

EVALUTION OF ANTIBACTERIAL ACTIVITY OF *ADATHODA VASICA* LEAF EXTRACT

E. Shravya Puri* and A. Sabitha Rani

Department of Botany, Osmania University College for Women, Koti, Hyderabad-500007.

Article Received on
01 Nov 2015,

Revised on 22 Nov 2015,
Accepted on 12 Dec 2015

*Correspondence for
Author

E. Shravya Puri

Department of Botany,
Osmania University
College for Women, Koti,
Hyderabad-500007.

ABSTRACT

The present study was undertaken to evaluate the antimicrobial activity of petroleum ether leaf extracts of *Adathoda vasica* against selected pathogens. Antimicrobial activity of this plant was assessed against some pathogens *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *E. coli*. Antibacterial activity was determined by using agar cup bioassay method. Petroleum ether extract was found to be effective against tested bacteria. Antimicrobial activity was measured at different concentrations. The present study showed significant antibacterial activity of leaf extracts of *Adathoda vasica* against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus subtilis*, *E.coli*. 200mg/ml concentration of petroleum ether extract of

Adathoda vasica showed the maximum inhibition against *Pseudomonas aeruginosa* 1.8 cm followed by *Staphylococcus aureus* 1.2cm, *Bacillus subtilis* 1.1cm, *E.coli* 0.9cm. The present study revealed the presence of antibacterial activity of *Adathoda vasica* against selected pathogens. Studies on the minimum inhibitory concentration and minimum bacterial concentrations were demonstrated against *Bacillus subtilis* 1.1cm, *E.coli* 0.9cm. and the highest minimum inhibitory concentration was exhibited against *Pseudomonas aeruginosa* 1.8 cm, *Staphylococcus aureus* 1.2cm, among bacteria *E.coli* showed lowest minimum inhibitory concentrations.

KEYWORDS: *Adathoda vasica*, petroleum ether, antibacterial activity.

INTRODUCTION

Biologically active compounds from natural sources have always been a great interest for scientists working on infectious diseases. Higher and aromatic plants have traditionally been

used in folk medicine as well as to extend the shelf life of foods, showing inhibition against bacteria, fungi and yeasts.^[1]

Medicinal plants represent a rich source of antimicrobial agent (Rashmi Pas, 2012).^[2] *Adathoda vasica* belonging to family *Acanthaceae*, commonly known as Adosa, is a small, evergreen shrub found many regions of India and throughout the world, with a multitude of uses in traditional Ayurveda. *Adathoda vasica* is most well-known for its effectiveness in treating respiratory conditions. The leaves of *Adthoda vasica* shows stimulant effect on the respiratory system. *Adathoda vasica* posses an antispasmodic and expectorant effect and has been used for centuries with much success to treat asthma, chronic bronchitis and other respiratory conditions.^[3] The powdered of leaf boiled with sesame oil, is used to heal ear infections and arrest bleeding. Boiled leaves are used to treat rheumatic pain and to relieve the pain of urinary tract infections. It is also believed to have abortifacient properties. It is used in some parts of India to stimulate uterine contractions, to speed childbirth.^[4]

METHODOLOGY

Collection of plant material

The plant material used is the dried leaves of *Adathoda vasica* that were collected from Osmania University College for Women botanical garden, Koti, Hyderabad. The leaves were washed with 70% of alcohol and rinsed with sterile distilled water, air dried and stored in air tight bottle.

Preparations of extracts

Finely powdered leaves (20gm) of *Adhatoda vasica* were extracted with 300 ml of petroleum ether (60-80°C) using soxhlet apparatus. The plant extract was further concentrated in rotary evaporator and residues were weighed. Crude extracts obtained after hot percolation were concentrated to dryness with the help of rotary evaporator under reduced pressure at <40°C and the yields were determined. All the extracts were kept in air-tight containers and stored at 4°C for further studies. Different concentrations of stock solutions (0.5 mg to 2.0mg) were prepared by dissolving the plant extract in DMSO Dimethyle sulphoxide.^[5]

Anti-bacterial activity

Pure cultures of microbes, namely *Pseudomonas aeruginosa* (MTCC25619) followed by *Staphylococcus aureus* (MTCC 9144), *Bacillus subtilis* MTCC 633), *Escherichia coli* (MTCC25922) were procured from MTCC Chandigarh and used for determining the

antibacterial activity of leaf extracts. The growth media employed in the present study included nutrient agar media. The media were sterilized by autoclaving at 121°C and 15 psi for 30 minutes. Agar-well diffusion methods (Ahmad and Beg, 2001), was employed to determine the antimicrobial activity *Adthoda vasica* against the bacteria *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus subtilis* and *E.coli*. The leaf extracts of *Adathoda vasica* at different concentrations of 500µg, 1000µg, 1500µg and 2000µg were used against the test bacteria. Since petroleum ether was used as a solvent for reconstituting the plant extracts, control wells were maintained, to test the antimicrobial activity in each plate. Results were noted after the appropriate incubation period by measuring the diameter of zone of Inhibition in centimeter (cm) scale.

RESULTS AND DISCUSSION

The plant extract of *Adathoda vasica* was found to be active against all bacterial organisms tested. various concentration of leaf extract (0.5-2.0mg). All the concentrations of leaf extract inhibited the fungal growth. Maximum activity was observed at 2.0 mg concentration of extract. With different concentrations of extract tested, the inhibition zone varied from (0.9) to (1.8cm) and increased with the increase in the concentration of test solution (Table.1). among all the bacteria high inhibition zone were observed in *Pseudomonas aeruginosa* (1.8cm) *In-vitro* screening showed a strong antibacterial activity of *Adhatoda vasica* against the bacteria *Pseudomonas aeruginosa* (1.8cm) followed by *Staphylococcus aureus* (1.2cm) *Bacillus subtilis* (1.1cm,) *E.coli* (0.9cm). *Bacillus subtilis*, *E.coli* exhibited slightly lesser activity compared to other organisms i.e (1.1cm) and (0.9 cm) respectively. (Fig.1 & 2).

Similarly leaf extract of *Adhatoda vasica* showed 100% inhibition against tested bacteria.^[6] Similar antibacterial studies on *Adathoda vasica* showed antibacterial activity of the plant against *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Salmonella typhii* and *Staphylococcus aureus*.^[7] In the present study, 200mg/ml concentration of petroleum ether extract of *Adathoda vasica* showed the maximum inhibition showed against tested Bacteria. Suggesting the leaf extract of *Adthoda vasica* possessed stronger disease control, its showed highly inhibiting activity.

CONCLUSION

The present study revealed that *Adathoda vasica* has a broad spectrum of antibacterial activity and potential source of antimicrobial agents. From the results obtained during the

present study, we can conclude that the leaf extract of *Adhatoda vasica* has excellent antibacterial activity against the tested bacteria.^{[8],[9]}

Plant leaf extracts of *Adathoda vasica* was found to have significant antibacterial activity. From the results we can conclude that *Adathoda vasica* has potent antimicrobial activity. Thus, there is a possibility of developing *Adathoda vasica* as an important source of biopesticide and that could be useful for an important and antibacterial agent.^[10]

TABLE1: Antibacterial activity of leaf extract of adthoda vasica.

Test bacteria/ Plant names	Zones of inhibition (cms)			
	<i>E.coli</i>	<i>P.aeruginosa</i>	<i>B.subtilis</i>	<i>S.aureus</i>
<i>Penicillin (100)</i>	-----	-----	1.3	1.9
<i>Streptomycin(100)</i>	2.7	3.2	-----	-----
<i>Adathoda vasica</i>				
500	0.3	0.6	0.4	0.5
1000	0.5	0.9	0.6	0.7
1500	0.7	1.5	0.9	0.9
2000	0.9	1.8	1.1	1.2

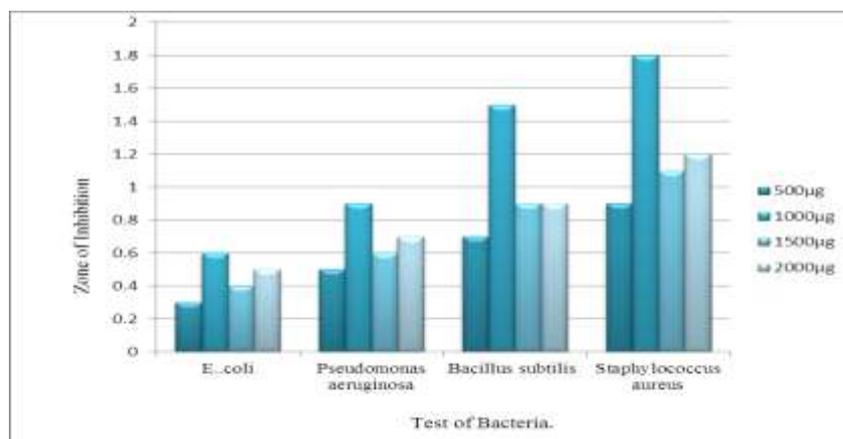


Fig1: Antibacterial activity of leaf extract of Adthoda vasica against six different bacterial pathogens.

REFERANCES

1. Para Sujana, Thulasi Muneppa Sridhar, Penchalaneni Josthna, Antibacterial Activity and Phytochemical Analysis of *Mentha piperita* L. (Pippermint) An Important Multipurpose Medicinal Plant. *American Journal of Plant Sciences*, 2013; 4: 77-83.
2. Rashmi Pa, Linu Mathew, Antimicrobial activity of leaf extracts of *Justicia adhatoda* L. I comparison with vasicine. *Asian Pacific Journal of Tropical Biomedicine*, 2012; S1556-S1560.

3. Atul Kumar Gangwar, Ashoke K. Ghosh. Medicinal Uses and Pharmacological Activity of *Adathoda vasica*. International Journal of herbal medicine, 2014; 2(1): 88-91.
4. Claeson UP, Malmfors T, Wikman G, Bruhn JG. *Adhatoda vasica*: a critical review of ethnopharmacological and toxicological data. Journal of Ethnopharmacology, 2000; 72: 1.
5. R. C. Jagessar, A. Mohamed, G. Go. An evaluation of the Antibacterial and Antifungal activity of leaf extracts of *Momordica Charantia* against *Candida albicans*, *Staphylococcus aureus* and *Escherichia coli* Nature and Science, 2008; 6(1): 1-14.
6. Inderjit Kaur, P.K. Chauhan, Munish Jaryal. Antioxidant and antimicrobial activity of leaf extract of *adathoda vasica* against the bacteria isolated from the sputum samples of asthamatic patients. International Journal of Drug Research and Technology, 2012; 2(3): 273-278.
7. Savant C.S, Saves. s. and Bhagavath A.M. Antimicrobial activity of alkaloids extracted from *Adthoda vasica*. International journal of Pharma and Bio Sciences, 2013; 4(3): 803-807.
8. Sagar vijayrao kathale, phytochemical screening and antimicrobial activity of leaves ethanolic extract of *adhotoda vasica* nees. International Journal of Pharma and Bio Sciences, 2013; 4(1): (P) 930 – 933.
9. Josephin Sheeba.B1 and Selva Mohan. T2 Antimicrobial activity of *Adhatoda vasica* against clinical pathogens Asian Journal of Plant Science and Research, 2012; 2(2): 83-88.
10. K. Ilango, V. Chitra², P. Kanimozhi³ and G Balaji¹ Antidiabetic, Antioxidant and Antibacterial Activities of Leaf extracts of *Adhatoda zeylanica*. Medic (*Acanthaceae*), journal of pharmaceutical science and research, 2009; 1(2): 67-73.