



## Asian Journal of Research in Pharmaceutical Sciences and Biotechnology

Journal home page: [www.ajrpsb.com](http://www.ajrpsb.com)  
<https://doi.org/10.36673/AJRPSB.2021.v09.i04.A18>



### ANTIBACTERIAL ACTIVITY OF ETHANOL EXTRACTS OF LEAVES OF *ADINA CORDIFOLIA*

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#### ABSTRACT

The goal of this study is to use the Agar well diffusion method to test the antibacterial activity of leaves of *Adina cordifolia* (Rubiaceae family) against bacterial pathogens. The pharmacological activity of the chosen herbs, which are often utilised in traditional medicine, was shown to be extensive. Ethanol extracts of *Adina cordifolia* leaves were tested for antibacterial activity against Gram negative bacteria *E. coli* and Gram positive bacteria *S. aureus* bacterial strains at concentrations of 25mg/ml, 50mg/ml, 75mg/ml and 100mg/ml. The results revealed that ethanolic plant extracts with a concentration of 100 mg /ml were more effective against *E.coli* than *S. aureus*. The findings showed that the plant has potent antibacterial properties and might be a new source of antibiotics.

#### KEYWORDS

*Adina cordifolia*, Soxhlet extraction, Agar well diffusion and Antibacterial activity.

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#### INTRODUCTION

People nowadays rely on allopathic treatments more often, however microorganisms are developing resistant to these drugs. As a result, the emphasis is changing toward the utilisation of natural goods and therapeutic herbs, which were primarily employed in Ayurveda in ancient times. Because microbes are very sensitive to natural drugs and react at a very fast rate, antibacterial screening is used to find new therapeutic agents for infection and infectious disease. Because microbes are very sensitive to natural drugs and react at a very fast rate, the results come in a very short time<sup>1</sup>.

The Rubiaceae family includes *Adina cordifolia*. Haldu refers to a group of plants native to India's central and southern regions, as well as Sri Lanka<sup>2-5</sup>. Plants contain chemical components that have a specific physiologic impact on the human body, making them medicinal. Different parts have been identified with anticancer, antibacterial, antiulcer, hepatoprotective, antiinflammatory, anti-diabetic, anti-amoebic, anti-nociceptive, and other biological properties. In the past, this plant was used to cure rheumatism, stomachache, headache, cold/cough, toothache, fever, discomfort and swelling, bacterial infection, urinary problems, conjunctivitis, infertility, and other ailments<sup>2-8</sup>. The goal of this investigation was to see if there was any antibacterial activity in vitro against *E.coli*<sup>9-11</sup>.

#### **Botanical description**

**Botanical Name:** *Adina cordifolia* (Roxb.)

**Family:** Rubiaceae

**Synonym:** *Haldina Cordifolia* (Roxb.)

**Local Name:** Kadami, Haldu

**English Name:** Yellow Teak, Saffron Teak<sup>4</sup>.

### **MATERIAL AND METHODS**

#### **Collection of Sample**

Leaves of *Adina cordifolia* was collected from the campus of R.K. Pharmacy College Azamgarh, U.P. and thoroughly rinsed with distilled water and shade dried in two week.

#### **Preparation of extracts**

The dried leaves were then ground into tiny bits using a grinder. The powdered leaves were defatted in petroleum ether for 48 hours using the Soxhlet equipment. The resulting marc was then extracted with ethanol for 72 hours using a Soxhlet device. The extract was then filtered and evaporated to dryness under vacuum before being utilised in further experiments.

#### **Test Microorganisms Used**

The antibacterial activity of two bacterial species, *Escherichia coli* and *Staphylococcus aureus*, was tested in this study.

#### **Preparation of suspension of bacterial culture**

Microorganisms for testing *Escherichia coli* and *Staphylococcus aureus* were grown in nutritional

broth and incubated for 24 hours at 37°C 2°C in an incubator shaker at 120rpm.

#### **Preparation of Media**

The medium was made by mixing nutritional agar with distilled water and autoclaving it for 15 minutes at 121°C. It's utilised as an antibacterial agent.

#### **Determination of Antibacterial Effect**

The 20ml of nutritional agar was placed in Petri plates and set aside for 30 minutes to harden. The antibacterial activity of ethanolic extracts of *Adina cordifolia* leaf was tested using the agar well diffusion technique. Under laminar air flow, 100l of each bacterial solution (*E.coli*, *S. aureus*) was injected into two agar plates using the spread plate method. Using sterile cork borers, wells of 6mm in diameter and spaced about 2 cm apart were pierced in the culture medium to create four uniform wells in each Petri dish. The wells were filled with 50l of ethanolic extract at 25mg/ml, 50mg/ml, 75mg/ml, and 100mg/ml concentrations. After 1 hour, all of the agar plates were placed in the incubator and incubated at 37°C for 24 hours. The zone of inhibition surrounding the well was measured to evaluate antibacterial activity. The tests were carried out in an aseptic environment<sup>6,7,9</sup>.

### **RESULTS AND DISCUSSION**

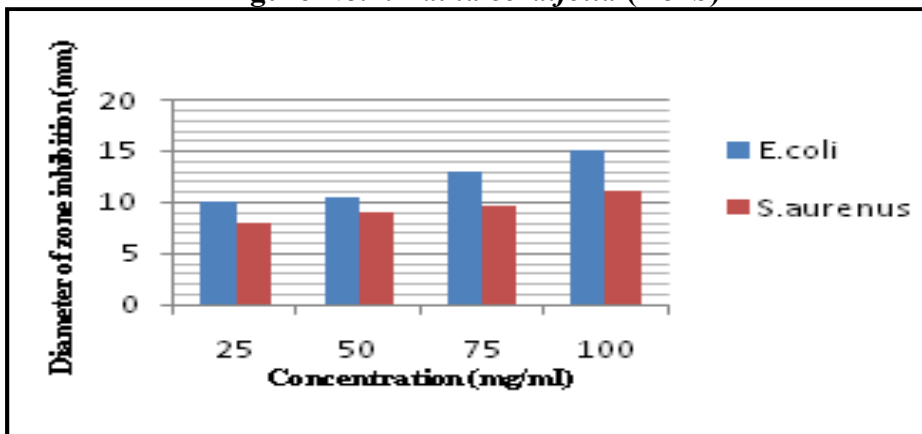
The antibacterial activity of ethanolic extracts of *Adina cordifolia* leaves was tested against one Gramnegative bacteria, *E. coli* and one Grampositive bacteria, *S. aureus*. Table No.1 and image 1 show the zone of inhibition for various concentrations of plant extract. When compared to *S. aureus*, the zone of inhibition produced by *E.coli* at 100mg/ml concentration was larger (15mm) (11mm).

**Table No.1: Antibacterial activities of ethanol extract of *adina cordifolia* leaves against test organisms**

S.No	Concentration (mg/ml)	Diameter of Zone Inhibition (mm)	
		<i>E. coli</i>	<i>S. aureus</i>
1	25	10	8
2	50	10.5	9
3	75	13	9.5
4	100	15	11



**Figure No.1: *Adina cordifolia* (Roxb)**



**Figure No.2: Zone of Inhibition, Effect of ethanol extract of *adina cordifolia* leaves on bacterial growth**

**CONCLUSION**

Natural products have always attracted the interest of the globe since they have less side effects, are more cost effective, and have a greater therapeutic impact. *Adina cordifolia* leaves were shown to have antimicrobial properties. Throughout human history, herbal remedies have been a widely respected source of medicine. Herbs are now frequently employed, demonstrating that they are becoming an increasingly important aspect of modern, high-tech medicine. Apart from possessing

natural therapeutic benefits against a number of diseases, medicinal plants have been studied extensively for the treatment of chronic cough, jaundice, stomachaches, cancer, diabetes, and a variety of other disorders. The current review focuses on *Adina cordifolia's* botanical description, pharmacological activity, and therapeutic usage. Active antibacterial components were found in these plants. More research is needed to extract these active compounds, which might be used as an antibiotic source.

## ACKNOWLEDGMENT

The authors wish to express their sincere gratitude to R.K. Pharmacy College, Azamgarh, Uttar Pradesh, India for providing necessary facilities to carry out this research work.

## CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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**Please cite this article in press as:** Asha Roshan and Navneet Kumar Verma. Antibacterial activity of *ethanol* extracts of leaves of *adina cordifolia*, *Asian Journal of Research in Pharmaceutical Sciences and Biotechnology*, 9(4), 2021, 158-161.