ADHATHODA VASICA- A CURE FOR RESPIRATORY INFECTIONS

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***Abstract*:** *Adhathoda vasica* belonging to Acanthaceae family is used as medicine since ancient times. It is well known for its effect in treating respiratory infections and is highly demandable. The present study aims to isolate respiratory pathogens from clinical samples and to prepare herbal syrup using the leaves of *Adhathoda vasica*. This study also determines the effect of herbal syrup on respiratory pathogens by Agar well diffusion method and disc diffusion method. The pathogens such as *Staphylococcus aureus*, *Klebsiells pneumoniae*, *Pseudomonas aeruginosa*, and *Escherchia coli* were successfully isolated. The herbal syrup inhibited *Klebsiella pneumoniae*, followed by *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Escherchia coli* on both methods. The results suggested that the plant *Adhathoda vasica* has significant effect on respiratory pathogens and can be used as drug for respiratory infections.

Key words- *Adhathoda vasica*, Herbal syrup, Agar well diffusion, Disc diffusion, Respiratory pathogens.

I. INTRODUCTION

Medicinal plants play a dominant role in maintaining human health since ancient times. Medicinal plants are important sources of practical drugs for people throughout the year. Plants acts as a prominent reservoir for new and novel therapeutics (Demain and Sanchez, 2009). They can be used as antibacterial, anti helminthic, astringent, emetic, febrifuge, sedative and stimulant (Ishibangu, et. al., 2002). They are a rich source of antimicrobial agents (Mahesh and Sathish, 2008). They are rich in phytoconstituents and many of them are effectively used to cure a wide range of ailments. Medicinal plants contain numerous biologically active compounds which are helpful in the treatment of various diseases and improving the life (Samy, *et. al.*, 2008).

Adhatoda vasica belonging to Acanthaceae family is a small, evergreen perennial bush. It is sub herbaceous bush which is distributed throughout India (Kalpesh Panara, *et. al.*, 2012). It is used in ancient ayurvedic system of medicine and is known as "Aadathodai" in Tamil and "Malabar nut" in English (Anjaria and Bhatt, 1995). The whole plant is used to cure many human ailments. The leaves are simple, petiolate, ex-stipulate, 10-20 cm long and 3-10 cm broad, lanceolate to ovate lanceolate having crenate margin, tapering base and an acuminate apex with characteristic odour and bitter taste. The leaves are of dark green colour in above region and pale yellow below. The leaves are used to treat malarial fever, chronic fever, intrinsic hemorrhage, cough, asthma, leprosy, skin diseases, and piles (Sharma, 1996). The plant is also used as abortifacient (Wakhloo, *et. al.*, 1979). They are used as analgesic and are effective as cardiotonic (Ilango, *et. al.*, 2009). The extract of the leaves are used against ringworm (Khare, 2007).

The present study aims to determine the antibacterial activity of herbal syrup prepared from *Adhathoda vasica* against respiratory pathogens isolated from clinical samples.

II. MATERIALS AND METHODS

2.1 Collection of Plant

The plant sample was collected from Vadakuthu, Cuddalore district, Tamilnadu. The leaves of *Adhathoda vasica* were collected and washed thoroughly with distilled water to remove the dust particles. Then the leaves were shade dried and coarsely powdered using mechanical grinder.

2.2 Preparation of herbal syrup

10 g of powdered sample was added to 50 ml of water and boiled to 78°C. Then, 10 g of palm jaggery was added to the solution and boiled until it gets reduced to one fold. The syrup is filtered using clean muslin cloth and cooled. The herbal syrup was ready for further use.

2.3 Collection of clinical samples

Sputum samples were collected from infected persons by using sterile cotton swabs. Then the swabs were immediately immersed into saline.

2.4 Isolation and Identification of pathogenic bacteria

Sputum samples were used to isolate the bacteria. The samples were collected aseptically and then streaked on Nutrient agar, Mannitol salt agar, Cetrimide agar medium and EMB agar medium. The isolated organisms were identified by Gram staining.

2.5 Antimicrobial activity using agarwell diffusion method

20 ml of sterile Muller Hinton agar was poured over sterile petriplates and allowed to set. Plates were then seeded with 24 hrs old bacterial culture using sterile swabs. For agar well diffusion method, wells were made on the plate by using cork borer. Extracts were added to the well in the concentration of 10µl, 20µl, 30µl respectively. The plates were allowed to dry for 10 minutes for the diffusion of extracts into the agar. Then the plates were incubated at 37°C for 24 hrs. After 24 hrs, the plates were examined for zone of inhibition (Murray, *et. al.,* 1995).

2.6 Antimicrobial activity using disc diffusion method

Sterile Muller Hinton agar plates were prepared as agar well diffusion method. Sterile filter paper discs impregnated with syrup of concentrations 10µl, 20µl, and 30µl were placed over the agar plates. The plates were allowed to dry for 10 minutes for the diffusion of extracts into the agar. Then the plates were incubated at 37°C for 24 hrs. After 24 hrs, the zones were examined and measured in millimeters (Murray, *et. al.,* 1995).

III. RESULTS AND DISCUSSION

Pathogens such as *Staphylocoocus aureus, Klebsiella pneumoniae, Escherichia coli, and Pseudomonas aeruginosa* were isolated from clinical samples. The herbal syrup preapared from the leaves of *Adhathoda vasica* is dark green in colour and in liquid consistency. This herbal syrup possesses antibacterial activity and shows effective result against respiratory pathogens. The results obtained by Agar well diffusion method are summarized in table 1. The results obtained by disc diffusion method are summarized in Table 2. The size of the zone increases as the concentration increases. The antimicrobial activity is mainly due to the presence of terpenes which can cause disruption of cell membranes (Urzua, *et. al.,* 1998). The antimicrobials prepared from plants are more effective than synthetic antimicrobials (Iwu, *et. al.,* 1999). The maximum zone of inhibition is seen in *Klebsiella pneumoniae* (16mm). The minimum inhibitory effect is on *Escheriachia coli* (6mm) as it is a normal flora and it can cause only opportunistic infections. Thus, it is evident that the formulated herbal syrup is effective against respiratory pathogens.

Table 1. Results of zone of inhibition using herbal syrup by agar well diffusion method.

PATHOGENS	10µl	20µl	30µl
Staphylococcus aureus	3mm	7mm	11mm
Pseudomonas aeruginosa	4mm	8mm	13mm
Escherichia coli	1mm	3mm	6mm
Klebsiella pneumoniae	8mm	12mm	16mm

Table 2. Results of zone of inhibition using herbal syrup by disc diffusion method.

PATHOGENS	10µl	20µl	30µl
Staphylococcus aureus	2mm	5mm	9mm
Pseudomonas aeruginosa	3mm	5mm	10mm

Escherichia coli	NA	2mm	4mm
Klebsiella pneumoniae	7mm	11mm	14mm

III. CONCLUSION

In this study, the antibacterial activity of *Adhathoda vasica* has been investigated. The formulated herbal syrup is more effect on *Klebsiella pneumoniae* and it can be used as syrup for respiratory infections. This study proves that leaves of *Adhathoda vasica* are capable of treating respiratory problems. Further pharmacological and Pharmacognosical investigations are being carried out to identify its medicinal profile in the field of medicine.

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