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Antioxidant potential of *tamarindus indica* seed coat

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ABSTRACT

The study is an attempt to investigate antioxidant activity of ethanolic extract of seed coat of *Tamarindus indica* by DPPH (2, 2-diphenyl-1-picrylhydrazyl) free radical scavenging method using ascorbic acid as standard. In the present study, the extract of *T. indica* seed coat was found to possess strong antioxidant activity. This activity of *T. indica* extract may be attributed to their free radical-scavenging ability. The extent of antioxidant activity of *T. indica* extract was found significant as compared to standard.

Keywords: *Tamarindus indica*; 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.1, 2

T. indica contains large number of poly phenolic compounds that may give antioxidant activity. The percentage profile of poly phenols in Tamarind pericarp was dominated by proanthocyanidins in various forms catechin, procyanidinB_2, epicatechin, procyanidin trimer, procyanidin tetramer, procyanidin pentamer, procyanidin hexamer and other compounds in less quantity. The present study is to determine the antioxidant capacity of ethanolic extract of seed coat of *T. Indica*. 3-5

EXPERIMENTAL

Plant material

T. indica seeds were collected in the month of June-July 2007 from local area of Bhopal and dried and authentified 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-4025 A.

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Materials chemicals

DPPH (1, 1-Diphenyl-2-picrylhydrazyl), gallic acid, potassium ferricyanide, phosphate buffer (P_H 6.6), trichloroacetic acid and ferric chloride. All other reagents were of analytical grade obtained from department of pharmacy, B.U. Bhopal.

Plant extraction

The seed coat of *T. indica* was separated by mechanical means using hand grinder. The powdered seed coat so obtained was then extracted with ethanol using soxhelation method. The extract was then dried and stored. Phytochemical screening of the extract was done and results shows the presence of proteins, tannins, glycosides and carbohydrates in ethanolic extract of *T. Indica* seed coat.

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. 6-10
Scavenging activity was calculated by using equation:

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

Table 1: Antioxidant activity by DPPH method

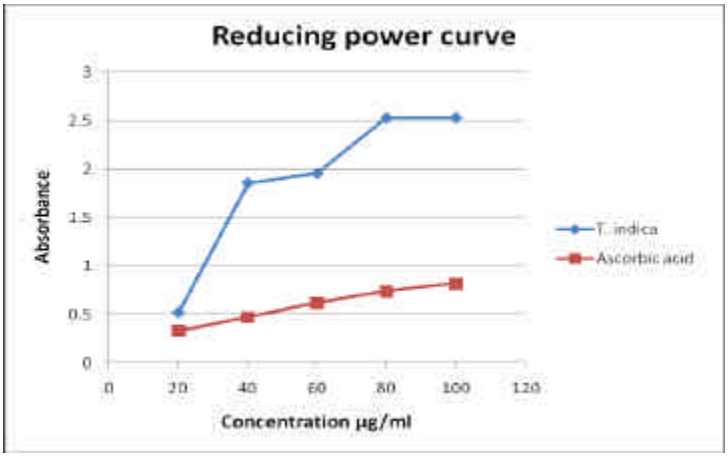
S. No.	Sample	IC_{50} value (µg/mL.)
1.	*Tamrindus indica* extract	25.24 ± 0.044
2.	Ascorbic acid (standard)	24.48 ± 0.204

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)	Sample Absorbance	Ascorbic acid Absorbance
1.	20	0.521±0.002	0.33±0.001
2.	40	1.860±0.012	0.47±0.014
3.	60	1.958±0.010	0.62±0.200
4.	80	2.530±0.200	0.74±0.001
5.	100	2.533±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)



Graph 1: Reducing power graph for *T. indica*

The antioxidant activity is expressed as IC_{50}. The IC_{50} value is the measure of concentration in µg/ml of extract that inhibits 50% of DPPH radicals. 11, 12

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 $FeCl_3$ (0.5 mL, 0.1%), and the absorbance was measured at 700 nm. 13, 1.

RESULTS AND DISCUSSION

IC_{50} value for *T. indica* seed coat ethanolic extract was found to be 25.24 ± 0.044 µg/mL and whereas for ascorbic acid it is 24.48 ± 0.204 µg/mL. Thus *T. indica* seed coat possesses significant antioxidant activity as compared with standard (Table 1).

The reducing power of T. indica ethanolic 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. Graph 1 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 *T. indica* seed coat ethanolic extract possess significant reducing power. (Table 2)

DISCUSSION AND CONCLUSION

It is clear from the above results that *T. indica* seed coat ethanolic extract possesses significant antioxidant activity. Thus it can be used as a new plant for the research to study various related activities of this plant**.**

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