AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: http://www.ajptr.com/

A Review on Hepatoprotective Activity of Psidium Guajava

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ABSTRACT

Liver disease is a major health problem in all countries, especially in developing countries. The drugs available to treated liver disease may cause further damages. There is an urgent need of some herbal medicines to treat liver disease without causing any further damages. *Psidium guajava* is one of the important plant in the Myrtaceae family. *P. guajava* which was reported the antibacterial, antidiarrhoeal, antihyperglycemic, antimalarial, cytotoxic, antioxidant activity etc. The aim of this review to compile the data of the hepatoprotective activity of a *P. guajava* extract in a recent years.

Keywords: *Psidium guajava*, Liver, Hepatoprotection.

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Received 16 August 2014, Accepted 18 September 2014

Please cite this article in press as: Manikandan R *et al.*, A Review on Hepatoprotective Activity of Psidium Guajava . American Journal of PharmTech Research 2014.

INTRODUCTION

Liver is the metabolic super-achiever organ in the body. Liver is the place for metabolism of carbohydrate, protein and fats. The hepatocytes of the liver eliminate the toxic substances from the blood[1]. In the time of metabolism the small amount of reactive oxygen species (ROS) are generated in liver produce oxidative stress, consequently damages the liver cells. Plant materials, which are being used as conventional medicine for the treatment of number of diseases and considered as one of the good sources for a new drug. The people and researchers are recognize that the herbal products are symbolise its safety in contrast, to the synthetics that are regarded as unsafe to human and environment. Three-quarters were recognized and used the plant and plant extracts for health care all over the world. Totally 2,50,000 higher plant species on the earth, nearly 80,000 are documented for its medicinal benefits[2]. In India nearly 45,000 of different plant species are present, nearly 15,000-20,000 plants have good medicinal value[3] *Psidium guajava* is a well known plant in a Myrtaeceae family is commonly called guave, goyave or goyavier, guavenbaum, guayave, banjiro, goiabeiro, guayabo, guava[4], goiaba in Portuguese, guayaba in Spanish. *P. guajava* grows in different climatic conditions and adapts in all the humid and subtropical areas of the world[5]. The leaves are tough dark and simple elliptic to ovate and extent of about 5-15 centimeters. The flowers have five petals with numerous stamens. The branches are crooked, bringing opposite leaves. *P. guajava* has a number of pharamacological activities, which is mainly used in the treatment of diarrhoea, cough, cold, cancer prevention, hepatoprotective etc[6,7]. The juice of *P. guajava* leaves has been known to cure toothaches, swollen gums, oral ulcers, diabetes, and the juice of leaves speeds up the healing process of wounds when applied externally. The present review to collect the data of the hepatoprotective activity of a *P. guajava* extract in a recent years.

Figure.1 *Psidium Guajava*

Phyto Constituent of the Plant

The flavonoids, terpenoids, tannins, saponins, steroids, amino acids[8], vitamin C[9] which are the natural products derived from the plant. These compounds are admire the researchers because of

its pharmacological properties including antidiabetic, antioxidant and hepatoprotective activity [10.] The human body act against the infection and degenerative diseases by the action of antioxidant compounds, because it inhibit and scavenging the free radicals[11]. Fu et al.,(2009)[12] isolated ursolic acid, 2alpha-hydroxyoleanolic acid, morin-3-O-alpha-L-arabopyranoside, quercetin, hyperin, myricetin-3-O-beta-D-glucoside,1-O-galloyl-beta-D-glucose etc., by column chromatography. Metwally et al.,[13] tested the antimicrobial activity of *P. guajava* leaves. They isolated flavonoids like quercetin, quercetin-3-O-α-L-arabinofuranoside, quercetin-3-O-β-D-arabinopyranoside, quercetin-3-O-β-D-glucosideand quercetin-3-O-β-D-galactoside. Taiye et al.,[14] found nearly 62 compounds in the extract of *P. guajava*stem bark. The components of hydrocarbons, amides, amines, 2,4,4,5,5,7,7-octamethyl, cyclononane, esters with 3,6-dioxa-2,4,5,7-tetraoctane by Gas chromatography mass spectrometry analysis. *Obaineh and Shadrach[15] studied the* phytochemical constituents and medicinal properties of Anacardium *occidentale* and *P. guajava*. The one gram of extract of *P. guajava* extract contains 1.67mg of total polyphenolin, 6.6% of oxalate, 11.5mg of tannin and 59.85% of alkaloid. Recently Sherweit et. al.,[16] found *P. Guajava* leaf oil contains 42 compounds with the dominant of beta caryophyllene and selin-7(11)-en-4α-ol and fruit oil extract contains 45 compounds with the dominant of beta cayophyllene and limonene by gas-liquid chromatography/ mass spectrometry method. Ayda Khadhr et al.,[17] results suggested that there are 29 compounds are present in the extract of stem of *P. guajava* essential oil. 36.4% of veridiflorol, 16.79% of germacrene D, 10.93% of alpha humulene, 10.62% of valerenol, and 5.9% of trans-caryophyllene are present in the extract.

Hepatoprotective Activity

Roy *et. al.,*[10] found that the aqueous leaf extract of *P. guajava* significantly reduced the elevated serum levels of aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase and bilirubin. The higher dose of (500 mg/kg) *P. guajava* leaf extract was more effective when compared to the lower dose (250 mg/kg) in CCl_4, Paracetamol or Thioacetamide and chronic liver damage induced by CCl_4. The *P. guajava* leaves extract at 450mg/kg body weight doses altered the levels of aspartate aminotransaminases, alanine aminotransaminases, alkaline phosphatase, total protein and albumin to return the normal level in erythromycin-induced liver damage in albino rats. Change in the levels of serum Hepatic enzymes were assayed in both erythromycin treated and control groups. Sambo *et. al.,*[18]. Vyas *et. al.,*[19] examined the antioxidant activity of *P. guajava* leaves extract by 2, 2 diphenyl-1-picrylhydrazyl free radical scavenging method. The extract which acquire strong antioxidant activity by comparing ascorbic acid as a standard. Due to their free radical scavenging ability the antioxidant activity of *P. guajava* extract may recognized. Taju et

al.,[20] evaluated the hepatoprotective activity of *P. guajava* leaf extract in paracetamol induced liver damage. The levels of aspartate aminotransaminase, alanine aminotransaminase, protein and bilirubin were reduced by the effect of *P. guajava* leaf extracts. The liver weight increases when compared the toxin control by the increasing concentration of the *P. guajava* leaf extract (500mg/kg, p.o). The methanolic extract of the leaf of *P. guajava* was evaluated in CCl_4, paracetamol induced hepatotoxicity in rats and levels of aspartate aminotransferase, alanine aminotransferase, alkaline phosphatate and bilirubin were evaluated. The methanolic extract (250 mg/kg and 500 mg/kg) significantly decreased the activities of serum enzymes and bilirubin which were comparable to that of silymarin revealing its hepatoprotective effect. The histological examination of the liver tissue supported the hepatoprotective activity of methanolic leaf extract of the *P. guajava* Roy *et.al.*,[21]. D'Mello *et. al.*,[22] found that the ethanolic extract of *P. guajava* doses of 200, 400 mg/kg decreases the levels of serum enzyme of serum glutamic oxaloacetic transaminase, serum glutamic pyruvic transaminases, alkaline phosphatase and bilirubin in paracetamol induced hepatotoxicity. Chen *et. al.*,[23] assessed the hepatoprotective activity and cytotoxic effect of *P. guajava* leaf extracts. Nine clone liver cells used and cells were treated with *P. guajava* extracts for 24 hours. No retardation growth in lower concentration. No cytotoxic effect in the concentration lower than or equal to 500 μg/ml of the water and hot water extracts. The hot water extracts showed higher hepatoprotective and lower cytotoxic properties. Vandna Kalsii[24] was evaluated the antioxidant activity ofthe dried powdered stem of *P. guajava* were extracted sequentially with acetone, methanol and water. The extractshave stronger free radical scavenging effect at higher concentration (100 μg/ml) of the extract. The methanol extract of *P. guajava* stem have same antioxidant activity as of ascorbic acid. Nor and Yatin[25] assessed the enzyme activities in the *P. guajava* treated groups. At a Doses of 0.5 g/kg body weight, 1.0 g/kg body weight, 2.0 g/kg body weight significant decreases in the levels of alanine aminotransferase, aspartate amino transferase, lactate dehydrogenase, glutathione reductase and γ-glutamyl transpeptidase. The specific activity of glutathione peroxidase are higher in the treated group when compared to the control group. The *P. guajava* leaf extract at doses of 500 mg/kg, b.w, p.o, decreased the eminent levels of serum transaminases, alkaline phosphatase and restored the normal value of total protein significantly in acetaminophen induced hepatotoxicity Tajua, *et al.*,[26]. Osman *et al.*,[27] assessed the hepatoprotective effect of ethanolic extract of the pomegranate peel and *P. guajava* leaves. In the hepatoprotective and curative periods, rats treated with pomegranate peel and *P. guajava* leaves of ethanolic extracts or silymarin significantly decreased in the activities of serum enzymes of aspartate amino transaminases, alanine aminotransaminases, gamma-glutamyl transferase,

lysosomal enzymes when compared to the CCl_4 treated group. The levels of total protein and albumin levels increased in the extract treated group. Vanitha Reddy *et al*.,[28] find the antioxidant properties of *Aegle marmelos* and *P. guajava* by the 2,2-diphenyl 1-piuryl hydrazyl method by the various extracts such as methanol, ethanol and water. The extracts found to have various antioxidant components such as beta carotene, alpha tocopherol, glutathione, ascorbic acid etc., Among the three extracts of *P. guajava* showed varying degree of antioxidant activity. Mohamed[29] compare the hepatoprotective activity of aqueous extracts of *P. guajava* and *Zizyphus spina-christi*. The hepatotoxicity was induced by paracetamol, it induces the levels of aspartate aminotransferase, alkaline phosphatase, lactate dehydrogenase, bilirubin etc., The plant extracts was administered orally 0.5ml /day for 4 weeks. The administration of plant extract which reduces the serum enzymes levels and restored the normal activity of hepatic antioxidant enzymes.

CONCLUSION

The presence of hepatoprotective activity of the extract of *P. guajava* leaf provided a new therapeutic path against the liver diseases and its complications. Further characterizations of active components of *P. guajava* leaf and pharmacological studies should be conducted to investigate the hepatoprotective potential of this plant.

ACKNOWLEDGEMENT

The authors are grateful to Dr. P. Selvaraj, Chairman, Shivani Group of Institutions, Trichy, whose spacious heart cheered our efforts to process. This venture properly and successfully to complete the task.

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