WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 9, Issue 5, 452-464. Review Article ISSN 2277– 7105

TRADITIONAL USES OF GUAVA: A REVIEW

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Article Received on
28 Feb. 2020,

Revised on 19 March 2020,
Accepted on 07 April 2020,

DOI: 10.20959/wjpr20205-17297

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ABSTRACT

Psidium guajava is a one of the important food crop as well as medicinal plant in tropical and subtropical countries. It is widely used as food and in folk medicine. Preparations of guava *(Psidium guajava*L.) have traditionally used tomanage several diseases. Traditional medicine in cases of diabetes mellitus, cardiovascular diseases, cancer, and parasitic infectionsaroundidentified the medicinally important phyto-constituents. The number ofmetabolites have great yield and some have to possess useful biological activities belonging mainly to phenolic, flavonoid, carotenoid, terpenoid as well as triterpene. Extracts and metabolites of this plant, particularly a leaves and fruits possess useful pharmacologicalactivities. This aims a comprehensive of the chemical constituents, pharmacological and clinical uses of *P. guajava* is mainly known for its antispasmodic and antimicrobial properties in the treatment ofdiarrhoea and dysentery. It is demonstrated that the pharmacological ability ofthis plant to show antioxidant, hepatoprotective, antiallergy, antimicrobial, antispasmodic, cardioactive, antidiabetic, antiinflamatory and antinociceptive activities. Traditional medicine for the adjuvant treatment of diabetes mellitus in China. Diarrhea is the most common cause of death in children home treatment should be administered by parentsto prevents diarrheal complications. Traditional diarrheal treatment involved the use of *Psidium guajava* leaves. Flavonoids is the main active components in *Psidium guajava* leaves and havetoomany multi-physiological functions. *Psidium guajava* leaves samples contents heigher flavonoid compounds, glycoside and aglycone which possessed the highest antioxidant capacities.

KEYWORD: Guava; *Psidium guajava*; Myrtaceae; Pharmacological actions; traditional medicine.

INTRODUCTION

Psidium guajava, it grows in the tropical and subtropical areas of the world. The main traditional use known is as an anti-diarrhoeal and other reported uses include gastroenteritis, dysentery, stomach, antibacterial colic pathogenic germs of the intestine.[1] *Psidium guajava* Linn. (family Myrtaceae), commonly called guava, goyaveorgoyavier in French; guave, Guavenbaum, Guayave in German; banjiro in Japanese; goiaba, goiabeiro in Portugal; arac¸ ´a-goiaba, arac¸ ´a-guac¸ ´u, guaiaba in Brazil; guayaba, guayabo in Espa˜noland guava in English.[2] *Psidium guajava* is a little tree that is 10m in high with skinny, smooth, patchy, peeling bark. Leaves are opposite, short-petiolate, the blade oval with prominentpinnate veins, 5–15 cm long. Flowers are showy; petals whitish up to 2 cmlong, stamens numerous.[1] *Psidium guajava* is used in many areas of the world for the treatment of a several diseases, e.g. as an anti-inflammatory, for diabetes, hypertension, caries, wounds, pain relief and reducing fever *P. guajava* is widely used in Mexico for treatment ofgastrointestinal and respiratory disturbances and is used as ananti-inflammatory medicine.[3] Leaves are used on wounds, ulcers and for rheumatic pain, while they are chewedto relieve toothache.[4] In Peru, it is used for treatment of gastroenteritis, dysentery, stomach painindigestion, inflammations of the mouth and throat in the form of gargle.[5] The leaves of guava contain triterpenic acids as well asflavonoids; avicularin and its 3-l-4-pyranoside with strong antibacterialaction.[6] Diabetes mellitus (DM) is a chronic metabolic disorder.[7] *P. guajava*, is apopular drug for treating type II diabetics. Guava is known for its nutritional and medical value for anti-hyperglycemic, anti-hyperlipidemic, anti-oxidative, hepatoprotection,anti-allergy and anti-nociceptive.[8-11] Diarrhea is a common problem in almost every area of the world.[12] Traditional medicines are usually administered by a group of people in a Society with the use of different types of roots of plants.[13] In somecountries, diarrhea is still treated as traditional manner[14] flavonoids is the main biologically activecompounds and have multi-directional biological activities which including antioxidant activity, hypoglycemic effects and Hypertensive effects.[15-16] Traditionally, preparations of the leaves have been used in people Medicine in many countries, mainly as anti-diarrheal remedy.[17]

ACTIVITY OF GUAVA

ANTI-INFLAMMATORY/ANALGESIC

A simmering of fruit tree leaves is employed worldwide for the treatment of varied inflammatory ailments as well as rheumatism. The leaf extract (50–800 mg/kg, i.p.) also produced dose-dependent and significant analgesic effects.[18] The anti-inflammatory and

analgesic activities of 70% ethanolic extract of leaves of *Psidium guajava* were also investigated The extracts were administered at a dose 300 mg/kg, p.o. Aspirin (300 mg/kg, p.o.) was employed as the reference drug. *Psidium guajava* leaves showed significant antiinflammatory activity with an inhibition of 58%.[19] The essential oil (0.8 mg/kg) significantly reduced oedema formation induced by carrageenan while at 0.4 mg/kg and 0.8 mg/kg the oil also significantly reduced granuloma formation induced by cotton pellets.[20]

ANTIMICROBIAL

The restrictive effects of liquid and alcoholic extracts of the guava bush (root moreover as leaves) on the expansion of cocci aureus, eubacteria mutans, bacteria genus aeruginosa, salmonella, enteritidis, Bacillus cereus, Proteus spp., Shigella spp. And Escherichia coli, causal agent of intestinal infections in humans were examined using the in vitro agarwell diffusion method.[21] Three antibacterial substances have been detected in the leaves which are derivatives of Quercetin.[22] Methanolic extract from fruit ripe have fungicidal action against Arthrinium sacchari M001 and Chaetomium funicola M002 strains.[23] The bark tincture showed fungicidal activity at different concentrations but exhibited only fungistatic property in case of Candida albicans.[24]

ACNE LESION

Psidium guajava leaf extracts have potent antimicrobial Activities against Propionibacterium disease of the skins and should be useful in treating acne particularly once they are better-known to possess medication activities.[25]

ANTITUSSIVE EFFECTS

In another result, the water infusion from Psidium guajavaleaves decreased the frequency of coughing induced by capsaicinaerosol as compared to the control, within 10 min after injectionof the extract.[26]

ANTI-HYPERGLYCEMIC

The rapidly increasing diabetes mellitus is becoming a serious problem to human health in several areas of the world. With the distinctive traditional medical opinions as well as natural medicines mainly originated by herbs, traditional medicine offers good clinical opportunities and shows a bright future in the treatment of diabetes mellitus and its complications. The effect of guava bark, leaves and fruit as antidiabetic agents has been studied by several author.[27] Evaluation of anti-hyperglycaemic activity of the ethanolextract obtained from the

stem bark of guava on blood glucose levels of normal, alloxan-induced hyperglycaemicrats and normal glucose loaded rats. The treatment with *Psidium guajava* aqueous leaf extract (0.01–0.625 mg/ml) showed significant inhibition on LDL glycation in a dose-dependent manner.[28-29] Demonstrated that the methanol extract from *Psidium guajava* leaves exhibited significant inhibitory effect on PTP1B(protein tyrosine phosphatase 1B).[30] Anti-LDL (low density lipoprotein) glycative agents were investigated using aqueous decoctions of *Psidium guajava* fruit ripe at concentrations of 0.01–0.625 mg/ml.[31]

ANTIMALARIAL EFFECTS

The parasite lactate dehydrogenase (PLDH) assay method which is for evaluating antimalarial compounds, by using stem-bark and fruit extracts of guava.[32-33] Leavesand stem bark of *Psidium guajava* inhibited Entamoeba histolytica growth with MAC < 10g/ml.[34]

EFFECT ON DENTAL PLAQUE

The adhesion of early settlers of plaque on the tooth surface incorporates a role within the initiation of the event of plaque. Tooth brushing is taken into account a superior technique for reducing plaque accumulation. Chemical agents are used to reduce plaque accumulation on tooth surfaces. The treatment of the early plaque settlers with 1 mg/ml aqueous extract leaf of guava reduced the cell-surface hydrophobicity of Staphylococcus sanguinis, Staphylococcus mitis and Actinomyces sp. By 54.1%, 49.9% and 40.6%, respectively.[35]

HEPATOPROTECTIVE EFFECTS

The hepatoprotective effect of an aqueous leaf extract of *Psidium guajava* were studied. The leaf extract at doses of 500 mg/kg produced significant hepatoprotection.[36] Antioxidant, free radical scavenger and radioprotective activities Cellular damage or oxidative injury arising from free radicals or reactive oxygen underlying a number of human neurodegenerative disorders, diabetes, inflammation, viral infections, autoimmune pathologies and digestive system disorders.[37] Dried leaves of *Psidium guajava* were extracted with hot water, ascorbic acid was a substantially more powerful antioxidant than the extracts from guava leaf.[38] These antioxidant properties are associated with its phenolic compounds such as protocatechuic acid, ferulic acid, quercetin, quercetin, ascorbic acid, gallic acid guavin B and caffeic acid.[39]

WOUND HEALING

The wound healing properties of a methanolic leaf extract of guava were determined using the excision wound model. More than 90% wound healing was observed after 14 days post-surgery, whereas 72% healing was observed in the distilled water treated group.[40]

THE ACTION OF ANTI-ALLERGIC

Agents from guava on T cell immunity in mice was investigated and Studies were carried out on methanol and aqueous extracts of *Psidium guajava* leaves. These extracts cause potentinhibition of histamine release from mast cells and blocked IL- 10-mediated.[41]

ANTICANCER/ANTITUMOUR EFFECTS

An aqueous extract of *Psidium guajava* leaves inhibited of the cancer cell line DU-145 in a dose-dependent manner. At 1.0 mg/ml, the extract reduced the viability of PCa DU-145 to 36.1% and3.6%, respectively after 48 h and 72 h of incubations.[42] Guava leafoil shown the highest anti-proliferative activity with an IC50value of 0.0379 mg/mlon P388 cell lines.[43] *Psidium guajava* aqueous leaf extracts are efficacious for the prevention of tumour development by depressing Tr cells and subsequently shifting to Th1 cells.[44] *Psidium guajava* extracts have the potential to be developed as new chemotherapeutic agents to prevent or to inhibit the growth of tumour

CARDIOVASCULAR, HYPOTENSIVE EFFECTS

The result of Associate in nursing liquid leaf extract of *Psidium guajava* on heart muscle injury was studied. High-energy phosphates and malondialdehyde in the reperfused hearts were significantly reduced with the plant extract.[45] Aqueous leaf extract of *Psidium guajava* exhibited cardio protective effects against myocardial ischemia-reperfusion injury in isolated rat.[46] A guava leaf extract may therefore be beneficial for the prevention of cardiovascular diseases, also shows its traditional use in hypertension is well established.

ANTI-DIARRHEAL

The use of traditional medicine for diarrhea in children. Common traditional medicines used included guava leaves, these traditional medicines were used by respondents as an initial treatment for diarrhea.[47] A dose of zero.2 ml/kg leaf extract produced 65% inhibition Quercetin showed significant anti-diarrhoeal activity.[48-49] Quercetin and quercetin-3-arabinoside, extracted from the buds and leaves of guava at concentrations of1.6 g/ml showed a painkiller like inhibition of neurotransmitter unharness within the coaxially

stirred up small intestine, along with associate initial increase in muscular tone, followed by a gradual decrease.[50] Asiatic acid, also extractedfrom the leaves, showed dose-dependent (10–500 g/ml) spasmolytic activity.[51] Methanol extractfrom leaves (8g/ml) of guava bush showed activity against simian (SA-11) rotavirus (93.8% inhibition).[52]

ANTI-DIABETIC

Guava, which has been used for diabetes treatment, was studied for its biologically active ingredient(s) and underlying mechanisms. In our study, the polysaccharides GP70 of guava significantly decreased the fasting blood level and elevated the glucosylated serumprotein (GSP) levels by 21% in type II diabetic.[53] Guava leaves extract had significant antidiabetic effects via the inhibition of tyrosine phosphatase and also can decrease in the number of lipid droplets of liver in type 2 diabetic.[54] *Psidium guajava* leaves extract had significantanti diabetic effects via the inhibition of tyrosine phosphatase, and alsocan decrease in the number of lipid droplets of liver in type 2 diabetic.[55] Guava polysaccharides have strong antioxidant activities.[56]

INFECTIOUS AND PARASITIC DISEASES

Aqueous and organic extracts of guava leaves have been demonstrated to have antibacterial Activity because of its inhibitory effect against antibiotics-resistant clinical isolates of Staphylococcusaureus strains.[57-58] A methanolic extract exerted medication effects, preventing the expansion totally different of various} strains from different bacterium like staph aureus, escherichia, bacteria genus aeruginosa, Proteus spp and enteric bacteria.[59] Candida krusei and Candida glabrata which provided higher inhibition.[60] Inaddition, leaf acetone extract of P. guajava has also exhibited moderate acaricidal and insecticidal activities causing the dead of Hippobosca maculata adult fly.[61]

DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE

Antimicrobial result of a leaf extract against the most developer of skin disorder lesions, Propionibacterium acnes, and alternative organisms isolated from skin disorder lesions. The antimicrobial activity was also displayed against pathogenic bacteria associated with wound, skin, and soft-tissue infections.[62] The acetone and methanol extracts displayed relevant activity against dermatophytic fungi, and thus could be considered as new agents against skin disease. Furthermore, phenols from the leaves were tested on human-skin fibroblast cells and showed antifungal properties.[63] The ethanol extract from the leaves

reached the very best activity. Therefore, the leaves might be appropriate for both boosting the whitening of skin and inhibiting browning.[64]

CONCLUSION

The pharmacological studies conducted on *Psidium guajava*, which indicate the potential of the plant in the treatment of conditions such as, diarrhoeal, wounds, acne, dental plaque, malaria, allergies, diabetes, cardiovascular disorder, antioxidant and anti-inflammatory, microbial, tussive effects, hyperglycemic, cancer/tumour. In the plants the GP70-3 with a molecular weight which was purified from guava may be used as a α-glycosidase inhibitor for treating type II diabetes. Based on the several study it can be concluded that most children's diarrheal treatments, parents is use natural ingredients, suchas guava leaves, People prefer use traditional medicine because of its natural characteristics and families' cultural practices. It is used as initial diarrhea treatment at home for children. Traditional claims generally require experimental research for establishment their effectiveness. *Psidium guajava* L. leaves have been verified by several researches over the last decade against many disorders like Infectious and Parasitic Diseases, Diseases of the Skin and Subcutaneous Tissue and other worldwide diseases.

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