



Research Article

Antimicrobial Activity Of *Adhatoda Vasica* Against Pathogens

Aditya S. Balchanne*, Shubham S. Gannewar , Priya P. Sarkar , Gayatri A. Narule,
Snehal B. Hemane

Department of Microbiology, N. H. College Bramhapuri, (M.S) 441206, India

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ABSTRACT

The study evaluated the antimicrobial activity of *Adhatoda vasica* plant extracts against common bacterial pathogens in respiratory and ear infections. Extracts from yellow leaves, green leaves, and stems were prepared and tested against pathogens using the well diffusion method. Results showed significant antimicrobial activity across all parts of the plant, with yellow leaf extract particularly effective against ear pus pathogens and green leaf extract against cough organisms. Phytochemical analysis revealed bioactive compounds contributing to this activity. These findings suggest the potential of *Adhatoda vasica* extracts in developing herbal treatments for respiratory and ear infections.

INTRODUCTION

Adhatoda vasica, commonly known as Adulsa, holds a prominent place in Indian traditional medicine, notably Ayurveda, for over two millennia. As a member of the Acanthaceae family, this evergreen shrub boasts potent therapeutic properties primarily attributed to its bronchodilator alkaloids, particularly vasicine. Adulsa, renowned in indigenous medicine, offers a plethora of health benefits, particularly in treating bronchitis. All parts of the plant, notably the leaves, are utilized for their insecticidal and parasitological properties it's extensively used to alleviate symptoms of cold, cough, whooping

cough, chronic bronchitis. The root is esteemed for its efficacy in addressing various ailments such as strangury, leucorrhoea, bronchitis, asthma, and fever. Its versatility extends to serving as an antiseptic, antiperiodic, and anathematic agent. Plant-based antimicrobials represent a vast untapped source for medicines with enormous therapeutic potential. They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects of synthetic antimicrobials. They may act as lead compounds for the pharmaceutical industry or as the base for the development of new antimicrobials. Extensive literature review

*Corresponding Author: Aditya S. Balchanne

Address: Department of Microbiology, N. H. College Bramhapuri, (M.S) 441206, India

Email ✉: balchanneaditya27@gmail.com

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underscores the significant antimicrobial potential within the Acanthaceae family. Numerous studies have investigated the antimicrobial activity of *Adhatoda vasica* Nees, both independently and in combination with extracts from various plants. The crude leaf extract of *Adhatoda vasica* exhibited substantial inhibition against bean mosaic virus, while chloroform and ethanol extracts demonstrated notable antifungal properties against systemic fungal pathogens. Furthermore, aqueous and organic solvent extracts of *Adhatoda vasica*, along with extracts from *Allium sativum*, *Azadirachta indica*, *Embelica officinalis*, *Euphorbia pilulifera*, *Ocimum sanctum*, *Solanum trilobatum*, and *Withania somnifera*, exhibited bactericidal activity against *Mycobacterium tuberculosis* in vitro. These findings highlight the diverse antimicrobial potentials within the Acanthaceae family, suggesting promising avenues for further exploration in antimicrobial research. The effectiveness of a particular antimicrobial agent

results in the production of growth inhibition zones that appear as clear areas surrounding the disc from which the agent diffused.

MATERIAL AND METHOD

COLLECTION OF SAMPLE :

Adhatoda vasica Plant (Green leaves, Yellow Leavers and Stem) were collected from local region of Bramhapuri city.

PREPARATION OF EXTRACT :

Crush the parts of Adhulsa by using Mortar and pestal and filter the extract with the help of whatman filter paper.



Fig. 1: Different parts of Adhulsa plant



Fig. 2 : Crushed Green, Yellow and Stem Extract



Fig. 3: Filtration of Extract

INOCULATION OF CULTURE SAMPLE :

Sputum (T.B & Cough), Ear pus sample was collected from Government hospital Bramhapuri and pure culture of *E.coli* was collected from the

Microbiology laboratory of Nevjabai Hitkarini College Brahmapuri. Prepared 200 ml Nutrient broth into conical flask transfer 50 ml each Nutrient broth into 4 four conical flask and

autoclave it. Inoculated the all given culture sample into respective sterilized conical flask, Incubate for 37°C for 24 hrs.



Fig. 4: Sputum Sample



Fig. 5: Culture Sample

ANTIMICROBIAL ACTIVITY :

Prepared the MHA (Mueller Hinton Agar) media of proper amount autoclave it and after autoclaving pour the media into petri plates. Allow to solidified spread 1ml culture sample from Nutrient broth tubes in each respective plates, Prepared well in the middle of media with the help of borer pour extract of Green leaves, Yellow leaves and stem in each selective colony plate with the help of sterilized Pipettes. Incubate the plate for 24hrs at 37°C.



Fig. 6: Well Created using borer

RESULT AND DISCUSSION :

The antimicrobial activity of *Adhatoda vasica* against E. Coli, Ear pus, T.B and cough by well method. The plant extract *vasica* except T.B showed higher activity for different cultures sample. Zone of inhibition where seen in almost all petri plates which shows the effectiveness of *Adhatoda vasica*. Among all extracts only yellow leaves shows higher antimicrobial activity against Ear pus with maximum zone of inhibition 3.4 cm. Green leaves extract shows intermediate antimicrobial activity against the E.coli and Cough with zone of inhibition 2.2 cm. The stem extract shows slightly effective in microbial activity against all given culture sample. All extracts shows poorest Antimicrobial activity against Tuberculosis and does not gives zone of inhibition. As shown in Table no. 1

Table No. 1: Antimicrobial activity of plant extracts against tested by using well diffusion methods.

Sample	Green leaves extract	Yellow leaves extract	Stem extract
Cough	2.2 cm	1.8 cm	1.7 cm
Ear pus	2.2 cm	2.1 cm	1.9 cm
E. Coli	2 cm	3.4 cm	1.8 cm
Tuberculosis		-	-

The symbol (-) represent Negative test



Fig. 7: Antimicrobial activity of Green Leaves Extract by Agar Well Diffusion Method



Fig. 8: Antimicrobial activity of Yellow Leaves Extract by Agar Well Diffusion Method

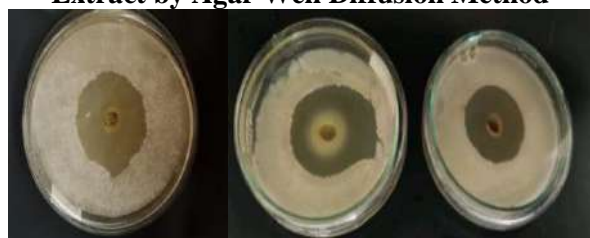


Fig. 9: Antimicrobial activity of Steam Extract by Agar Well Diffusion Method



Fig. 10: Antimicrobial activity of Different parts of Adhulsa Extract Against TB sample by Agar Well Diffusion Method

CONCLUSION :

After the discussion we can conclude that extraction of *Adhatoda vasica* can be used against Ear pus, *E.coli* and cough. The poorest result was seen in Tuberculosis. Green leaves shows antimicrobial activity against cough, *E.coli* and Ear pus gives zone of inhibition. Similarly, Yellow leaves shows antimicrobial activity against cough, *E. Coli* and Ear pus gives Zone of Inhibition. Stem shows slightly antimicrobial activity as compared to others and gives slight zone of inhibition.

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