Antibacterial and Antioxidant activity of Saracaasoca, Eclipta prostrate and Achyranthesaspera

Rajan Kumar Dubey, Rishabh Gupta, Mohit Kamthania, Rajendra Pavan

***Abstract*— To investigate the inhibition by natural plant extracts of *Saracaasoca* leaves, *Eclipta prostrate*leaves and *Achyranthesaspera*leaves. Antimicrobial activity was checked using disc diffusion method against *Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa*and *Staphylococcus aureus*. Plant extracts were prepared from Ethanol, Methanol, Butanol, Acetone, Chloroform and Distilled water. *Saracaasoca*was found to be most active against *Klebsiella pneumonia* bacteria giving zone of inhibition of 23mm. The antioxidant activities of methanolic extracts of the leaves of*Saracaasoca*, *Eclipta prostrate* and *Achyranthesaspera* were determined by the DPPH (1, 1-diphenyl-2-picryl hydroxyl) method. The results obtained in the present study indicate that the leaves of *Saracaasoca* are a potential source of natural antioxidants.**

***Index Terms*— Antibacterial activity, Antioxidant activity, Saracaasoca, Eclipta prostrate, Achyranthesaspera**

I. INTRODUCTION

The natural plant resources have been used to treat various ailments. Even after the advent of modern therapeutic techniques, the traditional or the folk treatments have not lost their importance [1]*Saracaasoca (Roxb.)De.wild or Saracaindica* belonging to family (*Caesalpinaceae), Eclipta prostrate* (*Asteraceae*) *and Achyranthesaspera* belonging to family (*Amaranthaceae*) are important medicinal herb found as a weed thought India. The potential of higher plants as source for new drugs is still largely unexplored. Among the estimated 250,000-500,000 plant species, only a small percentage has been investigated phytochemically and the fraction submitted to biological or pharmacological screening is even smaller. Thus, any phytochemical investigation of a given plant will reveal only a very narrow spectrum of its constituents. Historically pharmacological screening of compounds of natural or synthetic origin has been the source of innumerable therapeutic agents. Random screening as tool in discovering new biologically active molecules has been most productive in the area of potentiality of antibiotics [2,3,4,]. Reactive oxygen species (ROS) containfree radicals such as superoxide ions (O_2^-) and hydroxyl radicals (OH), as well as non-free- radical species such as hydrogen peroxide (H_2O_2)[5,6]. The antimicrobial extracts isolated from plants can be used to inhibit a variety of microbes both pathogenic and nonpathogenic that reside in our environment. Thus, it is very important to identify the plants with medicinal properties and to check their activity against the microbial diversity [7]. Some general considerations must be established for the study of the antimicrobial activity of plant extracts, essential oils and the compounds isolated from them. Of utmost relevance is the definition of common parameters, such as plant material, techniques employed, growth medium and microorganisms tested [8]. The leaves of *Saracaasoca, Eclipta prostrate* and *Achyranthesaspera*plants are the subject of interest for determination of antimicrobial activity against*Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa*and *Staphylococcus aureus* bacteria and antioxidant activity, respectively.

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II. MATERIALS AND METHODS:

Sample collection

Fresh leaves sample of two plants *Saracaasoca* (*Caesalpinaceae*), *Eclipta prostrate* (*Asteraceae*) and *Achyranthesaspera* (*Amaranthaceae*) were collected from Dhanavanti botanical garden of Mangalayatan University Aligarh. The leaf samples were washed 5 times with tape water and finally washed with distilled water and left on a bench to dry.

Extractspreparation

Plant leaf were dried in shade for five days and then powdered with the help of warring blender. Samples were soaked in Methanol, Ethanol, Butanol, Acetone, chloroform, and Distilled water in the ratio 1:10 separately with all solvent[9].

Inoculum preparation

The gram negative bacteria (*Escherichia coli, Klebsiella pneumonia* and *Pseudomonas aeruginosa*) and positive bacteria (*Staphylococcus aureus*) were pre-cultured in nutrient broth overnight in a rotary shaker at 37°C, centrifugedat 10,000 rpm for 5 min, pellet was suspended in double distilled water and the cell density was standardized spectrophotometrically (A_{610} nm)[10].

Antimicrobial activity

Antimicrobial activities were tested by disc diffusion method. Three different plants namely,*Saracaasoca, Eclipta prostrate* and*Achyranthesaspera.*Each of the plates also had 4 disks corresponding to six different kinds of solvents used to prepare plant extracts. In each plate spreading of 100 ul of

bacterial cultures were done.After solidification the filter paper discs (5 mm in diameter)impregnated with the extracts wereplaced on test organism-seeded plates.*Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa*and *Staphylococcus aureus* bacteria were used for antibacterial activity. All the plates are finally transferred into incubator at 37^{o}C for24hrs. Next day the Zone Of Inhibition is measured with help of antibiotic zone reader [11]. All tests done in duplicate.

Antioxidant activity

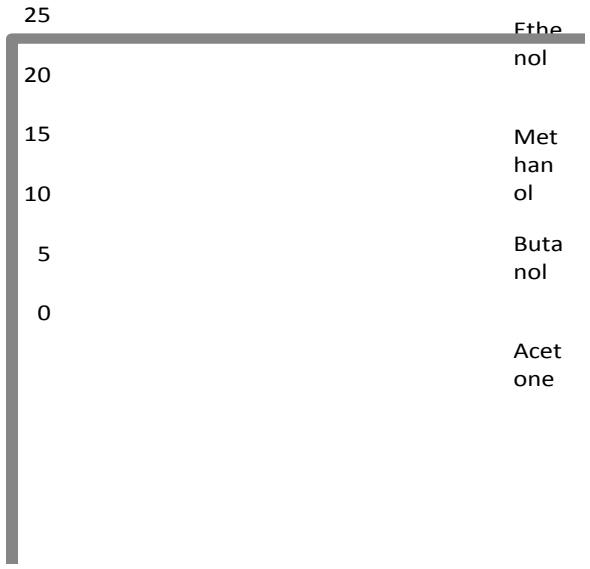
DPPH (1, 1-diphenyl-2-picryl hydroxyl) radical Scavenging activity was carried out by adopting the method of Blois23, Cotelle24, spectrophotometric method25. Methanolicsolution of DPPH (200µM), was added to serially diluted 0.05ml of ethanolic test extracts (100-500 µg/ml). An equal amount of ethanol was added to the control. After 20 min., the decrease in absorbance of test mixture (due to quenching of DPPH free radicals) was read at 517 nm and the percentage inhibition calculated by using the formula [12,13]. All experiments were performed in duplicate.

Inhibition (%) = Control-Test \ Control × 100

III. Result and Discussion

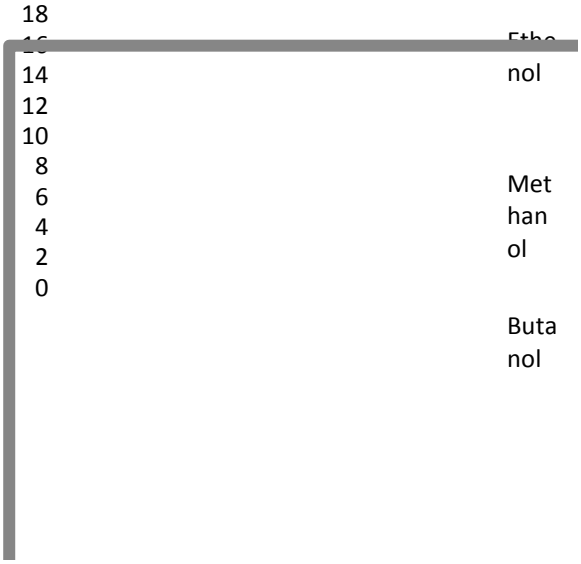
Result obtained in the present study relieved that the tested three medicinal plants extracts with Ethanol, Methanol, Butanol, Acetone, Chloroform and Distilled water posses potential antibacterial activity against *Escherichia coli,Klebsiella pneumonia, Pseudomonas aeruginosa*and *Staphylococcus.*

Figure 1: Antibacterial activity of Saracaasoca (*Caesalpinaceae*) plant with ethanol, methanol, butanol, acetone, chloroform and distilled water extract (100µg/ml).



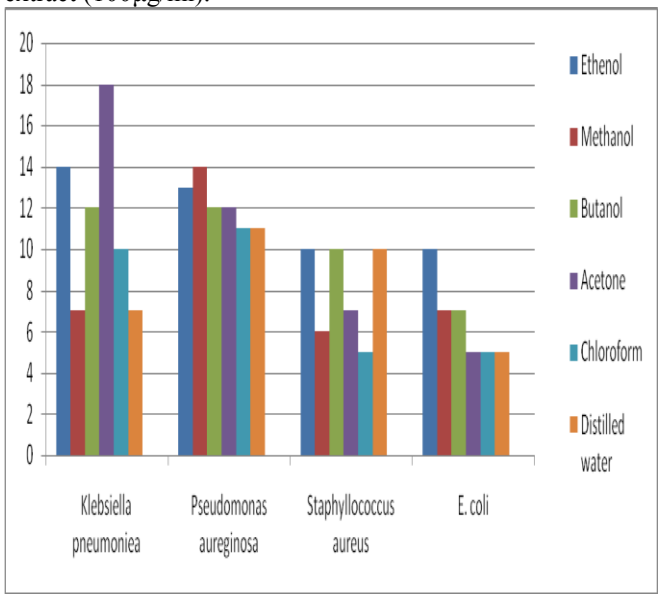
Values are mean inhibition zone in (mm).

Figure2 : Antibacterial activity of *Eclipta prostrate* (*Asteraceae*) plant with ethanol, methanol, butanol, acetone, chloroform and distilled water extract (100µg/ml).



Values are mean inhibition zone in (mm).

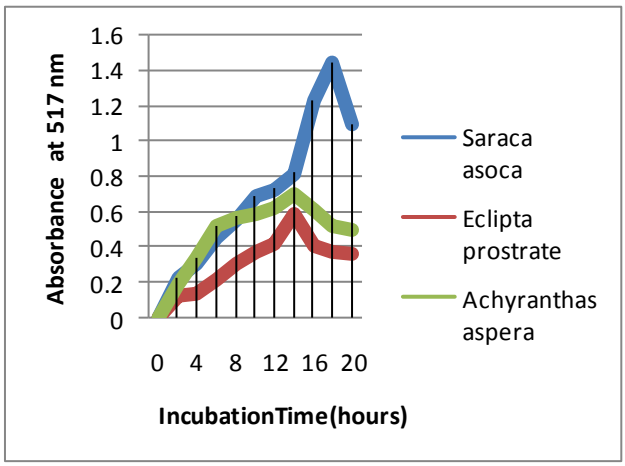
Figure 3: Antibacterial activity of *Achyranthesaspera*(*Amaranthaceae*) plant with ethanol, methanol, butanol, acetone, chloroform and distilled water extract (100µg/ml).



Values are mean inhibition zone in (mm).

DPPH (1, 1-diphenyl-2-picryl hydroxyl) is one of the compounds that possess a proton free radical and shows a maximum absorption at 517 nm. When DPPH encounter proton radical scavengers, its purple colour fads rapidly. This assay determines the scavenging of stable radical species of DPPH by antioxidants.

Figure 4: Antioxidant activity of *Saracaasoca*, *Eclipta prostrate* and *Achyranthesaspera* leafs absorbance measured at 517 nm by double beam spectrophotometer.



IV. Conclusion

In the present study it can be concluded that plant extracts from *Saracaasoca* (*Caesalpinaceae*), *Eclipta prostrate* (*Asteraceae*) and *Achyranthesaspera* (*Amaranthaceae*) have shown antimicrobial activities against*Escherichia coli*, *Klebsiella pneumonia*, *Pseudomonas aeruginosaand Staphylococcus*. Maximum activity against *Klebsiella pneumonia* bacteria was shown by the distilled water extract of *Saracaasoca*with a zone of inhibition of 23mm.The study suggest the leaves of *Saracaasoca* (*Caesalpinaceae*), *Eclipta prostrate (Asteraceae)* and*Achyranthesaspera (Amaranthaceae*), might be potential source of natural antioxidant activity and S*aracaasoca* has maximum antioxidant activity.

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