PHOTOCHEMICAL STUDY AND INVITRO ANTIBACTERIAL ACTIVITY OF THE ETHANOLIC PLANT OF *ELEPHANTOPUS SCABER L*

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ABSTRACT

Elephantopus scaber L. (ES) belongs to family Asteraceae (*Tatmuli*), given in dysuria, urethral discharges, diarrhoea, snake bite and dysentery . The present study is aimed to carry out the preliminary phytochemical analysis and to screen *in vitro* antibacterial activity against some major urinary tract infection (UTI) causing pathogens.

Keywords: Elephantopus Scaber L, Phytochemical , Antibacterial

INTRODUCTION

According to World Health Organization, medicinal plants are the best source to obtain a variety of newer herbal drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants. Therefore, such plants should be investigated to better understand their properties, safety and efficacy. The use of plant extracts and phytochemical, both with known antimicrobial properties can be of great significance in therapeutic treatments. In the last few years, a number of studies have been conducted in different countries to prove such efficiency. Many plants have been used because of their antimicrobial traits, which are chiefly due to synthesized during secondary metabolism of the plant. Human beings have depended on nature for their simple requirements as being the sources for medicines, shelters, food stuffs, fragrances, clothing, flavours, fertilizers and means of transportation throughout the ages. For the large proportions of world's population medicinal plants continue to show a dominant role in the healthcare system and this is mainly true in developing countries, where herbal medicine has continuous history of long use. The development and recognition of medicinal and financial aids of these plants are on rise in both industrialized and developing nations [1] .Most of the important drugs of the past 50 years, which have revolutionized modern medicinal practice, have been isolated/derivative from plants. These chemical ingredients exhibit therapeutic properties of plant and animal drugs. The WHO endorses and promotes the addition of herbal drugs in national health care programs because they are easily accessible at a price within the reach of a common man and are time tested and thus considered to be much safer than the modern synthetic drugs [2]. Thus, the research of pharmacologically/ biologically active agents obtained by screening natural sources such as plant extracts had led to the detection of many pharmaceutically valuable drugs that play a key role in the treatment of human diseases [3]. The phytochemical-pharmacological research work has recently yielded effective solutions to certain diseases which synthetic drug industry has failed to afford. E. scaber has been used as traditional medicine in many

countries. In Thailand, it has been used as traditional medicine. In Brazil, the decoction of whole plant is used to stimulate diuresis, reduce fever and eliminate bladder stones, febrifuge, and diaphoretic against cough, bronchitis, and asthma 4 . In Malaysia, decoction of E. scaber root has been used to accelerate contraction of abdominal area and prevent inflammation after childbirth. Besides, whole E. scaber was also boiled with red bean to remove flatulence 5. In Thailand people have used E. scaber to treat cough, as a tonic (root decoction) 6, chapped lips and galactogogue (whole plant decoction) 10. It has also been used in Madagascar as an antipyretic agent (decoction of aerial part) 7; in Taiwan (whole plant decoction) to treat hepatitis; in Nigeria (hot water extract of leaves) to cure arthritis and in Mauritius to treat diarrhoea, urinary problems and pimples (root paste) 8 . In India whole plant of E. scaber are used for the treatment of toothache as a toothbrush 9

In the present experiment we are studying the pyhtochemical analysis and invitro antibacterial activity of ELEPHANTOPUS SCABER L

MATERIAL AND METHODOLOGY

The plants were collected from the tribal belts of Bolangir District of Orissa, India on the basis of their ethnomedicinal uses. The plants were identified, confirmed and authenticated by the taxonomist of Department of Botany, P.N. College, Khurda, and Orissa. After authentification leaves were collected in bulk, washed, shade dried and extracted with ethanol for 48 hrs in a Soxhlet assembly. The extracts were concentrated, percentage yield calculated and then subjected to preliminary phytochemical analysis. The *in vitro* screening for antimicrobial study was carried out using selected urinary tract infection (UTI) causing pathogens which includes two gram positive bacteria *(Staphylococcus aureus and Enterococcus faecalis)* and three gram negative bacteria *(Escherichia coli, Pseudomonas aeruginosa* and *Proteus mirabilis)*. Five strains each of 5 UTI causing bacterial species were used in this study which was procured from Post Graduate Department of Microbiology, Orissa University of Agriculture and Technology, Bhubaneswar, Orissa. These organisms were identified by following the standard microbiological methods The antibacterial screening of

the extracts were carried out by determining the zone of inhibition using disc diffusion method. The strains of microorganisms obtained were inoculated in conical flask containing 100 ml of nutrient broth. These conical flasks were incubated at 37^0 for 24 h and were referred to as seeded broth. The density of the bacterial suspension was standardized by standard McFarland method The extracts were dissolved in dimethyl formamide which was previously tested for antibacterial activity against all test bacteria and found to have no antibacterial activity. The extracts were made solution at a concentration of 50 mg/ml and finally sterilized by filtration using 0.45 µm Millipore filters. The sterile discs (6 mm in diameter) were impregnated with 20 and 2.5 µl of above extract solution to achieve desired concentration of 500 and 250 µg/disc and placed in inoculated agar. Gentamicin (G) (10 µg/disc) and Ciprofloxacin (CF) (25 µg/disc) were used as standards. The controls were prepared using the same solvents employed to dissolve the extracts. The inoculated plates with the test and standard discs on them were incubated at 37^0 for 24 h.

RESULT AND DISCUSSION

The leaves of LG, VP and ES were extracted with ethanol in Soxhlet assembly for 48 hrs and the percentage yield of each extract is presented in Table 1. The extracts were subjected to preliminary phytochemical analysis, the result of which revealed the presence of the zone of inhibition is given, The antimicrobial activity in terms of zone of inhibition was shown in Table 2

Phytoconstituents	LG	VP	ES
Carbohydrate	+	-	-
Tannin	+	+	-
Alkaloid	+	+	+
Flavonoids	-	+	+
Saponin	-	+	+
Steroid	-	-	+
Glycoside	-	-	+

TABLE 1: Phytochemical analysis

Organisms	Conc. (µg/ml)	Zone of inhibition (in mm)				
		Extracts			Standards	
		LG	VP	ES	CF	G
1	a	12.1±0.23	15.7±0.5	15.9±0.61	28.0±0.41	10.8±0.8
	b	9.2±0.38	10.1±0.65	11.5±0.3		
2	a	13.2±0.51	17.5±0.13	17.7±0.5	26.4±0.23	25.8±0.55
	b	8.7±0.4	12.6±0.3	13.5±0.5		
3	a	10.6±0.8	16.3±0.15	17.0±0.7	25.6±0.18	26.6±0.6
	b	8.1±0.56	11.4±0.6	12.4±0.43		
4	a	14.9±0.34	17.8±0.52	19.8±0.7	24.5±0.71	25.4±0.45
	b	11.8±0.27	13.4±0.2	14.5±0.4		
5	a	15.1±0.6	15.0±0.31	17.3±0.9	25.3±0.52	24.5±0.7
	b	10.2±0.15	9.7±0.5	12.4±0.67		

.Table 2 : Antibacterial properties

The antibacterial activity of the ethanolic extracts has been shown. Among the extracts, ES exhibited highest activity against all the tested strains. It showed highest activity against *P. mirabilis* (19.8±0.7 µg/disc) and the lowest activity against *E. coli* (11.5±0.3 µg/disc) at 500 and 250 µg/disc respectively. VP extracts also exhibited good inhibitory activity against all the tested microorganisms and the highest activity was found against *P. mirabilis* (17.8±0.52 µg/disc) and lowest against *S. aureus* (9.7±0.5 µg/disc) at 500 and 250 µg/disc respectively. LG showed highest and lowest activity against *S. aureus* (15.1±0.6 µg/disc) and *P. aeruginosa* (8.1±0.56 µg/disc) at 500 and

250 µg/disc respectively. The observed activity may be due to the presence of potent phytoconstituents in the extracts.

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