



# Antimicrobial Activity of Traditional Medicinal Plants of India

## KEYWORDS

Adhatoda vasica, Swertia chirata, Jatropha curcas, Antimicrobial activity

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**ABSTRACT** In India several plants are commonly used as herbal medicine for the treatment of infectious dis-eases. three such plants *Jatropha curcas*, *Swertia chirata*, and *Adhatoda vasica* commonly used by the people of the area were screened for potential antibacterial activity. Antibacterial activity of both aqueous and methanol extracts of the plants parts were used for screening. The plants screened *Jatropha curcas*, *Swertia chirata* and *Adhatoda vasica*. Antibacterial activity was tested against Gram negative bacteria. The susceptibility of the microorganism to the extracts of these plants was compared with each other. The result showed that, the methanol extracts of selected medicinal plants exhibited high activity against the tested organism rather than aqueous extract of those plants. Extract of *Adhatoda vasica* showed higher antimicrobial activity than the extract of *Jatropha curcas*.

## 1. INTRODUCTION

Historically, plants have provided a source of inspiration for novel drug compounds as plant derived medicines have made large contributions to human health and well being in our country we are using crude plants as medicine since Vedic period. A major part of the total population in developing countries still uses traditional folk medicine obtained from plant resources [1].

Nowadays, multiple drug resistance has developed due to the indiscriminate use commercial antimicrobial drugs commonly used in the treatment of infectious disease [2]. In addition to this problem, antibiotics are sometimes associated with adverse effects on the host, including hypersensitivity, immune suppression and allergic reactions [3]. This situation forced scientists to search for new antimicrobial substances. Given the alarming incidence of antibiotic resistance in bacteria of medical importance [4] there is a constant need for new and effective therapeutic agents [5]. Therefore, there is a need to develop alternative antimicrobial drugs for the treatment of Infectious diseases from medicinal plants [6]. Several screening studies have been carried out in different parts of the world. There are several reports on the antimicrobial activity of different herbal extracts in different regions of the world [7].

Herbal drugs have become increasingly popular and their use is widespread. Various medicinal plants have been used for years in daily life to treat disease all over the world. Higher plants, as sources of medicinal compounds, have continued to play a dominant role in the maintenance of human health since ancient times [8].

Over 50% of all modern clinical drugs are of natural product origin [9] and natural products play an important role in drug development programs in the pharmaceutical industry [10].

It has been suggested that aqueous and ethanolic extracts from plants used in allopathic medicine are potential sources of antiviral, antitumor, antimicrobial agent [11].

In less developed states of India and particularly in Chhattisgarh, low income people such as rural farmers, people of small isolate villages and native communities use herbal medicine for the treatment of common infections. It is necessary to evaluate, in a scientific base, the potential use of herbal medicine for the treatment of infectious diseases produced by common pathogens. In the present study we have chosen some plants used in herbal medicine to determine their antibacterial property. [19] Evidently, there are not suf-

ficient scientific studies that confirm the antimicrobial activity of these plants. This study looks into the in vitro antimicrobial activity of these plants against gram negative (*E.coli*) microorganism. [13].

## 2. MATERIALS AND METHODS

Selection of medicinal plants for this study: In the present work a few selected medicinal plants were screened for potential antibacterial activity. These are as follows:

*Adhatoda vasica*  
Family: Acanthaceae  
Parts Used: Leaf

Traditional uses: Asthma, dermatitis, antispasmodic and chronic bronchitis.

*Swertia chirata*  
Family: Gentianaceae  
Parts Used: Leaf

Traditional uses: febricity, stomachic and liver disorders, antioxidative and hypoglycemic,

*Jatropha curcas*  
Family: Euphorbiaceae  
Parts Used: Leaf

Traditional uses: Anti-cancer, Anti-Parasitic and Anti-helminthic action.

### Sterilization of Plant material:

Fresh plants leaves were collected from garden of Rungta College of Pharmaceutical Sciences and Research, Bhilai. These explants (leaves) were washed with distilled water and sterilized by 0.1% solution of mercuric chloride for 1 minutes. After sterilization the explants (leaves) were thoroughly washed with distilled water.

### Preparation of extracts:

The collected materials were grinded to fine power with the help of pestle-mortar. Then these powdered materials were used for the preparation aqueous (20gm/ml) and 70 % methanol extracts. The final concentration of the each extract was 20 mg/ml.

### Microorganisms used:

The gram negative (*E.coli*) bacterial sample was collected from the Department of BioTech. in GD Rungta college of Science & Technology, Bhilai, (C.G.), INDIA, The organism

was sub-cultured in nutrient broth and nutrient agar for us in experiment.

#### In vitro Antibacterial Study:

The bacteria (*E.coli*) used for the antibacterial assay were sub-cultured. The modified agar-well diffusion method of [12] was employed to study the antibacterial activity of the plant extract. In this method well were poured with the test extracts and introduced into the plates inoculated with the bacterium. [13].The plates were incubated overnight at 37 degree Celsius. Antibacterial activity was determined measuring the inhibition zones formed around the well. [14],[15].

### 3. RESULT AND DISCUSSION

The aqueous extract of *Adhatoda vasica* and *Swertia chirata* *Jatropha curcas* were not found to be active against tested organism(*E.coli*) (Fig. A1, A2, A3).The methanol extract of *Adhatoda vasica* and *Swertia chirata*, *Jatropha curcas* showed different levels of antimicrobial activity toward test organism(*E.coli*). The methanol extract of *Adhatoda vasica* showed highest antimicrobial activity against tested organism (*E.coli*)(Fig.A1).the methanol extract of *Swertia chirata* exhibited low antimicrobial activity against tested organism(*E. coli*). *Adhatoda vasica*.(Fig.A2).

The methanol extract of *Jatropha curcas* not exhibited antimicrobial activity against *E.coli*.(Fig.A3).Successful prediction of botanical compounds from plant material is largely dependent on the type of solvent used in the extraction procedure.Traditional medicinal plants are used primarily as the solvent but in our studies we found that plant extracts in organic solvent (methanol)provided more consistent antimicrobial activity compared to those extracted in water. These observations can be rationalized in terms of the polarity of the compounds being extracted by each solvent and in addition to their intrinsic bioactivity. The results of screening are presented in (Fig. A4.).

The aqueous and methanol extracts of *Adhatoda vasica*, *Swertia chirata*, & *Jatropha curcas*, were subjected to a preliminary screening for antimicrobial activity against standard gram negative (*Escherichia coli*)bacteria. It was clear that the methanol extract of selected medicinal plants exhibited high activity against the tested organism rather than aqueous extract of those plants. Methanolic extracts of plants generally possess terpenes and phenolics which are reported different workers as antimicrobial compounds [16],[17].

### 4. PHOTOGRAPH

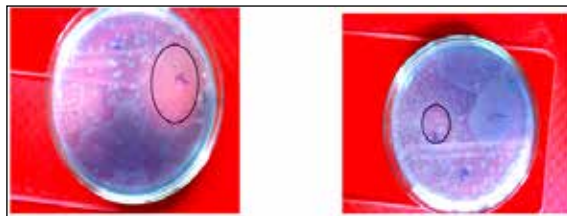


Fig: A1,(Aquatic & Methanol Fig:A2 ,(Aquatic & Methanol extract of *Adhatoda vasica* ) extract of *Swertia chirata*)



Fig:A3,(Aquatic & Methanol extract of *Jatropha curcas*)

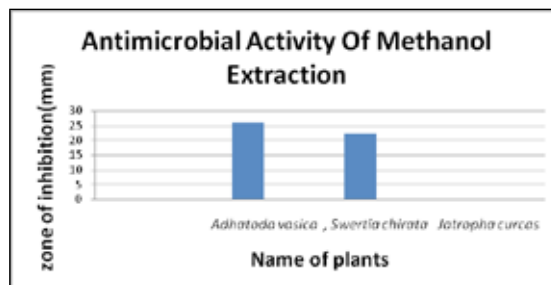


Fig: A4, Antibacterial activity of *Adhatoda vasica* (a), *Swertia chirata* (b) and *Jatropha curcas* (C in methanol (20mg/ml) extracts against gram (-ve) microorganisms.

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