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***In-vitro* antibacterial activity of various extract of *Mirabilis Jalapa* stem**

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ABSTRACT

Mirabilis jalapa Linn. of Nyctaginaceae was evaluated for antibacterial activity against the Gram positive bacteria viz., *Staphylococcus aureus*, *Bacillus Subtilis* and the Gram negative bacteria viz., *Escherichia coli* and *Pseudomonas aeruginosa*. Methanolic stem extract showed potent antibacterial activity against Gram positive bacteria and dichloromethane stem extract showed potent anti-bacterial activity against Gram negative bacteria, which was less than that of the standard drug.

Key words : *Mirabilis jalapa* Linn, Antimicrobial, Gram positive bacteria, Gram negative bacteria, Nyctaginacea.

INTRODUCTION

The bacteria have acquired genetic traits that enable them to enter the environment, remain in a niche, gain access to food sources and escape clearance by host immune and non immune protective responses. Unfortunately, many of the mechanisms that bacteria use to maintain their niche and the by products of bacterial growth are incompatible with the system of the human host. Many of these genetic traits are virulence factors, which enhance the ability of a bacterium to cause disease. Although most bacteria cause disease. Although most bacteria cause disease by directly destroying tissue, some release toxins, which are then disseminated by the blood to cause system- wide pathogenesis. Not all bacteria cause disease, but some always cause disease once infection occurs. The symptoms of a disease are determined by the function of the tissue affected, although systematic responses, produced by toxins and immune responses may also occur [1].

Mirabilis jalapa Linn, a traditional medicinal herb belonging to the family Nyctaginaceae in found throughout India. Is a perennial herb or under shrub. An erect herb to about one meter high, native of Peru, but now dispersed throughout the tropics. The plant is decorative and a

favourite garden plant with red, white, yellow, pink, purple and orange flowers. Which survive under conditions of neglect in England, France and some parts of the Africa.

Leaf is used as anti-inflammatory, boils, to heal wound as external application, bruises and also for allaying itching in urticaria. Roots as purgative. Roots thickened and tuberous upto 1 m high, stems swallow in clusters, funnel – shaped, simple or double, fragrant ellipsoid and one seeded [3,4]. To the best of our knowledge, no reports are available on the antimicrobial activity of *Mirabilis Jalapa* stem. As there is no reference in the literature regarding the antimicrobial aspects, it was considered worthwhile to investigate the antimicrobial properties of the stem of *Mirabilis jalapa* with various organic solvents and screening the resultant extracts for the antimicrobial activity [5].

MATERIALS AND METHODS

Plant material

Mirabilis jalapa was collected in Coimbatore Dist, of Tamil Nadu, India, in Feb. 2010. The sample was identified and Authenticated by Dr G.V.S. Murthy, Botanical Survey of India, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu. A voucher specimen (BSI/SC/5/23/09-10/Tech/1616) has been deposited at the Herbarium, Agricultural University, Coimbatore.

Preparation of Extracts

The shade dried and coarsely powdered stem were extracted with the solvent methanol and water individually by Soxhlet extractor. And successively by using methanol extract in the increasing polarity (Benzene, Dichloromethane, Chloroform) by shaking the solvents with methanol extract and separated using a separating funnel. Then the extract obtained were collected separately and concentrated by vacuum distillation.

Preliminary Phytochemical Investigations

The quantitative chemical test of various extracts of *Mirabilis jalapa* was carried out using standard procedure. Showed the presence of Alkaloids, carbohydrates, flavonoids, triterpenoids, tannins, saponins and unsaturated hydrocarbon [6,7,8,9].

Micro organisms used

Gram positive Bacteria : *Staphylococcus aureus*, NCIM 5021, *Bacillus subtilis* NCIM 2010.

Gram Negative Bacteria: *Escherichia Coli* NCIM 2911, *Pseudomonas aeruginosa* NCIM 5029.

Antibacterial activity determination: [10,11]

Preparation of the Inoculum

The inoculums for the experiment were prepared fresh in Mueller Hinton broth for preserved frozen slants. It was incubated at 37°C for 18-25 hr and used after standardization.

Muller- Hinton agar plates were prepared marked and inoculated with two Gram positive and two Gram negative bacteria aseptically [12]. After 5-10 min discs were placed in the medium [13].

Disc diffusion method was employed for determining the antimicrobial activities. Various extracts were dissolved in the same solvent DMSO (Dimethyl sulfoxide) and used in the concentration of 200 µg/ml. The diameter of the disc is 8 mm. Ciprofloxacin (10 µg/ml) were

used as a standard. And thus the antibacterial activity was determined based on the zone of inhibition around the colonies.

RESULTS AND DISCUSSION

Results reveal that methanolic stem extract of a *Mirabilis jalapa* Linn. were significantly effective against gram positive and dichloromethane stem extract showed significant effect against Gram negative bacteria when compared with other solvent extracts and the standard ciprofloxacin as shown in the Table 1.

Table No: 1 Antibacterial activity of *Mirabilis jalapa* stem extract

S. No.	Plant extracts	Gram Positive organism		Gram Negative organism	
		Diameter of zone of inhibition in mm		Diameter of zone of inhibition in mm	
		SA	BS	EC	PA
1.	Control (DMSO)	-	-	-	-
2.	BEMJ	14.33±0.33	-	13.33±0.33	-
3.	DEMJ	-	-	20.66±0.33	-
4.	CEMJ	-	-	8.66±0.66	-
5.	MEMJ	20.66±0.33	-	12.33±0.33	-
6.	AEMJ	-	-	16.66±0.33	-
7.	Standard (Ampicillin)	28.33±0.33	-	14.66±0.66	-

(-) Negative

SA - *Staphylococcus aureus* ; BS- *Bacillus subtilis*,

EC - *Escherichia coli* ; PA-*Pseudomonas aeruginosa*

BEMJ –Benzene extract of *Mirabilis jalapa*

DEMJ - Dichloromethane extract of *Mirabilis jalapa*

CEMJ - Chloroform extract of *Mirabilis jalapa*

MEMJ - Methanol extract of *Mirabilis jalapa*

AEMJ – Aqueous extract of *Mirabilis jalapa*

Values are expressed as mean ± SEM of triplicate observations.

CONCLUSION

The present study revealed that the stem of *Mirabilis jalapa* posses a good antibacterial activity. Further work is still under progress to explore the chemical nature of the active constituents and other pharmacological investigations are also under evaluation..

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