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EFFECT OF EXTRACTS FROM *ASPARAGUS RACEMOSUS* WILLD ROOT AGAINST PATHOGENIC BACTERIA

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ABSTRACT : Bactericidal activity of crude extracts from *Asparagus racemosus* were screened against eight pathogenic strains which belongs to *Bacillus subtilis, Staphylococcus aureus, Micrococcus luteus*, *Escherischia coli, Vibrio cholerae, Shigella dysenteriae , Shigella flexneri and Pseudomonas aeruginosa*. The chloroform and ethanolic extract exhibited predominant antibacterial activity against all the bacteria tested. The chloroform extract showed higher zone of inhibition than ethanolic extract. In case of both extract Gram positive bacteria were found to be more sensitive than those of Gram negative bacteria. The inhibition of both Gram positive and Gram negative bacteria by the solvent extracts indicated the presence of broad spectrum antibacterial substances in the plant root. The result was promising and supported the traditional use of *Asparagus racemosus* in several ailments.
Key words: Antibacterial activity, *Asparagus racemosus*, pathogenic bacteria

INTRODUCTION

From the time immemorial plants were used to eliminate pain and for the treatment of various diseases. In recent times World Health Organization is taking an official interest in this to develop the traditional system of health care. Special attention has been given on folk medicine as safety for microbial and nonmicrobial diseases (WHO, 1978). A large number of new antibiotics are introduced in the world market and at the same time microorganisms develop resistance. In the past few years most of the research work was conducted in plants to isolate bioactive compounds and formulated in various forms. Most of the herbal medicines are having a good response in the treatments. *Asparagus racemosus* Willd belongs to the family Aspragaceae traditionally used as anthelmintic, antiseptic, antidiarrhoeal and antidysenteric (Dhiman, 2005). This plant is recommended in Ayurvedic tests for prevention and treatment of gastric ulcers, dyspepsia and as a galactogogue. *A. racemosus* has been successfully employed by some ayurvedic practitioners for inflammation, nervous disorder, liver diseases and certain infectious diseases. However no scientific proof justifying the various traditional and folk use of this plant is available so far. In the present study, the preliminary phytochemical screening and antibacterial activity against selected bacteria have done.

MATERIALS AND METHODS

Plant material

The plant materials were collected from Birbhum district of West Bengal, India and authenticated by Prof. G. G. Maity, Plant taxonomist; Department of Botany, University of Kalyani and the voucher specimen (SNSAR73) were deposited in the Department of Botany, University of Kalyani. Plant materials were shade-dried at room temperature. It was then powdered and the powdered drug was standardized according to the WHO guidelines. The course powder was extracted and extract was used for further studies.

Extraction

Sixty grams(60g) of dried coarsely powdered drug of *Asparagus racemosus* was extracted with water(280 ml for 7 days) by maceration process and chloroform and ethanolic extracts(280 ml for 3 days) were prepared by soxhlet method(Cooper and Gunns, 2005). All the extracts were completely dried under vacuum. The dried extracts were then used for phytochemical analyses and antibacterial activity.

Phytochemical screening

Dried extracts were investigated by various chemical tests (Harbore, 1973).

Antibacterial screening

The antibacterial activities of different extracts were studied by disc diffusion method against, *Bacillus subtilis, Staphylococcus aureus, Micrococcus, Escherichia coli, Vibrio cholerae, Shigella dysenteriae, Shigella flexneri* and *Pseudomonas aeruginosa*. The bacterial cultures were procured from IG and BG Hospitals, Calcutta.

All the bacteria were inoculated in SBCB media and incubated at 37^0C for 4h. It produces a turbid solution and then it may dilute with same media and compared with the standard. This level is equivalent to $3.0x10^8$cfu ml^{-1} (John *et. al*.2006).

Disc- Diffusion assay:

Mueller –Hinton agar media (Perez *et.al*., 1990) was prepared and transferred to sterilized petriplates and allowed to solidify. A suspension of inoculum was added to media and swabs the entire surface of the agar media. The inoculums were uniformly distributed to the surface of the media by rotating the petriplate. Sterilized discs (5mm in diameter) dipped in solutions of the various extracts of different concentrations; standard and control were placed on the surface of agar plates. The plates were left for 1h at room temperature as a period of pre incubation diffusion to minimize the effect of variation in time between the applications of different solutions. Now all the plates were incubated at 37^0C for 18 h and observed for antibacterial activity. The diameter of the inhibition zones was observed and measured. The average area of zone of inhibition was calculated and compared with that of the standards.

RESULT AND DISCUSSION

The phytochemical analysis of the extract showed the presence of carbohydrates, steroids, tannins, alkaloids and phenolic compounds. Chloroform and ethanolic extracts were subjected to antibacterial activity against *Bacillus subtilis, Staphylococcus aureus, Micrococcus luteus, Escherichia coli, Vibrio cholerae, Shigella dysenteriae, Shigella flexneri* and *Pseudomonas aeruginosa*. The results are showed in Table1. In this study, Chloroform extract exhibited significant activity against Bs *Bacillus subtilis* and moderate activity against *Staphylococcus aureus* and *Shigella dysenteriae* at a concentration of 25µgml^{-1}, 50 µgml^{-1} 100 µgml^{-1} when compared with the standard ciprofloxacin 5 µgml^{-1}. Ethanolic extract showed that both chloroform and ethanolic extract of *Asparagus racemosus* root have potent antibacterial activity. Gram positive and Gram negative bacteria were equally affected by the root extract of *A.racemosus* indicating the presence of broad spectrum antibacterial substance in the plant.

Table I: Antibacterial activity of various extracts of *Asparagus racemosus* root

Sample	Extract	Concentration (µgml^{-1})	Inhibition Zone (mm)							
			Bs	*Sa*	*Ml*	*Ec*	*Vc*	*Sd*	*Sf*	*Pa*
Asparagus racemosus	Chloroform extract	25	22	20	18	16	20	18	16	20
		50	24	22	21	19	21	20	18	22
		100	27	24	25	22	23	23	21	24
	Ethanolic extract	25	19	18	18	16	18	18	18	18
		50	21	22	20	18	20	22	20	20
		10	23	24	24	20	24	24	22	24
Control	Chloroform		0	0	0	0	0	0	0	0
	Ethanol		0	0	0	0	0	0	0	0
Standard antibiotic	Ciprofloxacin		25	32	30	24	26	32	30	32

Bs Bacillus subtilis,Sa Staphylococcus aureus,Ml Micrococcus luteus, Ec Escherichia coli, Vc Vibrio cholerae, Sd Shigella dysentrae , Sf Shigella flexneri, Pa Pseudomonas aeruginosa.

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