EVALUATION OF PHYTOCHEMICALS, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITY OF *DRYMARIA CORDATA*

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Abstract: *In the present study*, *Drymaria cordata* collected from Golaghat district was analysed for phytochemical constituents, antioxidant activity and antimicrobial property. Saponin, tannin, phenol, flavonoid, terpenoid, cardiac glycoside, alkaloid and reducing sugar were present in the sample while steroid and anthraquinone were not detected in this study. The results showed significant amount of antioxidant activity and antimicrobial activity. Extracts of the plant were better/equally effective against tested organisms as compared to streptomycin. The study provides a scientific basis for the use of the plant extracts in traditional health care system.

Key words: *D. cordata*, phytochemical, antioxidant, antimicrobial activity

I. INTRODUCTION

Plants are the major source of medicines which play a vital role in maintenance of human health since long back. The importance of plants increasing day by day with the current global trends of shifting to obtain drugs from plant sources. The medicinal properties of the plants lie in chemical substances that produce a definite physiological action on the body of the human (Edeoga et al, 2005).

Drymaria cordata (Linn.) Willd belonging to family Caryophyllaceae grows wild in Assam. It has wide range of traditional application, juice of the whole plant is used in the treatment of sinusitis, bronchitis, headache, cold etc. by the local people of Assam. Akindele et al (2012) reported analgesic and antipyretic activities of this plant. The present study aims to find out the scientific basis for the use of this herbaceous plant in traditional health care system by analysing the phytochemical constituents, antioxidant and antibacterial activity.

II. MATERIALS AND METHODS

Collection and processing of plant material: *D. cordata* were collected from Kamargaon area of Golaghat district of Assam, shade dried and then powdered. The powdered was separately macerated with ethanol, methanol, chloroform, petroleum ether and distilled water for 48 hours and filtered using Whatman filter paper No. 1. The filtrate was then evaporated at a constant temperature of 50^{o}C until sticky mass of plant extract was obtained. Now the extract is kept in refrigerator for further use. This crude extract was dissolved in Dimethyl sulphoxide (DMSO) as neutral solvent to make final concentration for biochemical analysis.

Experimental

The qualitative phytochemical study was performed following the standard laboratory methods described by Aja et al., 2010 and Ajayi et al, 2011. Antioxidant activity study was performed using DPPH method as described by Anti-Stanojevic et al, 2009. The antimicrobial activity test was carried out by agar well diffusion method described by Nair et al, 2005 using 6mm borer. The activity was determined by measuring the diameter of zone of inhibition (ZOI) exhibited by the extract. Bacterial strains viz, *Bacillus subtilis* (MTCC 441), *Bacillus cereus* (MTCC 8750), *Staphylococcus aureus* (MTCC 3160), *Staphylococcus epidermis* (MTCC 3615) and *Proteus vulgaris* (MTCC 744); were used in the study. Strains were obtained from the Microbial Type Culture Collection (MTCC), Institute of Microbial Technology (IMTECH), Chandigarh, India. Streptomycin (10mcg) were taken for comparison of ZOI with the solvent extracts of the plant.

III. RESULTS AND DISCUSSION

The phytochemical characters of the samples are presented in Table 1. Presence of alkaloids, tannins, saponin, terpenoid, flavonoid, phenol and cardiac glycoside and absence of anthraquinone and steroid were confirmed in the sample. These phytochemicals are playing vital role in the treatment of different diseases and therefore they are still used in modern as well as traditional system of medicine. Table 2 shows that plant contain good amount of antioxidant activity. From the table 3 it is found that plant extract extracts showed antimicrobial activity against *B. subtilis, B. cereus, Staphylococcus aureus, S. epidermis, P. vulgaris* with zones of inhibition ranging from 14 to 22 mm. However, the extraction method did affect the antibacterial activity of the plant extracts; because methanol, chloroform and aqueous extract did not show any inhibitory activity against all the test organisms.

From the present study, it is found that *D. cordata* have certain important phytochemicals, antioxidant and broad-spectrum antibacterial activity in significant amount. This plant has been in use for years to treat various ailments. This study provides a scientific basis for the use of the plant extracts in traditional health care system. Further studies are needed which lead to their use as safe alternatives to synthetic drugs. Detail work by using different solvents extracts and with different methods will be the aim of further investigation.

Table 1: Results of phytochemical screening of extracts of *D. cordata*

Constituents	Sample
Saponin	+
Phlobatanin	-
Tannin	+
Phenol	+
Flavonoid	+
glycoside	+
Cardiac glycoside	+
Alkaloid	+
Anthraquinone	+
Terpenoid	+
carotenoid	-
Steroid	-
Reducing Sugar	-

+ indicates presence of constituents and – indicate absence of constituents

Table 2: antioxidant activities of *D. cordata*

Sample	Antioxidant activity (% inhibition in mg/ml)
	DPPH radical scavenging activity
P. aquilinum	79.5
Ascorbic acid	87.2

Table 3: Antibacterial activity of different solvent extract of *D. cordata*

Bacteria	Zone of inhibition (mm)					
	Ethanol extract	Patroleum ether extract	Methanol extract	Chloroform extract	Aqueous extract	Streptomycin
Bacillus cereus	20	16	-	-	-	18
Staphylococcus aureus	14	20	-	-	-	20
S. epidermis	16	22	-	-	-	20
B.subtilis	16	22	-	-	-	20
Proteus vulgaris	16	20	-	-	-	16

ACKNOWLEDGEMENT

Authors are thankful to the Head, Department of Botany, DKD College Assam, India for providing necessary facilities.

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