Research Article

Antioxidant screening of a Medicinal Plant *Artocarpus heterophyllus*

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ABSTRACT

Normal metabolism of our body generates harmful free radicals which are not neutralized by the body's primary and secondary defense mechanisms. Research has demonstrated the role of antioxidants to protect the body from cell damage that can lead to cancer, heart diseases etc. *Artocarpus heterophyllus* belonging to family moraceae is an important medicinal plant. Many parts of the plant including the bark, roots, leaves, and fruit are attributed with medicinal properties. The present study was designed to investigate antioxidant potential of ethanol extract of bark material of the plant. DPPH radical scavenging assay and Superoxide radical scavenging assay were performed using ascorbic acid as standard. Hydroxy radical scavenging assay, Nitric radical assay and Hydrogen peroxide assay were studied with curcumin as standard. Reducing power assay was carried out with BHT as standard. Trolox Equivalent Antioxidant capacity was also investigated. IC_{50} values observed for DPPH, Trolox, Hydroxy radical scavenging assay, Hydrogen peroxide, Reducing power, Superoxide radical scavenging, Nitric radical assay were 40.81, 113.00, 60.14, 96.41, 50.50, 24.30, 52.76 µg/ml respectively. The results clearly indicate that the bark extract has the potential to be effective antioxidant.

Keywords: DPPH, Trolox, Hydrogen peroxide, Reducing power.

INTRODUCTION

Reactive oxygen and nitrogen free radicals are produced during immune activity, and are triggered by several environmental factors such as pollution, smoke, and sunlight. Plants are rich source of antioxidants, which is evinced through many reports on medicinal plants with antioxidant potential. [1-4]

Identification of natural product antioxidants has become a realistic and powerful tool in the dietary and natural products industry.

The genus Artocarpus (Moraceae) comprises about 50 species of evergreen and deciduous trees. Economically, the genus is of appreciable importance as a source of edible fruit, yield fairly good timber and is widely used in folk medicines. Artocarpus species are rich in phenolic compounds including flavonoids, stilbenoids, arylbenzofurons and Jacalin, a lectin. Several pharmacological studies of the natural products from Artocarpus have conclusively established their mode of action in treatment of various diseases and other health benefits. [5]

The jackfruit, Artocarpus heterophyllus, is one of the important medicinal plant from family Moraceae. Each and every part of the jack fruit tree is found to posses some valuable uses. [6]

MATERIALS AND METHODS

Collection of plant material

The plant material was collected from the jungles near Shri Sondavadiraj Math, Sonda, District Sirsi and Karnataka, India. It is authenticated at Botanical Survey of India, Pune, India. Its authentication number is BSI / WRC / Tech. / 2010/ 86.

Sample extraction

Air shade dried powdered plant material (bark) was extracted with 80 % ethanol by keeping it for 48 hours at room temperature. The solvent from the total extract is removed under vacuum to get the sticky mass (3.516 %).

DPPH radical scavenging assay

Ethanol extract of *Artocarpus heterophyllus* was subjected to free radical scavenging activity by the method of Brand-Williams et al. [7] Here, ascorbic acid was used as reference standard.

Trolox Equivalent Antioxidant Capacity

Trolox equivalent antioxidant capacity (TEAC) was estimated as 2,2'-Azino-bis(3- ethylbenzthiazoline)-6-sulfonic (ABTS) radical cation scavenging activity according to the method of Re et al.[8] Trolox was used as reference standard.

Reducing power assay

The reducing power of extracts was determined as per the method of Oyaizu. [9] BHT was used as reference standard.

Hydroxy radical scavenging assay

Hydroxy radical scavenging assay was carried out following the procedure of Anuj Malik. [10]

Curcumin was used as reference standard.

Hydrogen peroxide assay

The hydrogen peroxide scavenging assay was carried out following the procedure of Anuj Malik. [10] Curcumin was used as reference standard.

Superoxide radical scavenging assay

Superoxide radical scavenging assay was carried out following the procedure of Anuj Malik.[10] Ascorbic acid was used as reference standard.

Nitric radical assay

Nitric radical assay was carried out following the procedure of Sreejayan, Rao. [11] Curcumin was used as reference standard.

RESULTS AND DISCUSSION

The medicinal effects of plants are often attributed to the antioxidant activity of phytochemical constituents mainly phenolics, flavonoids and flavonols.

Several concentrations ranging from 2 – 1000 µg/ml of the ethanolic extract of *A. heteriphyllus* were tested for their antioxidant activity in different in vitro models. It was observed that free radicals were scavenged by the test compounds in a concentration dependent manner up to the given concentration in all the models. The result of various radical scavenging assays for IC_{50} values were calculated and are given in Table 1.

Table 1: Radical scavenging assay

Name of the assay	IC_{50} expressed in µg/ml	
	Extract	Standard
DPPH radical scavenging assay	40.81±2.84	5.74±0.16
Trolox Equivalent Antioxidant Capacity	113.00±16.11	15.40±0.56
Hydroxy radical scavenging assay	60.14±1.72	11.49±0.27
Hydrogen peroxide assay	96.41±3.07	8.53±0.75
Reducing power assay	50.50±4.09	15.09±1.03
Superoxide radical scavenging assay	24.30±2.09	9.57±0.30
Nitric radical assay	52.76±4.61	11.08±0.50

[N=3 Results are expressed as mean ± SEM]

CONCLUSION

The results of different in vitro antioxidant activity assays indicated that the bark extract possessed appreciable free radical scavenging effects. The study offers opportunity to find a novel secondary metabolite of therapeutic use.

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