assessment of anti-epileptic drugs in generalized tonic clonic seizures. The present allopathic pharmacotherapy in the management of epilepsy is based upon the nature and type of epilepsy. It is reported that about 30% of patients require polytherapy for better control, which in turn increases the chances of drug-drug interaction and side effects. The reports of possible mechanism of action have shown that the identification of particular fraction and or active constituent can further provide more extensive results. Comparatively lesser side effects and interactions associated with these herbal remedies can make the anticonvulsant treatment more rationale and patient friendly. The review also found that certain herbal drugs mentioned in various TM across the globe have not been exploited up to the desired level, and these claims could be a better target for the development of more and more alternatives to allopathic anticonvulsants.

Jose Pais-Ribeiro & Rute F. Meneses Scientific research and clinical practice have been showing that a number of psychosocial variables are associated with better adjustment. Unsuccessful adjustment may be accompanied (e.g., as cause or consequence) by mental health problems, personality disorders, psychological, psychiatric and/or psychosomatic symptoms, and stigma (perception). Consequently, it is important to understand psychosocial dimensions associated with the disease that facilitate patients' adjustment and be aware of interventions that have a positive impact on adjustment.

Rika Hartati , Hashifah I. Nadifan All of ethyl acetate and ethanol leaves extracts of crystal guava were very strong antioxidants using DPPH, CUPRAC, and FRAP methods. For the highest antioxidant activity, ethanol was the best solvent for extraction leaves and ethyl acetate for extraction fruit of crystal guava.) there was a positive and high correlation between the TPC in leaves extract with the AAI of DPPH, CUPRAC, and FRAP.) are phenolic compound in crystal guava leaves mainly contributed to their antioxidant activity by DPPH, CUPRAC, and FRAP methods. DPPH, CUPRAC, and FRAP methods presented linear results in the antioxidant activity of leaves and fruit extracts. Crystal guava leaves may be developed as a natural antioxidant for the food and nutrition

J. Lahon , S. Phukan (2015)-The EEPG (200 mg/kg and 400 mg/kg) produced dose dependent anticonvulsant effect on MES induced seizures in albino mice, as suggested by reduction in the HLTE and total recovery time, and increase in the percentage protection from MES induced convulsions. EEPG also prolonged the latency of clonic convulsion and reduced the duration of convulsion in a dose dependent manner, as well as reduce the seizure score, thus suggesting the anticonvulsant effect of the extract on PTZ induced seizureThe maximal electroshock seizure test induced by bilateral corneal or transauricular electrical stimulation, is thought to be predictive of anticonvulsant drugs effective against generalized tonic-clonic seizures, while the pentylenetetrazole test, in which seizures are induced by systemic administration of convulsant doses of PTZ, is thought to represent a valid model for generalized absence and/or myoclonic seizures in humans. Meckes *et al*. (1996) found that sesquiterpenes isolated from hexane extract of *Psidium guajava* leaves had depressant activities on the CNS. The extract potentiated the latency of convulsions induced by leptazol in mice.Sushma *et al.* (2012) reported that the hydro ethanolic extract of the *P. guajava* leaves had protective effect on PTZ induced seizure at 100 mg/kg, 200 mg/kg and 400 mg/kg doses whereas it showed anticonvulsant effect at 200 mg/kg and 400 mg/kg doses in MES induced convulsion.

V. H. Pushpa, K. Padmaja the ethanolic extract of *Psidium guajava* produced a significant antiepileptic effect in a dose-dependent manner. The percentage inhibition of seizure produced by T2 is 49%, and T1 is 37% in MES test. And the percentage of protection from seizure by T2 is 83.4% and T1 is 50% in PTZ test. Hence, the higher dose (400mg/kg) has better antiepileptic activity in comparison to the lower dose (200mg/kg).

Manoj Kumar , Maharishi Tomar (2021) In the present review, GLs are documented as a source of natural compounds that are readily available. GL extracts have been extensively studied for their high levels of antioxidant, anticancer, hypoglycemic, and other biological activities. The rich presence of minerals and proteins, as well as vitamins, in GLs promote their utilization as a direct source of nutrients. The presence of numerous bioactive chemical compounds in GLs have been reported to enhance and stabilize different physiological and metabolic functions in the human body. GL also contains many secondary metabolites, such as flavonoids, triterpenoids, sesquiterpenes, glycosides, alkaloids, saponins, and other phenolic compounds. These compounds play a key role as immune stimulators and modulators of chronic diseases including diabetes, cancer, and gastrointestinal, neurodegenerative, and cardiovascular diseases. GL essential oil also has antioxidant, antimicrobial, and antiproliferative activity. GL extracts that contain high concentrations of vitamin E, flavone (apigenin), or β-caryophyllene show significant antiproliferative activity against colon carcinoma and various forms of human cancer. GL therefore has peculiar characteristics and pharmaceutical and medicinal profiles that promote diverse applications as an essential plant component in medicinal research and a low-cost ingredient in foodstuffs.

Dev Rishika and Ramica Sharma (2012)- Phytochemical constituents: Guava is a rich source of dietary fibres, vitamin A, C, folic acid and various dietary minerals like potassium, copper and manganese. Reports indicates that a single guava *(Psidium guajava*) fruit contains about four times the amount of vitamin C as an orange . Leaf extract of guava has been reported for their antibacterial activity because of the presence of flavonoid glycosides, morin-3-O-alpha-L-lyxopyranoside and morin-3-O-alpha-L-arabopyranoside · About sixteen types of carotenoids have been reported in the flesh part of the red guava and thirteen of them have been reported as guava carotenoids which is responsible for antioxidant activity .

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