

**INTERNATIONAL JOURNAL OF ADVANCES IN  
PHARMACY, BIOLOGY AND CHEMISTRY****Research Article****Phytochemical Screening and Antimicrobial Activity  
of roots of *Prosopis cineraria*****V. Kuchana<sup>1\*</sup>, S. Sampathi<sup>2</sup>, S. Pamu<sup>3</sup>, M. Poosa<sup>4</sup>.**<sup>1</sup>R.G.R. Siddhanthi College of Pharmacy, Secunderabad, Andhra Pradesh, India-500003.<sup>2</sup>National Institute of Pharmaceutical Education and Research, Hyderabad, India-500037.<sup>3</sup>Shadan Womens College of Pharmacy, Khairatabad, Hyderabad, India-500004.<sup>4</sup>Sultan-ul-Uloom College of Pharmacy, Banjara Hills, Hyderabad, India-500034.**ABSTRACT**

The antibacterial activity of the alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* (Linn.) Druce, was evaluated by the agar well diffusion method. The alcoholic extract was prepared by continuous hot percolation method with ethanol and hydro alcoholic extract was prepared by maceration. The presence of flavonoids and tannins were detected in the preliminary phytochemical tests. Moderate antibacterial activity was observed in the extracts (500 µg/ml) against some pathogenic microorganisms when compared with the standard Ampicillin (10 µg/ml)

**KEY WORDS:** Antibacterial activity, ampicillin, agar diffusion method and *Prosopis cineraria*.**INTRODUCTION**

Plants are considered as vital sources of medicinal agents for treating the dreadful diseases and play an important role in the basic health needs of the people in the developing countries. The active principles present in plants have medicinal value and produce a particular biological action on the human body. The use of medicinal plants play a vital role in covering the basic health needs in developing countries and these plants may offer a new source of antibacterial, antifungal and antiviral agents with significant activity against infective microorganisms. There are numerous examples of antimicrobials of plant origin that have an enormous therapeutic potential. The medicinal plants play a major role in developing countries to cover their basic health needs and these medicinal plants can be used as a source of antifungal, antiviral and antibacterial constituents which are active against different microorganisms and which are notorious to human health. Many powerful drugs are extracted from different parts of biologically active plants such as flowers, stem, leaf, bark, roots and seeds. Various chemical constituents of the plants like terpenoids, flavonoids and tannins

have antimicrobial activity against a wide range of microorganisms. *Prosopis cineraria* (Mimosaceae) is a small to moderate sized tree found in various parts of India such as Rajasthan, Gujarat, Haryana, Uttar Pradesh, Andhra Pradesh and Tamil Nadu<sup>1</sup>. This plant is used in pregnancy as a safeguard against miscarriage<sup>2-4</sup>. The smoke of the leaves is good for eye troubles. It is also known to possess anthelmintic, antibacterial, antifungal, antiviral, anticancer and several other pharmacological properties<sup>5</sup>. It is also reported that aqueous extract of bark and leaves applied externally to treat skin disease<sup>6</sup> disinfects wounds and promotes healing<sup>7</sup>.

In our present work, we extended the study to screen the antimicrobial activity of alcoholic and hydro alcoholic extracts of the roots of *Prosopis cineraria* against four different bacterial strains.

**MATERIALS AND METHODS****Plant material collection:**

The roots of the plant *Prosopis cineraria* was collected from Gajwel village, Medak district, Telangana during October 2014, identified by Senior

Plant Taxonomist and authenticated at the Herbarium of the Botany Department, Osmania University, Hyderabad, Telangana. The roots were air dried separately for one month and the dried material was coarsely powdered.

#### Preparation of the extracts:

About 150 g of the coarse powder was extracted with ethanol by continuous hot percolation method (Soxhlet apparatus). The marc was then further extracted with hydro alcoholic mixture using maceration. Both alcoholic and hydro alcoholic extracts were then evaporated under reduced pressure and were stored in refrigerator till use.

#### Phytochemical investigation:

The alcoholic and hydroalcoholic extracts of the root of *Prosopis cineraria* were subjected to preliminary phytochemical screening to identify the constituents present in them<sup>8,9</sup>.

A wide variety of natural constituents like alkaloids, glycosides, tannins, essential oils and other secondary metabolites like sterols, phenolic compounds, tannins and flavonoids were tested using standard procedures.

#### Bacterial strains:

Four bacterial strains viz. *Escherichia coli* [Gram negative], *Pseudomonas aeruginosa* [Gram negative], *Staphylococcus aureus* [Gram positive] and *Bacillus subtilis* [Gram positive] were used in this study. Microorganisms were procured from Microbiology Department, Osmania University, Hyderabad.

The bacteriostatic property of the extracts was tested by agar well diffusion method<sup>10</sup>.

#### Preparation of Antibacterial Solution:

The extracts were dissolved in dimethyl sulfoxide (DMSO) and were taken at concentration of 500 µg/ml for testing antibacterial activity using ampicillin (10µg/ml) as a standard with proper drug controls.

### EXPERIMENTAL PROCEDURE

#### Agar well diffusion method:

The extracts were dissolved in DMSO (1%) to get a concentration of 500µg/ml.

Agar plates were used for the study using cup plate method.

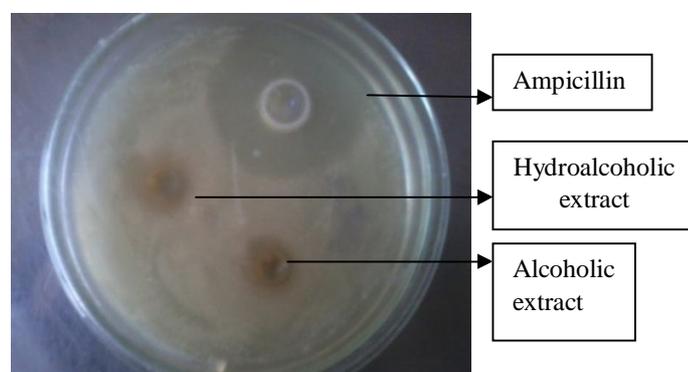
The microorganisms were inoculated on the agar medium by spread plate technique

Four wells were bored in each plate and 100 µl of the extract samples were added in the well plate.

The inoculated plates were incubated at 37°C For 24 hr

Antimicrobial activity was evaluated by measuring the zone of inhibition against the test organisms.

All the assays were carried out in triplicate and the results recorded as mean ± SEM of the three experiments.



**Fig: 1 ZONE OF INHIBITION OF *E.COLI* AGAINST AMPICILLIN, HYDROALCOHOLIC AND ALCOHOLIC EXTRACT OF ROOTS OF *PROSOPIS CINERARIA***

### RESULTS AND DISCUSSION

The alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* were screened for various phytoconstituents. The presence of flavonoids and tannins were detected in the preliminary phytochemical tests. The result of phytochemical investigation of the alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* is shown in table-1

#### Antimicrobial activity:

The alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* were tested against *Escherichia coli*, *Pseudomonas aeruginosa*, (gram negative), *Staphylococcus aureus* and *Bacillus subtilis* (gram positive). The zones of inhibition were recorded. Both alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* exhibited moderate antibacterial activity with all the tested strains at (500µg/ml) concentration when compared with the standard ampicillin (10µg/ml). The results of

antibacterial activity of alcoholic and hydroalcoholic extracts of the roots of *Prosopis cineraria* against four different bacterial strains in terms of zone of inhibition were shown in table-2 and its graphical representation in fig-2

Earlier the antimicrobial properties were reported by researchers from stem bark<sup>11</sup> and leaflets<sup>12</sup> of *Prosopis cineraria* and even from root, stem, bark, pods of the different species of *Prosopis* i.e. *Prosopis julifera*<sup>13</sup>, *Prosopis Africana*<sup>14</sup> and different species of Mimosaceae plants<sup>15</sup>.

The obtained activity may be due to the presence of flavonoids and tannins (presence is confirmed by the preliminary phytochemical studies).

Further studies are under progress to characterize the active principles present in the extracts.

## CONCLUSION

Plants have become a valuable source of medicinal agents which are used for the treatment of various diseases. Much attention has been paid towards plant based products which are extracted and isolated from plants. Natural products are taken much important as antimicrobial agents as they have fewer side effects when compared to commercially available products. There is an urgent need to identify newer chemical entities that are effective against resistant pathogens. In our present study the root extract of *Prosopis cineraria* exhibited antimicrobial activity against gram positive bacteria.

**Table 1 : Preliminary Phytochemical Screening of Extracts of roots of *Prosopis cineraria*(L.)Druce**

Sr. No	Name of the test	AE	HAE
1	Alkaloids	-	-
2	Carbohydrates	+	+
3	Proteins/Aminoacids	+	+
4	Glycosides	-	-
5	Saponins	+	+
6	Flavonoids	+	+
7	Phenolics/Tannins	+	+
8	Steroids	-	-

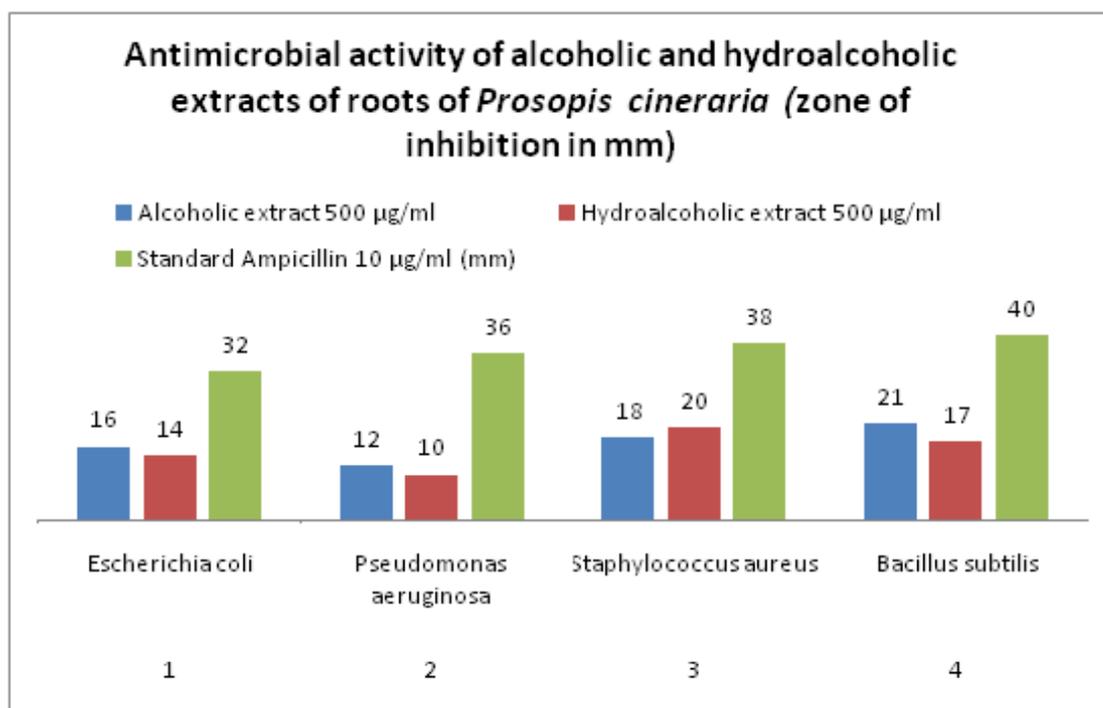
+ Present ; - Absent

AE - Alcoholic Extract

HAE - Hydroalcoholic Extract

**Table-2 : Antimicrobial activity of the root extracts of *Prosopis cineraria***

S no	Micro organism	Concentration of extract $\mu\text{g/ml}$	Zone of inhibition (mm)		Standard Ampicillin 10 $\mu\text{g/ml}$ (mm)
			Alcoholic extract	Hydroalcoholic extract	
1	Escherichia coli	500	16 $\pm$ 0.12	14 $\pm$ 0.10	32 $\pm$ 0.23
2	Pseudomonas aeruginosa	500	12 $\pm$ 0.24	10 $\pm$ 0.23	36 $\pm$ 0.15
3	Staphylococcus aureus	500	18 $\pm$ 0.41	20 $\pm$ 0.20	38 $\pm$ 0.23
4	Bacillus subtilis	500	21 $\pm$ 0.31	17 $\pm$ 0.12	40 $\pm$ 0.16



**Figure -2 Antimicrobial activity of the root extracts of *Prosopis cineraria***

#### REFERENCES

- Puri S and Kumar A, Establishment of *Prosopis cineraria* (L.) Druce in the hot deserts of India, New forests. 1995; 9 : 21-33
- Marwat SK, Rehman FU, Khan MJ, Ahmad M, Zafar M. Medicinal folk recipes used as traditional phytotherapies in district Dera Ismail Khan, Pakistan. Pak. J. Bot. 2011; 43(3) : 1453-1462
- Kirtikar KR and Basu BD, Indian medicinal plants, Leader road, Allahabad, India, 1984 ;( Vol. II):910
- Nandkarni KM, Indian material medica, Popular prakashan, Mumbai, 2000; 1 : 1011.
- Malik A, Kalidhar SB. Phytochemical examination of *Prosopis cineraria* L. (druce) leaves. Indian J. Pharm. Sci. 2007; 69: 576-578.
- Sharma H, Kumar A. Ethanobotanical studies on medicinal plants of Rajasthan (India). J. Med Plants Res. 2011; 5(7): 1107-1112.
- Nagori BP, Solanki R. Role of medicinal plants in wound healing. Res J. Med Plants. 2011; 5(4): 392-405.
- Trease GE, Evans MC. Textbook of Pharmacognosy, 13 ed. Bailliere Tindal, London, 1989; 683-684
- Harborne JB. Phytochemical Methods-A Guide to Modern Techniques of Plant Analysis. 3rd ed. Chapman and Hall, London, 1998; 42-203.
- Salar RJ, Dhall A. Antimicrobial and free radical scavenging activity of extracts of some Indian medicinal plants. J. Med Plants Res. 2010; 4(22): 2313-2320.
- Velmurugan V, Arunachalam G, Ravichandran V. Antibacterial activity of stem barks of *Prosopis cineraria* (Linn.) Druce. Archives of Appl. Sci. Res. 2010; 2(4): 147-150.
- Robertson S, Narayanan N, Deattu N, Nargis NRR, Comparative anatomical features of *Prosopis cineraria* (L.)Druce and *Prosopis juliflora* (Sw.) DC (Mimosaceae). Int. J. green pharm. 2010; 4: 275-280.

13. Satish S, Mohana DC, Raghavendra MP and Raveesha KA, Antifungal activity of some plant extracts against important seed borne pathogens of *Aspergillus* sp. J. Agric. Techno. 2007; 3: 109-119.
14. Kolapo AL, Okunade MB, Adejumobi JA, Ogundiya MO, Phytochemical Composition and Antimicrobial Activity of *Prosopis africana* Against Some Selected Oral Pathogens. World J. Agri. Sci, 2009; 5: 90-93.
15. Napar AA, Bux H, Zia MA, Ahmad MZ, Iqbal A, Roomi S, Antimicrobial and antioxidant activities of Mimosaceae plants; *Acacia modesta* Wall (Phulai), *Prosopis cineraria* (Linn.) and *Prosopis juliflora* (Swartz). J. Med Plants Res. 2012; 6(15) : 2962-2970.