

Antimicrobial Activity of Whole Plant of *Cyathula tomentosa*, Bark of *Scutellaria scandance* and Seed of *Cassia fistula*

Dwarika Prasad

Department of Chemistry, L.P. University, Phagwara - 144 411, Punjab, India.

(Received: 21 February 2012; accepted: 10 April 2012)

In the present investigation an attempt has been done to screen the antimicrobial activity of three commonly available medicinal plants of Garhwal region. The plants selected for the study are *Cyathula tomentosa*, *Scutellaria scandance* and *Cassia fistula*. These plants have been tested for their antimicrobial activity against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*, *Mycobacterium smegmatis*, *Salmonella typhi* and *Bacillus subtilis* which have been procured from S.B.S. P.G. Institute of Biomedical Science and Research Balawala Dehradun (UK). In this investigation the alcoholic extract of *Cyathula tomentosa* was found to be positive against the growth of all the bacteria cultures selected for the investigation. The alcoholic extract of bark of *Scutellaria scandance* was competent against *Klebsiella pneumoniae* and *Mycobacterium smegmatis* whereas the seeds of *Cassia fistula* were effective against *Salmonella typhi* and *Bacillus subtilis*.

Keywords: Antimicrobial activity, *Scutellaria scandance*, *Cassia fistula*, *Cyathula tomentosa*

Many research works have been done which aim at knowing the different antimicrobial and phytochemical constituents of medicinal plants and using them for the treatment of microbial infections (both topical and systemic applications) as possible alternatives to chemically synthetic drugs to which many infectious microorganisms have become resistant. During the last ten years the pace of development of new antimicrobial drugs has slowed down while the prevalence of resistance (especially multiple) has increased astronomically¹. The increase in number of antibiotic resistant bacteria is no longer matched by expansion in the arsenal of agents available to treat infections.

Literature reports and ethnobotanical records suggest that plants are the sleeping giants of pharmaceutical industry². They may provide natural source of antimicrobial drugs that will/or provide novel or lead compounds that may be employed in controlling some infections globally. *Cyathula tomentosa* (Kurru) belongs to family Amaranthaceae, is a perennial undershrub occurs throughout Garhwal Himalayas upto 600-2000 meter altitude, *Cyathula tomentosa* have been used in snake bite and has emetic properties The plant extracts were subjected to antibacterial activities. *Scutellaria scandens* belongs to the family Lamiaceae, is perennial erect shrub widely distributed in North.

Western Himalayas in India. *Scutellaria species* have been used as antiemetic medicine. *Cassia fistula* belongs to the family Leguminosae, *Cassia* species worldwide which are used in herbal medicine systems. This particular family of plants are used widely for their laxative actions. *Cassia*

* To whom all correspondence should be addressed.

fistula is no exception, it is often used as a highly effective moderate laxative that is safe even for children. *Cassia fistula* is also employed as a remedy for tumors of the abdomen, glands, liver, stomach, and throat, for burns, cancer, constipation, convulsions, delirium, diarrhea, dysuria, epilepsy, gravel, hematuria, pimples, and glandular tumors. In Ayurvedic medicine systems, the seeds are attributed with ant bilious, aperitif, carminative, and laxative properties. In Brazilian herbal medicine, the seeds are used as a laxative³.

Plant material

The whole plant of *Cyathula tomentosa*, *Scutellaria scandance* and *Cassia fistula* were collected from Baccheer District. Chamoli Utrakhand in the month of October and identified by Department Botany, P.G. College Gopeshwar where vaucher specimen were deposited.

Extraction

Exactly 150 g each of the powdered three plants were separately extracted in cold using 60% alcoholic for 4 days. The ethanol extract was concentrated to dryness through rotatory evaporator.

Sensitivity testing

The sensitivity testing of the extracts were determined using agar well diffusion method(4&6). The bacterial isolates were first grown in nutrient broth for 18 h before use. The inoculums suspensions were standardized and then tested against the effect of the two plant extracts at a concentration of 20 mg/ml each in DST medium. The plates were later incubated at

37°C ± 0.5°C for 24 h after which they were observed for zones of inhibition (Table 1). The effects were compared with that of the standard antibiotic streptomycin at a concentration of 1 mg/ml (Khan & Omotoso, 2003).

RESULTS AND DISCUSSION

Scutellaria scandance [Bark] extract showed positive tests for some bacterial cultures as given below:

Klebsiella pneumoniae

100 mg/ml ethanolic solution of *S. scandance* (bark) extract showed 24 positive control (Rifampcin) and 18 mm zone of inhibition against *Klebsiella pneumoniae*.

Mycobacterium smegmatis

100 mg/ml ethanolic solution of the extract showed 20 positive control (Rifampcin) and 15 mm zone of inhibition against *Mycobacterium smegmatis*.

Cyathula tomentosa [whole plant]

The extract showed positive tests for some bacterial cultures as.

Staphylococcus aureus

100mg/ml ethanolic solution of this extract showed 35 positive control (Rifampcin) and 11 mm zone of inhibition against *Staphylococcus aureus*.

Staphylococcus epidermidis

100 mg/ml ethanolic solution of this extract showed 17 positive control (Rifampcin) and 9 mm zone of inhibition against *Staphylococcus epidermidis*.

Table 1. Antibacterial activity of *Scutellaria scandance* and *Cyathula tomentosa* Extracts

Bacterial cultures	Plant extracts/zone of inhibition (in mm)[100 mg/ml]		
	1	2	3
<i>Staphylococcus aureus</i>	-	11	35
<i>Staphylococcus epidermidis</i>	-	09	17
<i>Klebsiella pneumniae</i>	18	11	24
<i>Mycobacterium smegmatis</i>	15	11	20

- =No inhibition

1. *Scutellaria scandance* (Barks).

2. *Cyathula tomentosa* (whole plant).

3. Positive control (Rifampcin).

Table 2. Antibacterial activity of extract of *Cassia fistula* (seed)

S.No.	Extract of seeds	Culture	Zone of inhibition (inmm)
1	Methanol extract of seed coat	<i>Staphylococcus Typhi</i>	18 mm
2	Methanol extract of seed coat	<i>Bacillus</i>	15 mm
3	Acetic acid extract of seed coat	<i>Fungus</i>	8 mm

Klebsiella pbeumoniae

100 mg/ml ethanolic solution of this extract showed 24 positive control (Rifampcin) and 11 mm zone of inhibition against *Klebsiella pneumoniae*.

Mycobacterium smegmatis

100 mg/ml ethanolic solution of this extract showed 20 positive control (Rifampcin) and 11 mm zone of inhibition against *Mycobacterium smegmatis*.

***Cassia fistula*(seed)**

Extract showed positive tests for two bacterial cultures as given below:

Staphylococcus typhi

100mg/ml solution of this extract showed 18 mm zone of inhibition against *Staphylococcus typhi*.

Bacillus

100mg/ml solution of this extract showed 15 mm zone of inhibition against *Bacillus*.

Fungus

100mg/ml solution showed 8mm zone of inhibition.

ACKNOWLEDGEMENTS

A authors express their thanks to Dr. G.R.S. Bisht, Reader, Department of Microbiology, SBSPG Institute of Biomedical Science and Research Balawala Dehradun (UK) 248161 and Lovely Professional University for lab facility and for antimicrobial activities.

REFERENCES

1. Hugo WB, Russel AD. Pharmaceutical Microbiology, Blackwell Scientific Publications, Third edition 1984; 179-200.
2. Hostettmann K, Hamburger M., *Phytochem.* 1991; **30**(12): 3864-3874 Oliver-Bever B., Medicinal Plants in Tropical West Africa, London, Cambridge Univ. Press. 1986; 134.
3. Gour R. D., Flora of the District Garhwal Srinagar Garhwal 1999
4. Cony, C. H., Lyne, M. P., and Grange, M. T., Microbiological Methods, 7th ed, Butter Worth-Heinemann Ltd. Great Britain 1995.
5. Trease GE, Evans WC., Textbook of Pharmacognosy. 12th Edition (Balliere, Tindall, London, 1983; 57-59, pp 343-383.
6. Russell AD, Furr JR., *J. Appl. Bacteriol.* 1977; **43**: 2523.