

ANTIMICROBIAL ACTIVITY POTENTIAL OF *NARAVELIA ZEYLANICA* (L.) DC. - AN IMPORTANT ETHNOMEDICINAL PLANT OF KERALA

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ABSTRACT

Naravalia zeylanica is a woody climbing vine distributed in hilly regions in South East Asia. It is found in almost all part of Kerala. It is one of the important medicinal plants used by the various people of Kerala to treat inflammation, skin diseases, rheumatoid arthritis, arthritis, headache, colic, wounds and ulcers. In the present investigation antimicrobial activity of the *Naravalia zeylanica* was evaluated against some gram positive and gram negative bacteria by disc diffusion method. Whole plant powder was extracted with different solvents such as Petroleum ether, Acetone, ethanol and distilled water were used for the study. The result showed that the ethanolic extract of *Naravalia zeylanica* exhibited more activity compared to other solvent extracts.

INTRODUCTION

India is one of the 12 mega biodiversity countries in the world. Variety of plants and animals indicates its significance in all over the world. Most of the plants are used as a medicine in different Indian systems of medicine. According to World Health Organization [1], medicinal plants would be the best source to obtain a variety of drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants. The use of crude extracts of plants parts and phytochemicals, of known antimicrobial properties, can be of great significance in the therapeutic treatments. In recent years, a number of studies have been conducted in various countries to prove such efficiency. Many plants have been used because of their antimicrobial traits, which are due to the secondary metabolites synthesized by the plants. *Naravalia zeylanica* is a traditionally used plant in India, for various medicinal preparations from ancient times. It is a woody climber with tuberous roots; opposite,

ovate, cordate leaflets; small flowers arranged in panicles and red coloured achenes along with long feathery styles [2]. The ethnomedicinal report revealed that the aerial parts of *Naravalia zeylanica* traditionally used in vitiated vata, pitta, inflammation, skin diseases, rheumatoid arthritis, arthritis, headache, colic, wounds and ulcers [3]. Plant is reported to contain mainly alkaloids, flavonoids, saponins and tannins [4]. The plant was already reported for anti-ulcer, antiarthritic, anti-inflammatory and anthelmintic activity [5, 6]. The enormous activity present in the plant indicated it contains lots of phytoconstituents. So the present study was framed to evaluate the antibacterial potential of *Naravalia zeylanica* against three gram positive and gram negative bacteria.

MATERIALS AND METHODS

The plant material *Naravalia zeylanica* (Malayalam - Vatakkodi, Poyalachi, karuppakkodi) was collected from Manikkunnumala, Wayanad, Kerala and the plant material was identified by the experts at M. S Swaminathan Research Foundation and also by literature survey.

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Research Article



Method for preparation of plant extract

The collected plant material was cleaned and dried properly. 10g of powdered plant material was put into different wide mouth bottles, each containing 100 ml of Petroleum ether, Acetone, Ethanol and distilled water. The bottles were closed and kept for 72 hours. After 72 hours, the extracts were filtered using Whatmann no 1 filter paper. The extract was subjected flash-evaporation to get the concentrated extract.

Preparation of the test organisms

The organisms selected for the present study is *Escherichia coli*, *Staphylococcus aureus* and *Klebsiella pneumoniae*. Stock cultures of different bacteria were grown in nutrient broth at 30°C and were sub-cultured and maintained in nutrient broth at 4°C. Before swabbing, each culture was diluted (1:10) with fresh sterile nutrient broth.

Antibacterial assay

The antibacterial activity was determined by the paper disc diffusion method [7]. A suspension of the organism was added to sterile nutrient agar medium at 45°C. The mixture was transferred to sterile petriplates and allowed to solidify. Sterile disc of diameter 5 mm (made from Whatmann No. 1 filter paper previously sterilized in autoclave) was dipped in different extracts of the plant. Then the sterile disc containing test solution of the plant extracts were placed over the seeded agar plates in such a way that there is no overlapping of zone of inhibition. Standards and a blank were placed on the surface of agar plate. The plates were kept at room temperature for 2 h to allow diffusion of the test solution into the agar; they were

incubated for 24 h at 37°C. After the incubation period was over, the plates were observed and zone of inhibition measured in millimeters (mm).

RESULTS AND DISCUSSION

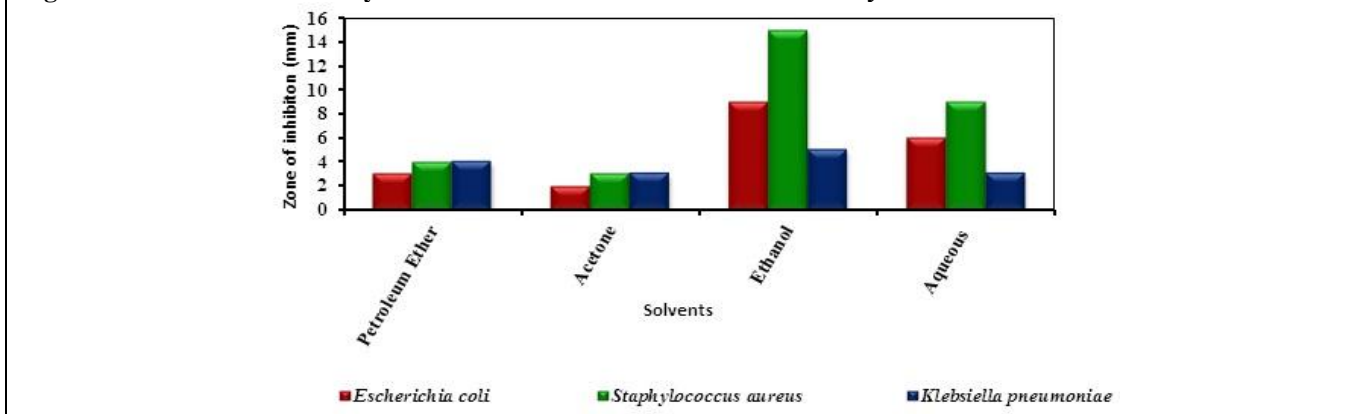
The ethnomedicinal plant selected for the present study is *Naravalia zeylanica* used by the various people of Kerala. The plant material was collected, dried, powdered and extracted with four different solvents such as petroleum ether, acetone, ethanol and distilled water by cold maceration method. Antibacterial activity of the extracts was carried out by agar disc diffusion method and zone of inhibition was measured. The zone of inhibition of *Naravalia zeylanica* against three bacterial strains was displayed in Table 1 and Figure 1.

The result showed that maximum zone of inhibition was observed against three bacterial strains in ethanol extract followed by aqueous extract. There was no significant results observed against petroleum ether and acetone extracts. The study proved that *Naravalia zeylanica* is an effective antimicrobial agent. The ethanolic extracts are found to be more effective than the other extract. The present study supported by the study of *Uvarani et al.* [8], the chloroform and ethanolic extract showed the inhibitory activity against four bacteria strains, but the ethanolic extract showed potent inhibition against *Streptococcus pneumoniae* and *Staphylococcus aureus* in higher concentration. The potent antibacterial activity may be due the presence of phytoconstituents such as flavonoids, triterpenoids and phenolic compounds in the plant.

Table 1. Antibacterial Activity of different solvent extracts of *Naravalia zeylanica*

S. No	Solvents	Zone of Inhibition (mm)		
		<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>	<i>Klebsiella pneumoniae</i>
1.	Petroleum Ether	3	4	4
2.	Acetone	2	3	3
3.	Ethanol	9	15	5
4.	Aqueous	6	9	3

Figure 1. Antibacterial Activity of different solvent extracts of *Naravalia zeylanica*



CONCLUSION

In the present study *Naravalia zeylanica* extract offers a remarkable antimicrobial activity against Gram +ve and gram -ve organisms. Based on the results obtained *Naravalia zeylanica* is found to be an effective antimicrobial agent which can be used in various products including drugs, cosmetics and other products.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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