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Research Article

Comparative anti-microbial activity analysis of *Ixora coccinea* and *Datura metel*

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Abstract

The plants are rich in anti-microbial agents for their anti-microbial activity. In this study, the powdered leaves extracts of *Ixora coccinea* and *Datura metel* were macerated and extracted with solvents in acetone, methanol and iso-propanol. The study was done to evaluate the anti-microbial property of leaf extracts of *Ixora coccinea* and *Datura metel* against the bacterial strain of *Escherichia coli* and *Staphylococcus aureus* by agar well diffusion method. From the antimicrobial activity assay, the best zone of inhibition formation of 11.8 ± 0.64 mm was observed in the case of *Ixora coccinea* against the bacterial strain of *Escherichia coli* whereas *Datura metel* had shown good anti-bacterial activity against *Staphylococcus aureus* by the inhibition zone formation of 15.3 ± 0.27 mm. These results showed that *Escherichia coli* have an excellent susceptibility against *Ixora coccinea*, wherein *Staphylococcus aureus* showed susceptibility against *Datura metel*. These results revealed that acetone extracts of these plants leaves have antibacterial activity against the tested organisms than the other used extracts for the experimental studies. Auxiliary studies should be started to interpret the action mechanism of antimicrobial effect in order to detect the active ingredients which in turn can be utilized in drug development.

Keywords: *Ixora coccinea*, *Datura metel*, Leaf extract, solvents, Anti-bacterial property, *Escherichia coli*, *Staphylococcus aureus*, agar well diffusion method.

INTRODUCTION

As per the World Health Organization [WHO 1997] 70-80 percent of the total populace relies upon customary medication for their medical service's needs. Natural medications have been being used since well before present day medication existed. The utilization of plants to fix a few sorts of human infections has a long history. Treatment with therapeutic plants is considered very safe as there is no or minimum side effects. The traditional medicinal systems such as Unani, Ayurveda, Chinese, European and Mediterian cultures systematically and officially used. These medicinal plants for over 4000 years as medicine. Because of greater accessibility, cost affectivity and non-poisonous nature, these medications are acceptable wellspring of remedial specialists. Against microbial, for example, hostile to bacterial, against contagious, against viral properties are utilized to diminish the quantity of diseases [Prachayasittikul et al., 2008 – Rios et al., 2005]. *Ixora coccinea* and *Datura metel* were used. *Ixora coccinea* belongs to the Rubiaceae family. *Ixora* is also known as "West Indian Jasmine". In the *Ixora coccinea*, the flowers, leaves, stem, root, bark are used to treat various ailments in traditional system of Indian medicine. Here, the pink colour of the flowering plant was used. The leaves are used to treat acne, ulcers etc., the flower and roots are used to treat the dysentery, fever, hiccups and so on. In old times, it was a habit of applying oil boiled with crushed *Ixora* flower to cure unhealed wounds. Another plant of the *Datura metel* belongs to the Solanaceae family. Leaves and flowers of *Datura metel* are the source as drug, used to treat the asthma and whooping cough. Many infections and diseases were treated by using *Datura metel* plant. An excess will cause migraine, queasiness, spewing and influence the focal sensory system causing side effects including mind flights, transient cognitive decline, extreme lethargies, and so on *Datura metel* is likewise utilized as a

pesticide. Seed is blended in with sorghum flour are utilized as toxin lure for oats.

MATERIALS AND METHODS

Collection of plant materials

The *Ixora coccinea* and *Datura metel* leaves were selected based on their medicinal importance and collected from our University campus and dump side of Tambaram railway station respectively.

Cold extraction

The collected leaves were rinsed with distilled water for the removal of unwanted constituents. The rinsed leaves dried at 37°C for a week under sun shade. After a week, the leaf was powdered individually using mortar and pestle. 50 grams of dried powder was taken and extracted with 100 ml of methanol (80%) uninterruptedly up to 48 h by associated with intermittent shaking and stirring [Rojas et al., 2003]. The mixtures were then filtered through Whatmann filter paper respectively. The filtered solvent extracts were evaporated for dryness using hot air oven at the temperature of 65°C. One gram of each concentrated solvent extracts were dissolved in 9 ml of methanol and stored at refrigerator (4°C) for further research work use.

Collection of microbial culture

The pure culture of pathogenic organisms of *Staphylococcus aureus*, *Escherichia coli* were obtained from King's Institute of Preventive Medicine and Research, Guindy, Chennai for the current research work. The antimicrobial property of the extract was tested separately on bacterial strains such as *Staphylococcus aureus* and *Escherichia coli* by *Ixora coccinea* and *Datura metel* [Parekh et al., - Karaman et al., 2005].

Preparation of standard culture inoculum

0.65 g of nutrient broth was taken and it was poured into the 50 ml distilled water in a conical flask and sterilized in autoclave. Loops full of two strains were inoculated in the broth separately for the maintenance of mother culture. The inoculated culture was incubated in shaker incubator in the room temperature for its growth. The bacterial strains were maintained in the refrigerator and sub-cultured for every 72 hrs for their nativity.

Determination of antimicrobial property by agar well diffusion method

1.4 g of nutrient agar was dissolved in 50ml of distilled water. The agar was melted and sterilized in autoclave. The petriplates were sterilized and kept in Laminar airflow chamber to reach room temperature. Then agar was poured in the petriplates and wells were punctured aseptically by a sterile cock borer to test antibacterial activity of leaf extract against the bacterial strains by the agar well diffusion method [Dabur et al., 2005]. 7 µl of bacterial culture was poured on the plates. The culture was then evenly spread using sterile L- rod by spread plate technique. Methanol was used as a positive control whereas isopropyl alcohol was used as negative control. Methanol [Sumathi et al., 2010 – Srinivasan et al., 2001] and isopropyl alcohol were macerated with leaf extracts to maintain positive and negative controls. The leaf extracts of 7 µl with solvents were poured on each well. The plates were incubated at 37ºC for 24 hrs. Antimicrobial activity was estimated by measuring the Zone of Inhibition against the pathogenic organisms.

RESULTS AND DISCUSSION

The results for the Antimicrobial activity against bacterial strains shown distinct with the leaf extracts of *Ixora coccinea* and *Datura metel*. Though cow urine leaf extract did not show much activity against bacteria which means that the cow urine remained indolent with all strains in agar diffusion method (not shown in Table and Figure also). Among four solvent extracts, two solvent extracts such as Acetone of 11.8 ± 0.64, Methanol of 10.1 ± 0.17 had shown great activity against microbial strains, while propanol had shown moderate significance. The strain of *E. coli* had shown high sensitive to *Ixora coccinea* extracts than S. aureus. The *Staphylococcus aureus* had shown high sensitive to *Datura metel* extracts. The Acetone leaf extract of *Datura metel* had shown inhibition of 15.3 ± 0.27 mm against S. aureus and methanol extract with 12.1 ± 0.12 mm, whereas propanol inhibited with 10 ± 0.61 mm of zone respectively (Table 1).

From the Figure 1, it was observed that the best zone of inhibition formation of 29.8 ± 0.64 mm was observed in the case of *Ixora coccinea* against the bacterial strain of

Table1. Antimicrobial activity of medicinal plants against bacterial strains.

Plants	Solvent extract	Diameter of zone of inhibition in millimeters	
		E. coli	***S. aureus***
Ixora coccinea	Acetone	11.8 ± 0.64	2 ± 0.05
	Methanol	10.1 ± 0.17	5.0 ± 0.31
	Propanol	9 ± 0.51	9 ± 0.63
Datura metel	Acetone	6 ± 0.02	15.3 ± 0.27
	Methanol	6 ± 0.53	12.1 ± 0.12
	Propanol	7.5 ± 0.09	10 ± 0.61

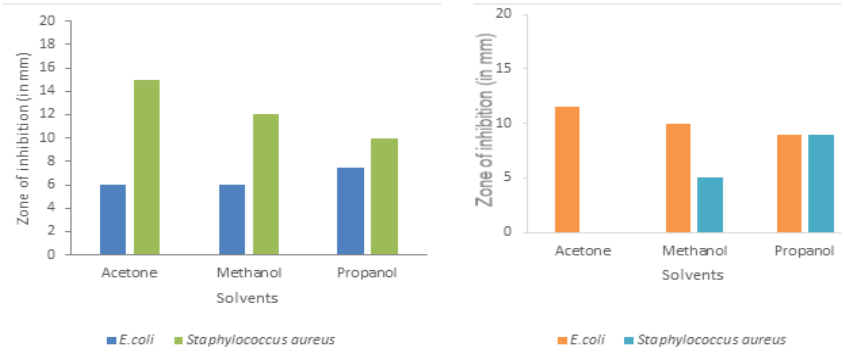

Figure 1. (a) Antibacterial activity of *Datura metel* against bacterial strain. (b) Antibacterial activity of *Ixora coccinea* against bacterial strain.

Escherichia coli whereas *Datura metel* had shown good anti-bacterial activity against *Staphylococcus aureus* by the inhibition zone formation of 15.3 ± 0.27 mm.

CONCLUSION

From the above examination, it tends to be inferred that agar well dissemination strategy was utilized to decide the antimicrobial movement of restorative plants. Hereby, the plant extracts have shown the zone of inhibition against pathogenic strain of *E. coli* and *staphylococcus aureus*. During the test, the positive and negative controls were utilized for the treatment. In the relative investigation uncovers that the zone of hindrance of *E. coli* was higher than that of *staphylococcus aureus*. Though in *Datura metel*, the near investigation uncovers that the zone of restraint of *staphylococcus aureus* was higher than that of *E. coli*.

These results showed that *Escherichia coli* have an excellent susceptibility against *Ixora coccinea*, wherein *Staphylococcus aureus* showed susceptibility against *Datura metel*. The auxiliary studies could be started to interpret the action mechanism of antimicrobial effect in order to detect the active ingredients which in turn can be utilized in drug development since medicinal plants have been used for treating ailments in health system.

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