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Phytochemical Screening and Antibacterial Activity of *Aerva Lanata L.*

Microbiology

KEYWORDS : Aerva lanata L, Phytochemical, Antibacterial activity.

Karthikeyan Elangovan — PG and Research Department of Microbiology, Marudupandiyar College, Thanjavur, Tamilnadu, India.

Arunkumar Sathasivam — Research scholar, Department of Biotechnology and Genetic Engineering, Bharathidasan University, Tiruchirappalli, Tamilnadu, India.

Rajasekaran Rajendran — PG and Research Department of Microbiology, Marudupandiyar College, Thanjavur, Tamilnadu, India.

ABSTRACT

Aerva lanata L is the most important Indian medicinal plant used in the treatment of various diseases. The phytochemical studies on the plate leaf extract showed that, alkaloids, Terpenoids, Cardiac glycosides, saponin, tannins and flavonoids were presented. The antibacterial activity of distilled water, acetone and methanol of Aerva lanata L leaves were tested on five different pathogenic bacteria. The zones of inhibition ranged between 16 mm to 23 mm for bacterial pathogens. Extracts made in methanol was found to be effective against most of the organisms.

INTRODUCTION

Plants have been an essential part of human society since the start of civilization. During the vedic period, great importance was given to plants. Rig Veda and Anathar Veda around 250 medicinal plants were described. It is estimated and approximately fifty six present of low income world's population use herbal medicine and supplementation for their primary health care. Respiratory infections, diarrhea, fungal or bacterial infections, diabetes and malaria are among the common health problems in rural communities in tropical developing countries. The rural population in different parts of the world is more disposed to dispose to traditional ways of treatment because of the easy availability and cheaper cost (Subbarayappa, 2001). Numerous tropical medicinal plants are used traditionally which are remedial against these diseases (Somchit *et al.,* 2004). Medicinal and aromatic plants and their essence are rich in antibacterial and antifungal compounds could be an alternate way to combat against bacterial and fungal diseases (Ramasamy and Charles Monoharan, 2004).

Aerva lanata (L.) Juss. Ex Schult belongs to the family Amaranthaceae. It is one of the important plant grow in the warmer parts of India ascending to 1,000 m. The Sanskrit terms of *A. lanata* are paashaanabheda, gorakshaganjaa, satkabhedi, aadaanpaak. It is commonly known as sirupeelar in Tamil or Siddha (Khare, 2007). Therefore, the present investigation was undertaken with its primary motive to isolate and identify the chemical constituents of the above mentioned plant. The aim of this study is to screen the antimicrobial activity of the leaves of *Aerva lanata* L. using four different solvents such as distilled water, acetone and methanol.

MATERIAL AND METHODS

Collection and identification of plant

The fresh plant materials were collected with sterilized knife in clean polyethylene bags separately and brought to the laboratory. Washed and botanically identified, cut into small pieces and then dried in shade for about two weeks. The dried plant material was coarsely powdered and passed through sieve and used for the extraction by using the solvents of increasing polarity.

Continuous hot extraction-using soxhlet apparatus

The coarse powder was packed, in the soxhlet apparatus and extracted with different solvents namely distilled water, acetone and methanol separately by continuous hot percolation method. After the completion each extract was filtered and the solvents were removed by distillation under reduced pressure, a cosloured residue was attained.

Phytochemical test

The extract was analyzed for alkaloids, carbohydrate, phytosterols, fixed oil and fats, tannins and phenolic compounds, proteins and amino acids, gums and mucilage, flavonoids, lignin and saponins carried out by standard ((Harborne, 1976; Trease and Evens, 1978).

Pathogenic bacteria

The microbial species were obtained from MTCC- (Microbial Type Culture Collection) IMTECH, Chandigarh. The plant extracts were tested for antibacterial activity in the disc diffusion assay using five important test strains of bacteria viz. *Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus* and *Enterococcus fecalis.* Bacterial cultures were maintained on nutrient agar at 4°C. The cultures were sub-cultured in nutrient broth at 37°C for 18 hours and used for the experiments.

Assay of antibaterial activity

Antibacterial activity was carried out using disc diffusion method (Bauer *et al.,* 1996). Concentration impregnated discs were placed on the selected bacterial strain swabbed plates. Each plate contains 6 different concentrated discs. Plates were incubated at 37°C for 24 hrs and after incubation results were observed.

RESULTS AND DISCUSSION

The phytochemical active compounds of *Aerva lanata* (L.) qualitatively analyzed and the results were presented in Table-1. In the phytochemical screen in compound such as alkaloids, Terpenoids, Cardiac glycosides, saponin, tannins and flavonoids present in *Aerva lanata* (L.). Knowing the phytochemical constituent can help one to speculate on the medicinal value of the leaves. Flavonoids have been reported to have antibacterial and antifungal properties (Chattopadhyay *et al.,* 2001). Tannins have antimicrobial (Satdive *et al.,* 2003) and antioxidant properties. Alkaloids have pronounced physiological effect particularly on the nervous system (Irobi and Daramola, 1994). The presence of there phytochemicals in the leaves suggests that the plant is pharmacologically active, supporting the claim by traditional healers.

Plants are important source of potentially useful structures for the development of new chemotherapeutic agents. Many reports are available on the antiviral, antibacterial, antifungal, anthelmintic, antimolluscal and anti-inflammatory properties of plants

(Khan *et al.,* 1988; Mensah *et al.,* 1990).

In the present study *Aerva lanata* (L.) antibacterial activities were analyzed against *Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus* and *Enterococcus fecalis.* The highest antibacterial activities were observed in methanol extract compared than standard antibiotic (Gentamicin, 10mg). Among the three solvent extract used the methanol was found to be effective when compare to the other two solvents (Fig – 1). Studies on the antimicrobial properties of the medicinal plants of the world have been investigated by many biologists (**Deena** *et al.,* **2002)**.

CONCLUSION

A methanolic extract of *Aerva lanata* (L.) possesses antimicrobial potentials against both gram positive and gram negative bacteria. It is therefore confirmed as a useful antimicrobial agent. The powdered leaves is rich in phytochemicals and secondary metabolites such as alkaloids, Terpenoids, Cardiac glycosides, saponin, tannins and flavonoids which are probably responsible for its medicinal properties.

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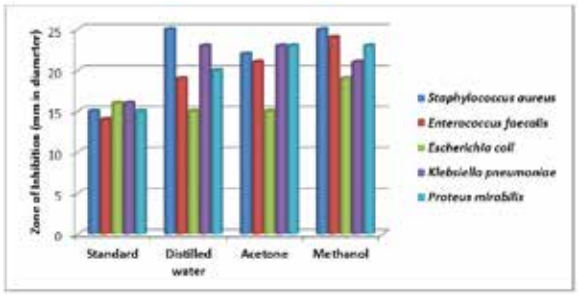
Table 1. Preliminary phytochemical study of *Aerva lanata* (L.)

S. No.	Phytochemical compounds	Leaves extract
1.	Alkaloid	+
2	Terpenoids	+
3.	Cardiac glycoside	+
4.	Saponin	+
5.	Tannin	+
6.	Flavonoids	+

+ indicates the presence and – indicates the absence of the chemical constituents.

Fig. 1. Screening of antibacterial activity of *Aerva lanata* (L.) leaves extracts



*Gentamicin (10mg)

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