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Antibacterial Activity of plant *Asparagus racemosus* of Root Extract

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Abstract

Antibacterial activity of plant *Asparagus racemosus* belonging to family LIliaceae ,was evaluated some selected human pathogenic microorganism (*Pseudomonas aeroginosa,Escherichia coli, Staphylococcus aureus*) following agar well diffusion method using different concentration (60%, 80%, 100%). Two solvents Methanol and Acetone were used for extraction. It was concluded from the results that Methanolic as well as Acetone root extract of *Asparagus racemosus* of were quite effective in inhibiting growth of *staphylococcus aureus* bacteria. Therefore, the root extract of this plant can be selected for further investigation to determine their therapeutic potential.

Key words: Asparagus racemosus plant,Liliaceae, Antibacterial activity, Agar well diffusion method.

Introduction

In Indian system of medicine *Asparagus racemosus* is an important medicinal plant and it's root paste or root juice has been used in various ailments and as health tonic[1,2]. The major active constituents of *Asparagus racemosus* are steroidal saponins. Isoflavones, asparagamine, racemosol, polysaccharides, mucilage, vitamins A, B1, B2, C, E, Mg, P, Ca, Fe, and folic acid present in roots. Other primary chemical constituents of *Asparagus* are essential oils, asparagine, arginine, tyrosine, flavonoids (kaempferol, quercetin, and rutin), resin, and tannin[3]. This herb is highly effective in problems related with female reproductive system. Charak Samhita written by Charak and Ashtang Hridyam written by Vagbhata, the two main texts on Ayurvedic medicines, list *Asparagus racemosus* as part of the formulas to treat women's health disorder[4-7]. *Asparagus racemosus* is used for prevent ageing increase longetivity, impart immunity, improve mental function, nervous disorders, dyspepsia, tumors, inflammation, neuropathy and hepatopathy[8]. Roots & rhizomes of asparagus racemosus potent antioxidant, antitussive, antidyspepsia, antiulcer and anticancer activity[9]. The herb contains several active constituents which are useful in treating many diseases. It mainly contains steroidal saponin, aglycons as asparagin which is an anticancer agent

and other pharmacologically important constituent[10]. A study of ancient classical Ayurvedic literature claimed several therapeutic attributes for the root of *Asparagus racemosus* and has been specially recommended in cases of threatened abortion and as a galactogogue . Root of *Asparagus racemosus* has been reffered as bitter, sweet, emollient, cooling, nervine tonic, constipating, galactogogue, aphrodisiac, diuretic, Rejunvenating, carminative, stomachic, antiseptic and as a tonic[11]. In the present investigation, the root extract of *Asparagus racemosus* prepared by various extraction processes using different solvents was screened for potential antibacterial activity against both gram positive and gram negative strains of bacteria.

Material and Method

Collection of plant material :

The roots of *Asparagus racemosus* were collected from Nature nursery, Pipliyapala, Choithram square, Dist. Indore (M.P.), India. The collected plant material was brought to laboratory for further analysis. Plant was identified by botany Department from Gujarati Science college, Indore.

Processing of plant material :

The collected *Asparagus racemosus* roots were taken and washed thoroughly under water. The root was cut into small pieces and Cleaned dried for 25 to 30 days. The dried plant material was crushed into fine powder. Finally the fine powder was stored in air tight container at room temperature.

Preparation of root extract of asparagus racemosus :

Dried root powder was taken in which 200 ml of Methanol and Acetone added separately in the flask. The flasks were covered with aluminum foil & allowed to stand 6 to 7 days for extraction. The extract was filtered through whatmann filter paper no. 1 and evaporated at 50°c using rotatory evaporater. The extract was collected and stock solution 60 mg/ml was prepared.

Procurement of bacteria:

Bacterial strains used for determining antimicrobial activities of root extract of *Asparagus racemosus* procured from Department of Biotechnology, PMB Gujarati Science college, Indore (M.P.), India. Pathogens are used for the study of *Escherichia coli, Staphylococcus aureus, and Pseudomonas aeroginosa.*

Screening of antibacterial activity Methanolic and Acetone extract of Asparagus plant:

The preliminary screening of antibacterial activity was conducted at 1000 µg/ml concentration by disc-diffusion method Straptomycin 30 µg /disc (Himedia)and erythromycin 15 µg /disc (Himedia) were used as positive control while respective solvent was used as negative control on all the bacteria to compare the zone inhibition with that of the extract sample[12].

Screening of root extract (Methanol and Acetone) *Asparagus* plant was done agar-well diffusion method. Nutrient agar medium (Beef extract 1g, Yeast extract 2g, Sodium chloride 1g, Peptones 5gm, Agar-agar 20 g, Distill water 1000 ml was used throughout the investigation). The medium was autoclaved at 121.6°C for 30 min. and poured into petri plates. Bacterias were grown nutrient broth for 24 hours.

A 100 µl of Bacterial suspension was spread on each nutrient agar plates. Agar wells of 8mm Diameter were prepared with the help of sterilized stainless steel Cork borer in each petri plates. The wells in each plate were loaded with 60%, 80% and 100% concentration of prepared extract of *Asparagus racemosus*. The petri plates kept as control contained pure solvent in the well. The plates were incubated at 37± 2°c for 24 hours in the incubation chamber. The zone of growth inhibition was calculated by measuring the Diameter of the inhibition zone around the well including the well Diameter. The readings were taken in perpendicular direction for all the 3 replicates and the average values were tabulated. Percentage inhibition of growth of bacterial microorganism was calculated after subtracting control from the values of inhibition Diameter using control as standard[13].

Table 1 Percent inhibition of growth of human pathogenic bacterial spp. At different concentration of Methanolic Extract of *Asparagus racemosus*:

Concentration of Methanolic Extract of *A. racemosus* (In %)	Inhibition zone diameter (In mm)		
	S. aureus	***E.coli***	***P. aeruginosa***
Control	Nil	Nil	Nil
60	14	11	10
80	16	14	12
100	19	16	14

Table 2 Percent inhibition of growth of human pathogenic bacterial spp. At different concentration of Acetone extract of *Asparagus racemosus*:

Concentration of Acetone Extract of *A. racemosus* (In %)	Inhibition zone diameter (In mm)		
	S. aureus	***E.coli***	***P. aeruginosa***
Control	Nil	Nil	Nil
60	14	11	10
80	15	14	12
100	17	16	13

Result and Discussion

The present study brings out that methanolic and acetone root extract of *Asparagus Racemosus* proved itself as good antibacterial agent. The metanolic extract of *Asparagus racemosus* showed considerable growth inhibition of test bacteria at different concentrations (60%, 80%, 100%) as compared to acetone root extract of the plant. The methanolic root extract of *Asparagus racemosus* was found to be most effective against *S.aureus*at (19mmat 100%) followed by (16mm at 80%), (14mm at 60%), and it offered minimum inhibition in *P. aeruginosa* (14mm at100%), (12mm at 80%), and (10mm at 60%) as given in table 1. The acetone extract of *Asparagus racemosus* was found to be most effective against *S.aureus* at (17mm at 100%)followed by (15mm at 80%), (14mm at 60%), and it showed minimum inhibition towards *P. aeruginosa* (13mm at 100%), (12mm at 80%), and (10mm at 60%) shown in table 2.

It was concluded from the results that methanolic as well as acetone root extract of *Asparagus racemosus* were quite affective in inhibiting the growth of *staphylococcus aureus* which is considerd as serious human pathogen causing infections in wounds. The possible reasons for this antibacterial activity of *Asparagus racemosus* are presence of alkaloids, phenolics, and flavanoids in its leaves[14]. Majority of photochemical components are known to produce the theraperutic activity like antibacterial, antifungul and antioxidant etc.[15]. These finding are in accordance with the work carried out by Salie[16] and Kannabiran[17].

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