ANTIBACTERIAL PROPERTIES OF LEUCAS CEPHALOTES (ROTH) SPRENG. LEAF

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ABSTRACT: Leucas cephalotes a common ethanomedicinal plant, is used by folklore of Tirupati in Andhra Pradesh for fevers and urinary tract infections. In the present study leaves of L. cephalotes were shade dried, powdered and extracts were made by Soxhlet Extractor using different organic solvents like hexane, dichloromethane, methanol and ethylacetate. The antimicrobial activity of these organic extracts was evaluated against pathogenic organisms of staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Proteus vulgaris and Klebsiella pneumoniae. These isolates were obtained from clinical specimens like urine, blood and pus of Sri Venkateshwara Institute of Medical Sciences, Tirupati. The zone of inhibition was determined for these pathogenic microorganism by using specific standards and respective controls for determining Minimum inhibitory Concentration (MIC). Among these tested organic extracts, hexane and methanolic extracts showed prominent antibacterial activity index for each tested extract has been calculated.

Key words: Leaf, Leucas cephalotes, Organic leaf extracts, Anibacterial properties.

INTRODUCTION:

Leucas cephalotes a medicinal plant belonging to family Lamiaceae is an annual, erect, stout and hairy pubescent herb of 0.6-0.9m height. It grows abundantly around the seven Hills of Trumala Hills which are situated between 79°19’ to 79°23’ East longitude and 13°37’to 13°43’ latitudes. It is prominent in Darmargiri of chittoor District, Andhra Pradesh. The local name of L. cephalotes is “Pedda tummi”, “tummi” and its Sanskrit synonyms are “Dronapushpi” “Tumba”, “Chhatraka” and “Drona” etc. Folklores use the plant as a stimulant, diaphoretic, laxative, anthelmintic, antiseptic and insecticidal1. As per Ayurveda the plant is used for heating, in cause in indigestion causes of ‘vata’ and ‘pitta’ and also fight against bronchitis, jaundice, inflammations, asthma, dyspepsia paralysis and leucoma. The leaves of L. cephalotes are used in fevers and urinary tract infections2. The present study has been concentrated on extraction of entire leaf using different organic solvents their antibacterial properties against pathogenic strains.

METHODOLOGY

Preparation of organic leaf extracts

The pungent leaves of L.cephalotes shade dried the extracts were prepared by using different organic solvents like hexane, dichloromethane, methanol and ethyl acetate using Soxhlet Extractor3.

Screening for Antibacterial activity

The organic leaf extracts of L.cephalotes were screened for antibacterial activity
against pathogenic strains of Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, proteus vulgar is and kledsiella pneumoniae by using disc diffusion\textsuperscript{4,5} and agar cup methods\textsuperscript{6}. Different concentrations of an extract has been checked on filter paper discs for their inhibitory activity against the particular clinical isolates. Minimum Inhibitory Concentration (MIC) was recorded for each extract. The results were read along with control that is organic solvent with out plant extract. The sensitivity was recorded and compared with standard antibiotic substances used for its sensitivity on particular test isolates. Standard antibiotics used were Vancomycin of S. aureous and Gentamycin for E.Coli, Ps. Aeruginosa, Pr. Vulgaris, and Klebsiella pneumoniae. The activity index was calculated by comparing the inhibition zone of the extract i.e., test sample with that of standard antibiotic.

RESULTS & DISCUSSION

The organic leaf extracts from methanol, hexane, ethylacetate and dichloromethane showed antibacterial activity against the list organizing (Table – 1). It is clear from the table-I that data recorded for organic extracts form hexane and methanol showed prominent antibacterial activity. The above two extracts were found more potent against pathogenic strains of S.aureus, E.coli and Ps. Aeruginosa. Activity index of methanol and hexane extracts of L. cephalotes were more prominent when compared to dichlomethane and ethylautate. This knowledge may be exploited in formulating newer Ayurvedic drugs or in understanding the composition(s) of Anyurvedic medical scriptures which may help to explore newer drugs for treatment.

From the present findings, it may be concluded that Leucas i.e., exhibiting a pronounced antimicrobial effect on pathogenic organism, thus it to use by folklore in curing fever and urinary infections is justified. It is used popularly as a major ingredient in two important Ayurvedic formulation Plihari Vatika and Gorocanadi Vati\textsuperscript{7}.

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## TABLE -1 ANTIBACTERIAL ACTIVITY OF LEUCAS CEPHOLATES LEAF

| S. No. | Organic Solvent extract | Concentration µg/ml | Zone of inhabitation in mm* | Staphylococcus aureus | Escherichia coli | Pseudomonas aeruginosa | Proteus vulgaris | Klebsiella pneumoniae |
|--------|-------------------------|---------------------|-----------------------------|----------------------|------------------|------------------------|-----------------|---------------------|
| 1.     | Methanol                | 50                  |                             | 5                    | 3                | 2                      | 2               | 1                   |
|        |                         | 100                 |                             | 12                   | 10               | 8                      | 3               | 2                   |
|        |                         | 150                 |                             | 16                   | 12               | 9                      | 7               | 4                   |
| 2.     | Hexane                  | 50                  |                             | 6                    | 4                | 3                      | 2               | 2                   |
|        |                         | 100                 |                             | 12                   | 11               | 8                      | 4               | 5                   |
|        |                         | 150                 |                             | 20                   | 15               | 12                     | 10              | 9                   |
| 3.     | Diethyl methane         | 50                  |                             | 3                    | 2                | 2                      | 1               | --                  |
|        |                         | 100                 |                             | 5                    | 4                | 3                      | 2               | --                  |
|        |                         | 150                 |                             | 7                    | 6                | 5                      | 4               | --                  |
| 4.     | Ethyl acetate           | 50                  |                             | 1                    | 1                | --                     | --              | --                  |
|        |                         | 100                 |                             | 2                    | 2                | --                     | --              | --                  |
|        |                         | 150                 |                             | 4                    | 3                | --                     | --              | --                  |
| 5.     | Standards               | Vancomycin          | 10mgg/disc                 | 15                   | --               | --                     | --              | --                  |
|        |                         |                     | 30mcg/disc                 | --                   | 11               | 10                     | 10              | 6                   |

Values are means of 3 replicates -*including diameter of the filter paper disc 16 mm – indicates No inhibition.

## TABLE -2 ACTIVITY INDEX OF LEUCAS CEPHALOTES LEAF

| S. No. | Organic Solvent extract | Concentration µg/ml | Activity index |
|--------|-------------------------|---------------------|----------------|
|        |                         |                     | Staphylococcus aureus | Escherichia coli | Pseudomonas aeruginosa | Proteus vulgaris | Klebsiella pneumoniae |
| 1.     | Methanol                | 50                  | 0.33          | 0.27          | 0.2          | 0.2          | 0.16          |
|        |                         | 100                 | 0.80          | 0.90          | 0.8          | 0.3          | 0.33          |
|        |                         | 150                 | 1.06          | 1.09          | 0.9          | 0.7          | 0.66          |
| 2.     | Hexane                  | 50                  | 0.4           | 0.36          | 0.3          | 0.2          | 0.30          |
|        |                         | 100                 | 0.81          | 1.00          | 0.8          | 0.4          | 0.83          |
|        |                         | 150                 | 1.33          | 1.36          | 1.2          | 1.0          | 1.50          |
| 3.     | Diethyl methane         | 50                  | 0.2           | 0.18          | 0.2          | 0.1          | --            |
|        |                         | 100                 | 0.33          | 0.36          | 0.3          | 0.2          | --            |
|        |                         | 150                 | 0.46          | 0.54          | 0.5          | 0.4          | --            |
| 4.     | Ethyl acetate           | 50                  | 0.06          | 0.09          | --           | --           | --            |
|        |                         | 100                 | 0.13          | 0.18          | --           | --           | --            |
|        |                         | 150                 | 0.26          | 0.27          | --           | --           | --            |