COMPARATIVE MICROBIOLOGICAL ACTIVITIES OF ETHANOLIC EXTRACTS OF ROOTS AND AERIAL PARTS OF *ACHYRANTHES ASPERA* LINN

S. Suresh Kumar*, P. Perumal, D. Boopathy, Pulok. K. Mukherjee¹, B. Suresh²

*J.K.K. Nataraja College of Pharmacy, Komarapalayam, ¹Dept. of Pharmaceutical Technology, Jadavpur University, Kolkata, ²J.S. S. College of Pharmacy, Ooty.

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**ABSTRACT:** Ethanolic extract of roots and aerial parts of *Achyranthes aspera* was investigated for its antibacterial activity against Bacillus subtilis, Bacillus pumilus, and Proteus vulgaris and anti fungal activity against Cryptococcus neoformans, Aspergillus flavus at 100 mg/disc using diffusion method. The comparative studies shown that ethanolic extract of roots and aerial parts of *Achyranthes aspera* have exhibited moderately equal action when compared to Cotrimoxazole (30 mg/disc) for antibacterial and Clotrimazole (30 mg/disc) for antifungal activity. Our findings confirm the traditional therapeutic claims for this herb.

**INTRODUCTION**

*Achyranthes aspera* (Amaranthaceae) commonly found as a weed on waysides and waste places throughout India. The paste is prepared from leaves and is used for cuts, boils, blisters, abortifacient¹,². A decoction of the root is used in anti inflammatory, antifertility, remove cataracts and for snake bite (as an antidote). The present study was undertaken to study the comparative antibacterial and antifungal activity of the ethanolic extracts of roots and aerial parts of *Achyranthes aspera*.

**MATERIALS AND METHODS:**

**Preparation of Extracts:**

The plant *Achyranthes aspera* were collected near Erode. The root and aerial parts were separated and it was shade dried, pulverized and sieved through 40 mesh. The powdered roots and aerial parts were extracted with ethanol in soxhlet apparatus. The ethanol extracts obtained were evaporated under vacuum to remove solvent completely. Then those were taken for further studies.

**Bacterial Strains:**

Bacterial strains used for testing included for antibacterial studies such as Bacillus subtilis, Bacillus pumilus, Proteus vulgaris and for Antifungal studies Aspergillus flavus, Cryptococcus neoformans were obtained from National Collection of Industrial Micro Organism, Pune, India. The stock culture was maintained on muller Hinton agar medium at 37°C.

**Antibacterial and Antifungal Activity:**

Antibacterial and antifungal activity of the extract of *Achyranthes aspera* was studied using the disc diffusion method³ petriplates containing 10ml of muller Hinton agar medium were seeded with 24 hrs old culture of selected antibacterial and antifungal strain. Sterile filter paper discs (6 mm) containing 100 mg/disc of plant extract residue dissolved in acetone were placed on the surface of the medium. Acetone and water alone served as negative controls. A standard separate disc contained cotrimoxazole (30 mg/disc) as reference drug.
mg/disc) was used as a positive control for antibacterial and clotrimazole (30 mg/disc) was used as a positive control for antifungal activity. Incubation was done for 24 hrs at 37°C. The assessment of antibacterial and antifungal activity was based on the measurement of diameter of zone of inhibition formed around the disc. Three determinations were conducted for the extract.

RESULTS AND DISCUSSION:

The comparative studies shown that ethanolic extract of root and aerial parts of *Achyranthes aspera* have equipotent activity against all the bacterial and fungal strains tested. (Table 1 and 2). Plants showing significant therapeutic activity may be due to the presence of alkaloids and saponin principles. These results suggest the presence of either good antibacterial and antifungal potency (or) the high concentration of an active principle in the extract. The high degree of antibacterial and antifungal activity seems to confirm the folk therapy of infections and traditional therapeutic claims to this herb.

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### TABLE : 1
**Antibacterial activity of root and aerial extracts of *Achyranthes aspera* linn**

| Name of the plant | Extract   | Part of plant | Reference drug   | Zone of inhibition in mm | % of extract used and zone of inhibition in mm | Name of the organism used |
|-------------------|-----------|---------------|------------------|--------------------------|-----------------------------------------------|---------------------------|
| Acryanthes aspera | Ethanol   | Aerial        | Cotrimoxazole    | 35                       | 11 13 15 16                                 | Bacillus subtilis         |
|                   |           |               | Cotrimoxazole    | 38                       | 14 16 18 20                                 | Bacillus subtilis         |
|                   |           |               | Cotrimoxazole    | 34                       | 14 17 21 24                                 | Proteus vulgaris          |
| Acryanthes aspera | Ethanol   | Root          | Cotrimoxazole    | 35                       | 10 13 15 15                                 | Bacillus subtilis         |
|                   |           |               | Cotrimoxazole    | 37                       | 13 15 16 19                                 | Bacillus subtilis         |
|                   |           |               | Cotrimoxazole    | 34                       | 14 16 20 22                                 | Proteus vulgaris          |

### TABLE : 2
**Anti fungal activity of root and aerial ethanolic**

| Name of the plant | Extract  | Part of plant | Reference drug   | Zone of inhibition in mm | % of extract used and zone of inhibition in mm | Name of the organism used |
|-------------------|----------|---------------|------------------|--------------------------|-----------------------------------------------|---------------------------|
| Acryanthes aspera | Ethanol  | Aerial        | Cotrimoxazole    | 36                       | 19 20 25 28                                 | Crytococcus neoformans    |
|                   |          |               |                  | 32                       | 22 24 27 30                                 |                            |
| Acryanthes aspera | Ethanol  | Root          | Cotrimoxazole    | 36                       | 18 18 22 26                                 | Aspergillus flavus        |
|                   |          |               |                  | 32                       | 20 21 25 27                                 | Cryptococcus neoformans   |
|                   |          |               |                  |                          |                                              | Aspergillus flavus        |
