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Analysis of Antioxidant activity of tubers of *Cyperus rotundus* Linn.

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Abstract

In the present study the antioxidant effect of the tubers of *Cyperus rotundus* Linn. collected from Kannauj (U.P.) was assessed. The methanol extract of tubers of *Cyperus rotundus* were evaluated for antioxidant activity by 1, 1-diphenyl – 2 – picrylhydrazyl (DPPH) radical scavenging activity and reducing power assay. The total phenolic contents were estimated by Folin ciocalteu and aluminium chloride methods, respectively. Total phenol compounds were expressed in terms of equivalent amount of gallic acid (GAE) which is using as standard. Gallic acid and ascorbic acid were used as a reference standard.

Key words: Cyperus rotundus, DPPH, Antioxidant, Ascorbic acid, Gallic acid, scavenging activity.

Introduction

Cyperus rotundus Linn. commonly known as Nagarmotha a cosmopolitan weed found in all tropical, subtropical and temperate regions of the world. It belongs to the family cyperacea[1-2]. The essential oil extracted from tubers of *cyperus rotundus* are utilized in various forms such as ointment, lubricant, lotions, perfumes, massage and incense[3-5]. It is said to possess antidiarrhoeal, anti-inflammatory and antipyretic activities[6, 7]. As per Ayurveda the tubers have carminative and demulcent property, they are used to treat the abdominal disorders particularly diarrhea, indigestion and flatulence. A paste of fresh tubers is useful to act as an effective galactagogue to the breast[8,9]. Romans used the tubers as emmenagogue in uterine complaints.

Tuber extracts may reduce nausea and act as a muscle relaxant. The major constituents present in C. rotundus are triterpenes, polyphenol, alkaloids flavonoids, glycoside and saponin. Antioxidants play an important role in inhibiting and scavenging radicals, thus

providing protection against infection and degenerative diseases. They can either directly scavenge or prevent generations of reactive oxygen species[9]. The plant species have been investigated in the search for novel antioxidants, but generally there is still a demand to find more information concerning the antioxidant potential of plant species as they are, safe and also bioactive[10,11,12]. In this study, the antioxidant activity of methanol extract of *Cyperus rotundus* was studied using various assay.

Material and Methods

Plant material and extraction :

The tubers of *Cyperus rotundus* were collected from Kannauj in the month of Oct.-Nov. and washed, cut into pieces, air dried and then powdered. The powdered tubers subjected to extraction by soxhlation. The extraction was done with solvent methanol, filtered, squeezed off and evaporated under pressure in a rotary evaporator to obtain crude extract.

Evaluation of antioxidant activity :

(1) DPPH radical scavenging activity :

The DPPH method was used for estimating free radical scavenging activity of methanolic extracts of tubers of *Cyperus rotundus*and standard were assessed. About 10-100 ml of extract was added to 2ml of DPPH in methanol in a test tube. Absorbance at 517 nm was determined after 30 min at room temperature using spectrophotometer. The scavenging activity were calculated as a percentage of the radical reduction. Ascorbic acid was used as reference compound.

(2) Reducing Power assay :

Different concentrations of methanolic extract of *Cyperus rotundus* 10 mg/ml – 100 mg/ml) was mixed with sodium phosphate buffer (pH 6.6) 2 ml of 1% potassium ferricyanide solution and incubated at 50^0C for 15 minutes. After cooling the solution were mixed with 2ml of 10% trichloroacetic acid. This mixture was centrifuged for 10 minutes 2 ml of supernatant liquid was mixed with 2 ml of distilled water and 0.5 ml of 0.1% ferric chloride solution. The solution was allowed to stand for 10 minutes. The absorbance was measured at 700 nm. Ascorbic acid was used as reference standard. Higher the absorbance, higher is the reducing power.

Estimation of total phenolic contents :

The total phenolic content was determined by Folin – ciocalteu assay. Different dilution of extracts was made up to 3.5 ml, then 0.5 ml Folin – Ciocalteu reagent followed by 2 ml of 7.5% sodium carbonate was added. The reaction was kept in the dark for 30 minutes. After which the absorbance was measured at 750 nm. Total phenol compounds were expressed in terms of equivalent amount of gallic acid.

Results and Discussion

The antioxidant properties of *Cyperus rotundus* have been evaluated by measuring their DPPH free radical reducing scavenging activity, reducing power assay and total Phenolic content. Phenolic compounds are known to be powerful chain breaking antioxidants. It may

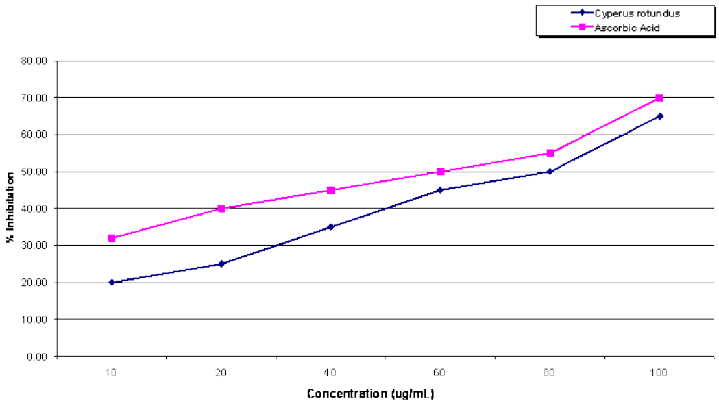

Figure 1. Free radical scavenging activity (DPPH).

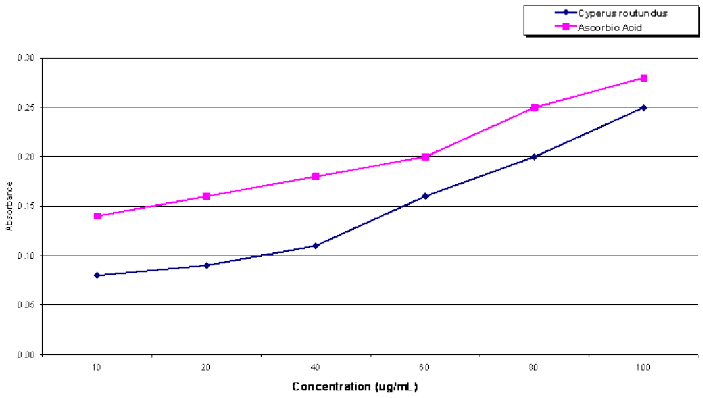

Figure 2. Reducing Power Assay

contribute directly to antioxidative action. The total phenolic content of the *Cyperus rotundus* measured by Folin-Ciocalteu reagent in terms of gallic acid equivalent.

The DPPH antioxidant assay based on the ability of DPPH a stable free radical to decolorize in the present of antioxidants. The resulting decolorization is stoichiometric with respect to numbers of electrons captured. The reduction capability of DPPH radicals was determined by decrease in its absorbance at 517 nm induced by antioxidants. Fig. 1 shows the curve of DPPH radical scavenging activity of *Cyperus rotundus*, compared with ascorbic acid, as standard. At a concentration of 100 mg/ml, the scavenging activity of methanol extract was 65%, while at the same concentration, that of standard ascorbic acid was 70%. The study showed that the extracts have the proton – donating ability and could serve as free radical scavengers, acting possibly as primary antioxidants.

The reducing power of *Cyperus rotundus* was very potent and the power of extract was increased with quality of sample. Fig. 2 showed the value of ferric reducing antioxidant ability with value of 30% in *Cyperus rotundus*. The methanolic extractcould

reduce the most Fe^{3+} ions which had a lesser reductive activity than the standard of ascorbic acid. Higher the value of absorbance indicated higher reducing power.

Conclusion

The present investigation shows that methanolic extract of *Cyperus rotundus* exhibits antioxidant and free radical scavenging ability. The strongest antioxidant activity of methanol extracts could be due to the presence of flavonoids and phenols. Presence of significant quantity of antioxidant as reflected from our studies may prove the pharmacological importance of this plant. The present study is in agreement with the earlier investigations. Based on the results obtained it can be suggested that this herb can be used as potent natural antioxidant which may be helpful to prevent various degenerative diseases.

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