



COMPARATIVE ANTIBACTERIAL STUDY OF METHANOLIC EXTRACTS (ROOT AND LEAF) AND PHYTOCHEMICAL SCREENING OF *Achyranthes aspera* Linn.

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ABSTRACT: *Achyranthes aspera* Linn a medicinal plant, belongs to the amaranthaceae family. In Ayurvedic system of medicine, the parts of this plant are used to treat various type of infectious diseases. The present study was carried out to compare the anti-bacterial activity of methanolic extracts of roots and leaves of *Achyranthus aspera* linn. Phytochemical screening showed that the plant contain carbohydrates, alkaloids, glycosides, terpenoids etc. The result obtained in the present study indicates that root extract of *Achyranthus aspera* linn is more powerful anti-bacterial agent when compared with leaf extract of the same plant.

KEYWORDS: - *Achyranthes aspera*, Ant-bacterial, Cup plate method, zone of inhibition

1. INTRODUCTION

Art of prevention and treatment of ailments by human using plant and plant parts is time immemorial. Documentary evidences for the usage can be traced back over five to six millennia of the civilization from India. However, over the years, traditional knowledge has given way to the advent of modern medicine and much of the knowledge is lost after generations of unuse. Inability of modern medicine system in treating several communicable and chronic diseases along with the advent of highly resistant microorganisms has resulted in renewed and rejuvenated efforts in the quest for plants with medicinal properties [1]. Plants especially with ethnomedicinal use have attracted the scientific community to evaluate their complete range of biological activities starting from antibiotic to antitumor activities. The potential of these plants as source for new drugs largely remain unexplored even today. Plants screened for antibacterial activities have provided modern medicine with an abundance of drugs and treatments against the infections [2].

Achyranthes aspera Linn belongs to family Amaranthaceae, found throughout tropical Asia, Africa and America. It is a climbing sub shrub or

shrub leaves-alternate or opposite, entire, estipulate, flower-small bisexual or unisexual, solitary or aggregated in cymes [3]. The antimicrobial properties of plants have been investigated by a number of researchers worldwide. In recent years the interest to Scholars Research Library evaluate plants possessing antibacterial activity for various diseases is growing [4] and it has also been proved that various plants extracts posses bacteriostatic and bactericidal effects [5] and most of the plants contains many bioactive compounds. In view of the above, the current study was carried out to evaluate antibacterial activity of *Achyranthes aspera* Linn.

2. MATERIALS AND METHODS

2.1. Plant material

The plant material was collected from Ramanattukara, Calicut, Kerala. The plant was identified by Calicut University Herbarium, Kerala, India and a voucher specimen (No.107899) was deposited at the Calicut university herbarium (Department of botany university of Calicut).

2.2.1. Extraction

The leaf and root were collected separately from the fresh plant. It was then dried in shades for

28days. The temperature was strictly ensured that the active constituents would not decompose. After drying, the plant part was cut into small sizes. The plant was extracted by the cold extraction method. 5g of powder was soaked in 250ml methanolic in a glass container for 6 days. The extract was concentrated by evaporation and dried to a solid in an oven. Finally, reddish color type of primary methanolic extract (PME) was found. The remaining methanolic extract was also concentrated by evaporation.

2.3. Chemicals

All the chemicals were purchased from Merck chemicals. TLC was done on prepared silica gel plates using N-Hexane: ethyl acetate: glacial acetic acid (10:5:0.1) as solvent system. Spots were detected by sulphuric acid spray reagent.

2.4. Phytochemical studies of the extract

The compounds that were responsible for the medicinal property of a drug are usually secondary metabolites. A systematic study of crude drug embraces through consideration of primary and secondary metabolites derived, as a result of plant metabolism. Thus detection of these various constituents are carried out by phytochemical screening techniques. The plant was found to contain alkaloids, carbohydrates, glycosides, Terpenoids etc as active constituents. R_f value of leaf extract was found to be 0.4918 while that of root extract was 0.4920

2.5. Anti-bacterial activity

Anti-bacterial activity was done using cup plate method. To prepare culture media Peptone (2 gm), Sodium chloride (1 gm) Beef extract (1 gm), Agar (2gm), was accurately weighed using physical balance and dissolve in 200 ml purified water with the aid of heat till you get a homogeneous liquid. Adjust to p^H 8-8.5 with 5M NaOH & boil for 10 minutes. If necessary filter it and sterilize by autoclaving at 121⁰c for 15mins. After sterilization, p^H should be adjusted to 7.2-7. Suspension of microorganism was prepared by inoculating *Staphylococcus aureus* to sterile saline (0.9% w/v NaCl solution) aseptically.

Sterilized nutrient agar medium is allowed to cool and when the temperature is about 45⁰c. 2ml of the suspension of microorganism was mixed with it and by gentle swirling. Poured this mixture aseptically into a pre sterilized petridish and allowed to set. When the seeded agar medium is set cups were bored with sterile cup borer. Using sterile syringe injected 0.1ml solution of test, standard, and control into the cups. After injection the petridishes are kept at room temperature for 2hrs for uniform diffusion of the agent to occur in seeded agar medium. Then it is incubated at 37⁰c for 24hrs and result are interpreted based on the zone of inhibition produced (6, 7).

3. RESULTS AND DISCUSSION

The phytochemical screening of the methanolic extract of leaf and root, the following results were obtained. The leaf extract showed the presence of Carbohydrates, Alkaloids, and glycosides. Root extract showed the presence of Carbohydrates, Alkaloids, Glycosides, and Terpenoids. From the TLC studies R_f value of root and leaf extract was found to be 0.4920, 0.4918 respectively. It was found that R_f value of both root and leaf extract are almost same and these values are identical to the R_f value of oleanolic acid.

The methanolic extract of a root and leaf of *Achyranthes aspera* linn. obtained by maceration have inhibitory activity against *Staphylococcus aureus* with an inhibition zone of 1cm and 0.6 cm respectively (Table 1).

Table 1. Antibacterial Activity

Organism	Standard (Ampicillin)	MeOH	MeOH extract of Root	MeOH extract of Leaf
<i>Staphylococcus aureus</i>	1.5 cm	0.3 cm	1 cm	0.6 cm

4. CONCLUSION

The current study has demonstrated that methanolic extract of root showed more diameter of inhibition zone when compared to methanolic extract of leaf. From the present study it was concluded that root extract of *Achyranthes aspera* was found to be more useful as antibacterial agent when compared with leaf extract of the same plant. Phytochemical study of methanolic extract of leaf and root of *Achyranthes aspera* linn. showed that root extracts are rich in phytochemicals as compared to leaf extract. TLC identity test of both extract showed the R_f value nearly same which correspond to R_f value of oleanolic acid.

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