Research Article [Modi *et al.*, 7(1): Jan, 2016:4860-4863]
CODEN (USA): IJPLCP **ISSN: 0976-7126**

INTERNATIONAL JOURNAL OF PHARMACY & LIFE SCIENCES
(Int. J. of Pharm. Life Sci.)

In Vitro Antimicrobial Screening of a few Ethno-medicinal Plants of Mimosoideae of Gulbarga-Karnataka, India

Rajasamarsen K Modi[1*], Seetharam[2] and Y.N Pratima Mathad[2]
1, Department of Botany, Government Degree College, Gulbarga, (Karnatka) - India
Biosystematics & Medicinal Plants Laboratory,
2, Department of Botany, Gulbarga University, Gulbarga, (Karnatka) - India

Abstract

In vitro antimicrobial activities of ethanol extracts of eight taxa belonging to Mimosoideae which are extensively used by folk and traditional practitioners of Gulbarga of Karnataka State were screened against few pathogenic bacteria and fungi by agar-well diffusion method. Among the various plant screened, *Mimosa hamata* exhibited significant antibacterial activity against *Bacillus subtilis* and antifungal activity against *Aspergillus flavus*. Similarly, *Acacia nilotica*, *Acacia chundra* and *Albizzia lebbeck* showed good antibacterial activity against *Bacillus subtilis* whereas *M. hamata* against *Escherichia coli*.

Key-Words: In Vitro Antimicrobial activity, Mimosoideae, Streptomycin, Bavistin

Introduction

Since time immemorial man relied on natural products, and plant in particular to promote and maintain good health and to fight sickness, pain and disease. Medicinal plants for the main resource base of traditional systems of medicine. India is endowed with an estimated 45,000 species of plants, including about 15,000 specifies of wild flowering plants. Of these approximately 5000 species are endemic to India and 2,500 species, representing over 1000 genera and 250 families are used in traditional medicine (Jain, 1991). The pas 200 years has witnessed not only the extinction of plant species, but also erosion of traditional knowledge related to the medicinal properties and uses of plants and other natural products. In recent decades, there has been vigorous effort to conserve, document and promote knowledge of plant drugs and to develop research programmes for the benefit of both traditional and modern medical systems. With the advances in the experimental methods in photochemistry and pharmacology, several folk medicines were screened for active principles and biological activities (River and Bruhn, 1979).

*** Corresponding Author**
E.mail: samarsen2001@rediffmail.com
manjunathk2007@rediffmail.com

In this context, the present endeavor reports the antimicrobial activity of Mimosoideae plants which are among the 300 medicinal plants used by North-eastern Karnataka state folk and traditional practitioners (Lambani, Gonda, Halakki, Kadukurba, Korcha, Pindari and Hakkipikki) for curing various ailments, including those caused by microbial pathogens (Seetharam *et al*., 1998).

Material and Methods

Observations:

1. ***Albizzia lebbeck*** (L.) Benth., (Mimosoideae), HGUG-245, (Local Name: Galimara). The leaves were used to cure night blindness in children. Fresh soft bark was grind in water and 50ml of the infusion was orally administered thrice a day for snake bite and scorpion sting.
2. ***Acacia farnesiana***(L.) Willd., (Mimosoideae), HGUG-242, (Local name: Kasturi Jali). The leaves were boiled in a water macerated and applied to the wounds and also oused in treatment of Gonorrhoea.
3. ***Acacia ferruginea*** DC., (Mimosoideae,) HGUG-238, (Local name: Banni mara) Wild **.** The leaves are used for curing dysentery and liver complaints. Leaves are eaten to avoid foul smell from the mouth.
4. ***Acacia chundra*** (Rottler) Willd., (Mimosoideae) HGUG-239, (Local name: Tereda kanti). The gum of this tree is

invariably used in dental injury and to kill the worms present in the stomach. The fruit has sweet acrid which is extensively used as a cooling agent.

5. ***Acacia nilotica*** (L.) Willd., (Mimosoideae), HGUG-241, (local name: Karijali) Equal quantity of fruits, flowers, leaves and bark were powdered and mixed with sugar (250g) About 10 g of this mixture was dissolved in a cup of milk and given once a day to cure premature ejaculation of semen.
6. ***Mimosa hamata*** Wild., (Mimosoideae), HGUG-236, (Local name: Sagarimullina gida) . Fruits are shade dried, powdered and mixed with lemon juice to cure ulcers in animals.
7. ***Prosopis juliflora*** (Sw.) DC., (Mimosoideae), HGUG-821 (local name: Sarkari jail,) Wild. The leaves were used to treat skin diseases. The sweet pulp of the pods was eaten to quench the thirst in times of scarcity of water.
8. ***Pichecellobium dulce*** (Roxb.) Benth., (Mimosoideae), HGUG-256 (local name: Seeme Hunase, Gourikambli kayi), wild. The stem bark was shade dried, powdered and mixied with fruits of *Piper longum* and *Palmyre palm*. To this little amount of sugar was added and boiled in water. The infusion was given orally to bring down the thirst during summer. Excessive consumption of raw fruits leads to loose motion.

Collection of Plant material

The plant species studied (Table-1) were collected from North-eastern Karnataka, India. The identification was carried out using the "Flora of Gulbarga District" by Seetharam *et al* (2000) and The "Flora of the Presidency of Madras" by Gamble (1935) and voucher specimens were deposited at the Herbarium Department of Botany, Gulbarga University, Gulbarga (HGUG).

Preparation of extracts

Shade dried and coarsely powdered plant material (20g) was soaked in 150ml of ethanol (95% v/v) and distilled water (70:30). After 48 hrs of maceration and under magnetic stirrer, the mixture was filtered and evaporated to dryness at room temperature. The residue left was weighed and dissolved in Dimethylformaide (DMF) to give a concentration of 1mg/ml.

***In vitro* antimicrobial assay**

The selected bacteria and fungi were procured from the department of Microbiology, Government College, Gulbarga, Karnataka. The DMF based plant drug extracts were screened for their antibacterial activity against *E.coli*, *Bacillus subtilis* and *Staphylococcus aureus* and *Aspergillus niger*, *Aspergillus flavus* and *Rhizopus nigricans* for antifungal activity by agar-well diffusion method (Ashworth et al.., 1975). Nutrient agar and Potato dextrose agar media were used to culture the bacteria and fungi respectively. The bacteria were inoculated into nutrient broth and inoculated at 37 ^{0}C in a BOD incubator and the suspensions were checked to approximately to provide 10^5 cells/ml. From this 200µl of suspension is transferred onto the Petri plates containing 20ml solidified nutrient agar and then the suspension was spread evenly on the medium with a glass spreader to get uniform lawn of bacteria. For getting a fungal mat spores. *A. niger*, *A. flavus* and *R. nigricans* were suspended in 3-5ml of saline solution taken in a test tube and the spore suspension was poured over a Petri plate containing 20 ml of potato dextrose agar. Excess suspension wee drained off with the help of sterile cork borer and well of 8 mm diameter were made wherein 100µl of the test solution was filled using sterile syringes. Streptomycin and Bavistin were used as standards for comparison of antibacterial and antifungal activity respectively. The plates were incubated at 27 ^{0}C for fungal activity and 37 ^{0}C for bacteria. The zone of inhibition was recorded by measuring the diameter at the end of 24 hr for bacteria and 72 hrs for fungi. As control the solvent (DMF) in which the extracts were not dissolved was added in separate Petri plate. Each experiment was repeated thrice and average values are reported in the **table-2.**

Results and Discussion

Among the various plants screened for *in vitro* antimicrobial activity, *M. hamata* exhibited significant antibacterial activity against *B. subtilis* (plate-1A) and antifungal activity against *A. flavus* (plate 2B), when compared with standard reference compounds, streptomycin and bavistin respectively (table-2). Similarly *A. nilotica*, *A. chundra* and *A. lebbeck* showed good antibacterial activity against *B. subtilis* (plate-1A). Whereas *M. hamata* against E. coli (plate-1C). While all the other extracts showed moderate antimicrobial activity against all tested bacteria and fungi (plate 1 & 2).

Owing to the ubiquitous, disease causing ability and toxicity of microbial pathogens, human have discovered and synthesized numerous compounds to control it. In spite of tremendous development in the field of synthetic drugs during recent era, higher plants still hold their own place. Synthetics, which have severe side effect. Due to invariable usage of such compounds, the pathogens have spontaneously developed resistance to them. Further being non-

biodegradable, these chemical themselves deteriorate the environment and biosphere. (Singh and Sing, 2000). Therefore, a systematic approach should be made to find out the efficacy of medicinal plants used by fold and traditional practitioners against pathogenic micro organism, so as to exploit them as herbal microbial agents.

Acknowledgement

Corresponding author Rajasamarsen K Modi is thankful to the University Grant Commission, South Zone Office, Bangalore for sanctioning Minor Research Project. Thanks to Dr. Ramakrishna Head of the Department Microbiology, Government College, Gulbarga providing laboratory to carryout microbial activity and lending microbial culture.

References

1. Ashworth J, Hargreares L L, Rosser A and Javis B. In: Some methods for Microbiological assay *(Academic Press, London)*, **1975, 75.**
2. Gamble J.S. In: Flora of Presidency of Madras, edited by Gamble J.S. (Adlard and Son, London), **1935, 414**.
3. Jain S K, Dictionary of Indian folk medicine and Ethnobotany, *Deep publications*, New Delhi, **1991** pp **311.**
4. Rivier L and Bruhn J.G. Editorial comment, *J. Ethnno Pharacol*, **(1979) 1**.
5. Seetharam Y.N, Halesh C and Vijay, Medicinal plants of North-Eastern Karnataka and their status, *My Forest***, 34 (1998) 767.**
6. Seetharam Y.N, Kotresha K and Uplaonkar S.B. In: Flora of Gulbarga District, edited by Seetharam Y N (Gulbarga University, Gulbarga India), **2000, 71.**
7. Singh I and Singh V. Antifungal properties of aqueous and organic solution extracts of seed plants against Aspergillus flavus and A. niger, *Phytomorph*., **2000 50(2):51.**

Table 1: List of plants screened for antimicrobial activity

Sl No.	Name of the Taxa	Name of the family/subfamily	Place of collection	Voucher specimen number	Part used
01.	*Albizzia lebbeck* (L)Benth,	Mimosoideae	Gulbarga	HGUG-245	Leaves
02	*Acacia farnesiana* (L.) Willd.	Mimosoideae	Chincholi taluk	HGUG-242	Leaves
03	*Acacia ferruginea* DC.,	Mimosoideae	Chittapur Taluk	HGUG-238	Leaves
04	*Acacia chundra* (Rottler) Wild.,	Mimosoideae	Yadgir Taluk	HGUG239	Leaves
05	*Acacia nilotica* (L.,)Wild	Mimosoideae	Gulbarga	HGUG-241	Leaves
06	*Mimosa hamata* Willd.,	Mimosoideae	Gulbarga	HGUG-236	Leaves
07	*Prosopis juliflora* (Sw.) DC	Mimosoideae	Yadgir	HGUG-821	Leaves
08	*Pichecellobium dulce* (Roxb.) Benth.,	Mimosoideae	Yadgir	HGUG-256	Leaves

Table 2: Antimicrobial activity of leaf extracts of a few Mimosoideae plants

Name of the Taxa	Zone of Inhibition (diameter in mm)					
	Bacillus subtilis	***Staphylococcus aureus***	***Escherichia coli***	***Aspergillus niger***	***Aspergillus flavus***	***Rhizopus nigricans***
Albizzia lebbeck (L) Benth,	18.0 ± 0.20	13.0 ± 0.44	13.0 ± 0.72	23.0 ± 0.52	20.0 ± 0.58	23.5 ± 0.80
Acacia farnesiana (L.) Willd.,	12.0 ± 0.50	12.0 ± 0.18	13.0 ± 0.44	24.0 ± 0.56	22.0 ± 0.60	24.0 ± 0.50
Acacia ferruginea DC.,	17.5 ± 0.18	12.0 ± 0.50	14.0 ± 0.12	20.0 ± 0.18	19.0 ± 0.18	21.0 ± 0.55

Acacia chundra (Rottler) Wild.,	18.0 ± 0.18	14.0 ± 0.50	13.0 ± 0.15	20.0 ± 0.32	19.5 ± 0.15	26.0 ± 0.66
Acacia nilotica (L.,)Wild	19.0 ± 0.26	15.0 ± 0.50	17.0 ± 0.16	24.0 ± 0.45	24.0 ± 0.58	24.0 ± 0.42
Mimosa hamata Willd.,	20.0 ± 0.50	16.0 ± 0.44	19.0 ± 0.56	23.0 ± 0.50	36.0 ± 0.68	23.5 ± 0.60
Prosopis juliflora (Sw.) DC.,	13.0 ± 0.50	12.0 ± 0.18	12.0 ± 0.44	25.0 ± 0.50	26.0 ± 0.52	23.0 ± 0.58
Pichecellobium dulce (Roxb.) Benth.,	15.0 ± 0.18	15.0 ± 0.28	15.0 ± 0.56	20.0 ± 0.58	20.0 ± 0.52	23.5 ± 0.64
Streptomycin	20.0 ± 0.20	20.0 ± 0.50	20.0 ± 0.65	-	-	-
Bavisatin	-	-	-	30.0 ± 0.62	35.0 ± 0.52	28.0 ± 0.52

* All the values are mean ± S.D. of three determinations; Diameter of agar-well- 8mm; Dose- 1mg/ml

How to cite this article
Modi R.K, Seetharam and Mathad Y.N. P. (2016). *In Vitro* Antimicrobial Screening of a few Ethno-medicinal Plants of Mimosoideae of Gulbarga-Karnataka, India. *Int. J. Pharm. Life Sci.*, 7(1):4860-4863.
Source of Support: Nil; Conflict of Interest: None declared

Received: 31.12.15; Revised: 05.01.16; Accepted: 15.01.16