



A COMPARATIVE STUDY ON ANTIMICROBIAL ACTIVITY OF ROOT EXTRACT OF *GLYCYRRHIZA GLABRA* AND LEAVES EXTRACT OF *ASPARAGUS RACEMOSUS*

Dr. Roli Shukla*

Department of Chemistry Govt. MLB, Bhopal (M.P.)

*Corresponding Author's E mail: k2pavni@gmail.com

Received 15 Mar. 2018; Revised 18 Mar.2018; Accepted 28 Mar. 2018, Available online 15 Apr. 2018

ABSTRACT

This study was carried out to evaluate the antimicrobial activity of Hydroalcoholic extract (80% ethanol) of *Glycyrrhiza glabra* root and *Asparagus Racemosus* leaves. The antimicrobial activity was determined by the well diffusion method against two bacterial strains, i.e *Staphylococcus aureus* and *Klebsiella pneumoniae*. The results indicated that plant extracts potent as antimicrobial agent at the concentration of 100mg/ml.

Keywords: Comparative Study, Antimicrobial Activity, *Glycyrrhiza Glabra*, *Asparagus Racemosus*.

INTRODUCTION

Natural products of higher plants may give a new source of antimicrobial agents with possibly novel mechanisms of action ¹⁻². The effects of plant extracts on bacteria have been studied by a very large number of researchers in different parts of the world ³. Much work has been done on ethnomedicinal plants in India ⁴. Plants are rich in a wide variety of secondary metabolites such as tannins, terpenoids, alkaloids, flavonoids, glycosides, etc., which have been found *in vitro* to have antimicrobial properties.

Mulathi (*Glycyrrhiza glabra*) is of considerable importance in term of its medicinal and aromatic values. *Glycyrrhiza glabra* is also known as licorice/Liquorice, sweet wood, mulahatli and yastimadhu ⁵. This plant belongs to Fabaceae family (Genus, *Glycyrrhiza*) and is native of south-east Europe and south-west Asia, including Iran. The roots of *G. glabra* are rich in bioactive compounds like antiviral, anticancer, anti-ulcer, anti-diabetic, anti-inflammatory, antioxidant, antimalarial, antifungal, anti-bacterial, estrogenic, anti-allergenic and expectorant activities ⁶⁻⁷.

Asparagus racemosus have numerous medicinal usages which have been reported in the Indian and British Pharmacopoeias and in indigenous systems of medicine. The plant is also known as Shatavari which means "she who has hundred husbands" which indicates to the rejuvenative effect of the herb on the female reproductive organs ⁸⁻⁹. Root of *A. racemosus* has been referred as bitter-sweet, emollient, cooling, nervine tonic, constipating, galactagogue, aphrodisiac, diuretic, rejuvenating, carminative,

stomachic, antiseptic¹⁰ and as a tonic. Beneficial effects of the root of *A. racemosus* are suggested in nervous disorders, dyspepsia, diarrhoea, dysentery, tumors, inflammations, hyperdipsia, neuropathy, hepatopathy¹¹, cough, bronchitis, hyperacidity and certain infectious diseases.

METHODS

Plant materials and preparation of extracts¹²⁻¹³

Fresh plant materials used in this study consisted of *Glycyrrhiza Glabra* (Root) and *Asparagus Racemosus* (Leaves) which were collected from local areas of Bhopal. The air-dried plant materials were grounded into coarsely powder and extracted with 80% ethanol. After filtration of total extracts, the extracts were evaporated to dryness and weighted.

Bacterial cultures

Two bacterial strains *Staphylococcus aureus* and *Klebsiella pneumoniae* were used for testing the activity.

Preliminary Phytochemical Screening¹⁴

The extracts were subjected to preliminary phytochemical testing to detect for the presence of different chemical groups of compounds. Crude extracts of plant materials were screened for the presence of saponins, phenol, alkaloids, flavonoids, glycosides, carbohydrates, protein and amino acids using standard procedure.

Antimicrobial activity testing¹⁵

Well diffusion method was used to test the Antimicrobial activity of *Glycyrrhiza Glabra* (Root) and *Asparagus Racemosus* (Leaves) at different concentrations, against microorganisms. The nutrient agar media was prepared, sterilized and poured in the petriplate. After the media solidified, the inocula were spread on the solid plates with sterile swab moistened with the microorganism suspension. Ciprofloxacin is taken as standard for bacteria. Extracts of *Glycyrrhiza Glabra* and *Asparagus Racemosus* (Concentration: 100 mg/ml, 50 mg/ml, and 25 mg/ml,) of 50 µl each were added in well. The plates were incubated at respective temperature for 24 hrs. Then, the antimicrobial activity was determined by measuring the diameter of zone of inhibition.

RESULTS

Preliminary phytochemical screening

Table 1: Phytochemical screening of 80% ethanolic extracts of *Glycyrrhiza Glabra* (Root) and *Asparagus Racemosus* (Leaves)

S. No.	Constituents	G. Glabra	A. Racemosus
1.	Saponin	-ve	+ve
2.	Phenols	+ve	+ve
3.	Alkaloids	+ve	-ve
4.	Flavonoids	+ve	+ve
5.	Glycosides	-ve	-ve
6.	Carbohydrates	+ve	+ve
7.	Protein and amino acids	+ve	-ve

Table 2: Antimicrobial activity of standard drug

S. No.	Name of Drug	Microbes	Zone of inhibition		
			10 µg/ml	20 µg/ml	30µg/ml
1.	Ciprofloxacin	<i>Staphylococcus aureus</i>	14±0.5	19±0.57	25±0.74
		<i>Klebsiella pneumoniae</i>	13±0.57	17±0.5	22±0.86

Table 3: Antimicrobial activity of 80% ethanolic extracts of *Glycyrrhiza Glabra* and *Asparagus Racemosus*

S. No.	Name of Drug	Microbes	Zone of inhibition		
			25 mg/ml	50 mg/ml	100mg/ml
1	<i>Glycyrrhiza Glabra</i>	<i>Staphylococcus aureus</i>	10±0.5	13±0.57	15±0.74
		<i>Klebsiella pneumoniae</i>	9±0.74	10±0.5	12±0.86
2	<i>Asparagus Racemosus</i>	<i>Staphylococcus aureus</i>	8±0.86	11±0.5	13±0.74
		<i>Klebsiella pneumoniae</i>	12±0.57	15±0.5	17±0.5

DISCUSSION

The above results show that the activity of 80% ethanolic extracts of *Glycyrrhiza Glabra* and *Asparagus Racemosus* shows significant antibacterial activity. This study also shows the presence of different phytochemicals with biological activity that can be of valuable therapeutic index. The result of phytochemicals in the present investigation showed that the plant contains more or less same components like saponin, phenol, carbohydrates, flavonoids, proteins and amino acids.

CONCLUSION

The hydroalcoholic extracts of naturally growing and cultivated *Glycyrrhiza Glabra* and *Asparagus Racemosus* showed appreciable antibacterial properties. The results of phytochemical study showed the presence of phenols, flavonoids and alkaloids etc. The phytoconstituents present in selected plants may responsible for various pharmacological studies.

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