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ANTIOXIDANT POTENTIAL OF *PSIDIUM GUAJAVA* LINN

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ABSTRACT: The study is an attempt to investigate antioxidant activity of *Psidium Guajava* leaf extract by DPPH (2, 2-diphenyl-1-picrylhydrazyl) free radical scavenging method using ascorbic acid as standard. In the present study, the extract of *P. Guajava* leaf extract was found to possess strong antioxidant activity. This activity of *P. Guajava* extract may be attributed to their free radical-scavenging ability. The extent of antioxidant activity of *P. Guajava* extract was found significant as compared to standard.
KEY WORDS: *Psidium Guajava*; antioxidant activity ; ethanolic extract

INTRODUCTION

Reactive oxygen species (ROS) and free radicals such as superoxide anion (O_2-), hydrogen peroxide (H_2O_2) and hydroxyl radical (OH-) are constantly formed in the human body by normal metabolic action, and have been implicated in the pathogenesis of certain human diseases, including cancer, aging, diabetes and atherosclerosis. Their action is opposed by a balanced system of antioxidant defenses including antioxidant compounds and enzymes. Upsetting this balance causes oxidative stress, which can lead to cell injury and death. Current research into free radicals has confirmed that foods rich in antioxidants play an essential role in the prevention of cardiovascular diseases, cancers and neurodegenerative diseases. Therefore, much attention has been focused on the use of natural antioxidants to inhibit lipid peroxidation, or to protect the damage of free radicals.

Herbal plants are known to contain a variety of antioxidants. Numerous substances have been suggested to serve as antioxidants. It has been revealed that various phenolic antioxidants, such as flavonoids, tannins, coumarins, xanthones and more recently procyanidins scavenge radicals dose-dependently, thus they are viewed as promising therapeutic drugs for free radical pathologies.[1,2]

P. Guajava is Called guayaba in Spanish-speaking countries and goiaba in Brazil, guava is a common shade tree or shrub in door-yard gardens in the tropics. It belongs to family Myrtaceae ,genus: Psidium ,species: guajava and common names of the plant are Guava, goiaba, guayaba etc. Plant parts which are used are fruits, leaves and barks. Guava is rich in tannins, phenols, triterpenes, flavonoids, essential oils, saponins, carotenoids, lectins, vitamins, fiber and fatty acids. Guava fruit is higher in vitamin C than citrus (80 mg of vitamin C in 100 g of fruit) and contains appreciable amounts of vitamin A as well. Guava fruits are also a good source of pectin - a dietary fiber. The leaves of guava are rich in flavonoids, in particular, quercetin. Much of guava's therapeutic activity is attributed to these flavonoids.

The flavonoids have demonstrated antibacterial activity. Quercetin is thought to contribute to the anti-diarrhea effect of guava; it is able to relax intestinal smooth muscle and inhibit bowel contractions. In addition, other flavonoids and triterpenes in guava leaves show antispasmodic activity. [3, 4]

EXPERIMENTAL

Plant Material

The dried leaves of *P. Guajava* Linn was purchased from a local market in Bhopal, their origins were identified and proved by Dr. A K. Pathak, H.O.D. department of Pharmacy, Barkatullah University, Bhopal. Specimen of the plant parts were submitted as herbarium with number BUPH-4031 A.

Plant Extraction

Hydroalcoholic (1:1) extract was obtained by maceration of dried leaves of the plant *P. Guajava*. The extract was then dried and well stored.

Scavenging Effects of Plant on DPPH Radical

Free radical scavenging effect was determined using the free radical generator DPPH (2,2-diphenyl-1-picrylhydrazyl). Different concentrations of plant extract were prepared in methanol ranging from 25 µg/mL to 250 µg/mL. Standard DPPH solution containing 400 micromole DPPH was prepared in methanol. Standard DPPH solution was then mixed with test drug dilution at a ratio 1:3 i.e. 1mL of test extract was mixed with 3 mL of Standard DPPH solution in different properly closed containers. The mixtures were kept in the dark at a room temperature for 90 minutes. Absorbance of resulting solution was measured using spectrophotometer at 517 nm. [5, 6,7,8,9]

Scavenging activity was calculated by using equation:

$$\text{Scavenging activity (\%)} = \left(1 - \frac{\text{Absorbance of sample at 517 nm}}{\text{Absorbance of control at 517 nm}}\right)$$

The antioxidant activity is expressed as IC50. The IC50 value is the measure of concentration in µg/ml of extract that inhibits 50% of DPPH radicals. [10, 11]

Reducing Power of Herbal Plant Extract

The reducing power of nutraceutical herbs was determined according to the method of Oyaizu (1986). Extracts in 1 mL distilled water were mixed with phosphate buffer (2.5 mL, 2 M, pH 6.6) and potassium ferricyanide (2.5 mL, 1%); the mixture was incubated at 50ºC for 20 min. A portion (2.5 mL) of trichloroacetic acid (TCA, 10%) was added to the mixture which was then centrifuged at 1500g for 10 min. The upper layer of solution (2.5 mL) was mixed with distilled water (2.5 mL) and FeCl3 (0.5 mL, 0.1%), and the absorbance was measured at 700 nm. [12, 13]

RESULT AND DISCUSSION

IC_{50} value for *P. Guajava* linn leaves extract was found to be 45.5 µg/ml. Thus *P. Guajava* linn leaves possess moderate antioxidant activity as compared as standard. (Table 1)

The reducing power of *P. Guajava* linn leaves extract was studied using potassium ferricyanide reduction method, the amount of Fe2+ complex was then monitored by measuring the formation of Pearl's Prussian blue at 700 nm. Table 2 shows the reducing power of the test drug extract increased with increase in concentration. Increased absorbance of the reaction mixture indicated the increased reducing power, thus it is clear that *P. Guajava* linn leaves extract possess significant reducing power. (Table 2)

CONCLUSION

It is clear from the above results that the hydro-alcoholic extract from *P. Guajava* linn leaves possess moderate antioxidant activity as compared as standard. (Table 1)

P. Guajava extract was found to possess good reducing power as clear from the Table 2. Thus *P. Guajava* can be viewed as promising therapeutic drugs for free radical pathologies.

Table 1 Antioxidant activity by DPPH method

S.No.	Sample	IC50 value (µg/mL.)
1.	*P. Guajava* extract	45.5± 0.044
2.	Ascorbic acid (standard)	25.8± 0.204

The data are expressed as mean value ± SD (n =3). All values are significant at P< 0.05.
Calculated using Graph pad (ANOVA)

Table 2 Reducing power method

S.No.	Concentration (µg/ml)	*P. Guajava* Absorbance	Ascorbic acid absorbance
1.	20	0.483±0.002	0.33±0.001
2.	40	0.704±0.012	0.47±0.014
3.	60	0.815±0.01	0.62±0.200
4.	80	0.901±0.2	0.74±0.001
5.	100	0.982±0.006	0.82±0.010

The data are expressed as mean value ± SD (n =3). All values are significant at P< 0.05.
Calculated using Graph pad (ANOVA)

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