

EVALUATION OF ANTIBACTERIAL ACTIVITY OF METHANOLIC EXTRACT OF PLANT *RIVEA ORNATA*Sharma Vaishali J.\*<sup>1</sup>, Patel Piyush M.<sup>2</sup><sup>1</sup>Research scholar, Singhania University, Pachheri Bari, Junjhunu, Rajasthan, India<sup>2</sup>Professor, Shri B.M.Shah College of Pharmaceutical education and Research, Modasa, India

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\*Email: [vaishalisharma84@gmail.com](mailto:vaishalisharma84@gmail.com)**ABSTRACT**

Phag described in classical text of Ayurveda is botanically identified as *Rivea ornata*. In present study methanolic extract of plant *Rivea ornata* was screened for in- vitro antibacterial activity against gram positive and gram negative bacteria by cup-plate method. The methanolic extract of the plant significantly inhibit the growth of bacteria as compared to the standard bactericide. The study reveals that the methanolic fraction of plant *Rivea ornata* possess significant antibacterial activity.

**KEYWORDS:** Antibacterial activity, streptomycin, plant of *Rivea ornata*, cup-plate method

**INTRODUCTION**

The use of medicinal plants as a source for relief from illness can be traced back over five millennia to written documents of the early civilization in China, India and the Near east, but it is doubtless an art as old as mankind. Neanderthals living 60,000 years ago in present day Iraq used plants such as holly back, these plants are still widely used in ethnomedicine around the world <sup>1,2</sup>.

The potential of higher plants as source for new drugs is still largely unexplored. Among the estimated 250,000-500,000 plant species, only a small percentage has been investigated phytochemically and the fraction submitted to biological or pharmacological screening is even smaller. Random screening as tool in discovering new biologically active molecules has been most productive in the area of antibiotics <sup>3,4</sup>.

On a global basis, at least 130 drugs, all single chemical entities extracted from higher plants, or modified further synthetically, are currently in use, though some of them are now being made synthetically for economic reasons <sup>5</sup>.

Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally in different countries and are a source of many potent and powerful drugs<sup>6</sup>. The different parts used include root, stem, flower, fruit, twigs exudates and modified plant organs. While some of these raw drugs are collected in smaller quantities by the local communities and folk healers for local used, many other raw drugs are collected in larger quantities and traded in the market as the raw material for many herbal industries <sup>7</sup>. Although hundreds of plant species have been tested for antimicrobial properties, the vast majority of have not been adequately evaluated <sup>8</sup>.

A woody climber branchless stout, white-tomentose. Leaves ovate-cordate 3-5 in. diam. often broader than long, glabrous above, white silky-tomentose beneath while young; petiole 1-2 in. Flowers large, white, in short, mostly 3-fid. Peduncles; bracts 1/2 in. Fruit 2/3 in. diam., indehiscent, globose, shining, yellow-brown, nearly dries <sup>9</sup>. *Rivea ornata* seed oil was found to contain 12, 13-epoxy-octadec-*cis*-9-enoic acid (vernolic acid, 22.0%) along with the other normal fatty acids like palmitic acid (24.2%), stearic acid (8.9%), oleic acid (17.1%) and linoleic acid (27.8%) <sup>10</sup>. Juice of the plant is used topically in hemorrhagic diseases and piles <sup>11</sup>.

**MATERIALS AND METHOD****Collection and identification of the plant material**

Entire herb of *Rivea ornate* was collected from Tripura, and authentication was confirmed by Dr. Madhava. A voucher specimen has been retained in the department of Pharmacognosy, B.Pharmacy College, Rampura, Kakanpur, Dist: Panchmahal, Gujarat, India.

**Preparation of the extract**

Plant was collected, shade dried were coarsely powdered with a mechanical grinder. Powder was passed through sieve No.40 and stored in a air tight container for the extraction. 100 gm of powdered drug was extracted with petroleum ether for 24 hours by soxhlet apparatus. The mark left after petroleum ether extract were dried and then extracted with 95% methanol in Soxhlet apparatus for 72 hours. After completion of extraction, the extracts were filtered through Whatmann No.1 filter paper. The filtrates were concentrated to dryness in vacuum and stored in desiccators.

**Microorganisms used**

The test microorganism used for the antimicrobial activity were four bacterial species –*Bacillus substilis* MTCC (121), *Staphylococcus aureus* MTCC (96), *Pseudomonas aeruginosa* MTCC (421) and *Escherichia coli* MTCC (443). These organisms were identified and procured from Institute of microbial technology Chandigarh, India. The stock cultures were maintained on nutrient agar medium at 4°C. The microorganisms were activated by inoculating a loopful of the strain in the nutrient broth (25ml).

**Antimicrobial screening**

Evaluation of antimicrobial activity was performed by Cup-plate method<sup>12</sup>. Sterile Muller Hinton agar media was poured in sterile petriplates under aseptic condition. 0.1 ml of the test organism was spread on agar plates. Cups were made at the size of 6 mm diameter, in the agar plates using the sterile borer. Streptomycin (10µg/disk) was served as reference standard. The disk (6 mm in diameters) was impregnated with 10 µl of each of 125 mg/ml (1.25 mg/disc), 250 mg/ml (2.5 mg/disc) and 500 mg/ml (5 mg/disc) methanolic extract of plant and standard were incubated at 37 ±0.5°C for 48 h depending on the incubation time required for the visible growth. The zone of inhibition (mm) was calculated by measuring the diameter of zone of bacterial growth around the cup. The average of three independent determinations was recorded <sup>13-16</sup>.

TABLE 1: ANTIBACTERIAL ACTIVITY OF METHANOLIC EXTRACT OF PLANT *RIVEA ORNATA*

Sample	Concentration	Mean $\pm$ SEM of diameter of zone of inhibition (in mm)			
		Gram positive bacteria		Gram negative bacteria	
		<i>B. subtilis</i>	<i>S. aureus</i>	<i>E. coli</i>	<i>P.aeruginosa</i>
Methanolic extract (a)	1.25 mg/disc	6.5 $\pm$ 0.12	7.2 $\pm$ 0.24	6.9 $\pm$ 0.12	7.5 $\pm$ 0.18
Methanolic extract (b)	2.5 mg/disc	16.3 $\pm$ 0.26	17.0 $\pm$ 0.23	16.8 $\pm$ 0.19	17.4 $\pm$ 0.15
Methanolic extract (c)	5 mg/disc	20.0 $\pm$ 0.38	19.3 $\pm$ 0.33	20.6 $\pm$ 0.17	20.8 $\pm$ 0.14
Streptomycin (d)	10 $\mu$ g/disc	24.7 $\pm$ 0.11	23.7 $\pm$ 0.18	25.2 $\pm$ 0.18	25.6 $\pm$ 0.20

Values are expressed as Mean  $\pm$  S.E.M of triplicate measurements. A value of  $P < 0.05$  was considered statistically significant (By one way ANNOVA followed by Dunnett's t-test).

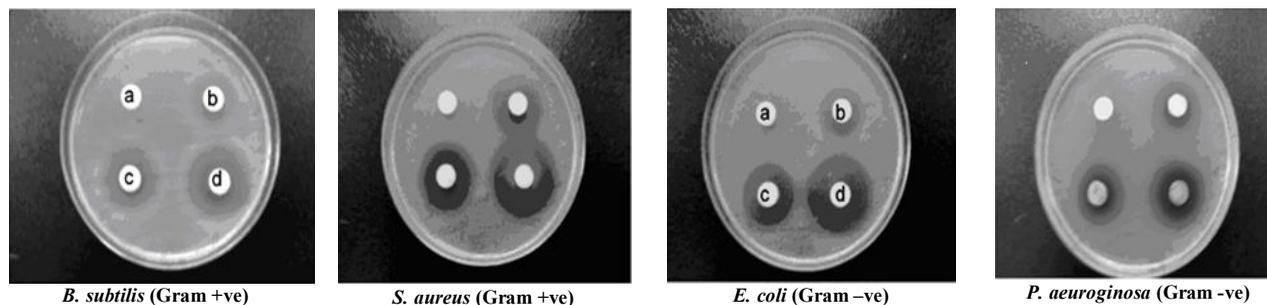


Figure 1: Antimicrobial activity of methanolic extract of plant *Rivea ornata* with gram positive bacteria and gram negative bacteria

### Statistical Analysis

The values are represented as mean standard error of mean (SEM) for triplicate set of experiments.  $P < 0.05$  is considered statistically significant (ANNOVA, Dennett's t-test).

### RESULT AND DISCUSSION

Antibacterial activity was done for methanolic extract of plant *Rivea ornata*. During antibacterial study the methanolic extract of plant showed concentration dependent increase zone of inhibition against bacteria by cup plate method. The result of antibacterial activity is shown in Table 1 and Figure 1.

### REFERENCES

- Thomson WAR. Medicines from the Earth. Maidenhead, United Kingdom. McGraw-Hill Book Co. 1978
- Stockwell C. Nature's pharmacy. London, United Kingdom. Century Hutchinson Ltd. 1988
- Gerhartz, W., Y.S. Yamamoto, F.T. Campbell, R. Pfefferkorn and J.F. Rounsaville, 1985. Ullmann's Encyclopedia of Industrial.
- Kroschwitz, J.I. and M. Howe-Grant, 1992. Kirk-Othmer encyclopedia of chemical Technology, 2: 893.
- Newman, D.J., G.M. Cragg and K.M. Snader, 2000. 19. The influence of natural products upon drug discovery. Nat. Prod. Res., 17: 215-234.
- Srivastava, J., J. Lambert and N. Vietmeyer, 1996. Medicinal plants: An expanding role in development, World Bank Technical Paper. No. 320.
- Uniyal, S.K., K.N. Singh, P. Jamwal and B. Lal, 2006. Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalayan. Ethnobiol. Ethnomed., 2: 1-14.
- Balandrin, M.F., J.A. Klocke, E.S. Wurtele and W.H. Bollinger, 1985. Natural plant chemicals: Sources of Industrial and Medicinal materials. Science, 228: 1154-1160.
- Forest flora by Hyderabad state-by Sharfuddin khan.
- Kallappa M. Hosamani, Raghavendra M. Sattigeri, P.G. Department of Studies in Chemistry, Karnatak University, Pavate nagar, Dharwad 580 003, India studied Industrial utilization of *Rivea ornata* seed oil: a moderate source of vernolic acid, Industrial crop and product, vol.12, issue 2, Aug.2000:93-96
- C.P.Kher, Indian Medicinal Plants, an illustrated dictionary, Springer; pg no. 552
- Tortora, G.J., Funke, B.R., Case, C.E, Microbiology- An Introduction, Benjamin Cummings Publishing Co., 1998:562-669.
- Mathew J., Antimicrobial activity of selected aromatic plants. Indian Drugs, 2005;42:28-33.
- Kumari T. GR, Paul PT, Ayyub S, Iyenger MA, Rao PS. Antimicrobial activity of some essential oil of *Elletaria cardamom* Maton, Indian drugs 2004;41:622-30.
- Mimica- Duki N. Bozin B., Skovi M, Mihajlovi B, Matavulj M. Antimicrobial activities of three menthe species essential oils, Planta Medica 2003; 69: 413-19.
- Bushnell OA, Fukuda M, Makinoda T. The antimicrobial properties of some medicinal plants found in hawaii, Pac. Sci. 1950: 4: 167-83.

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