ISSN No:-2456-2165

Potential Antibacterial Potential of Moringa Olifera against Multidrug Resistant Wound Infecting Bacteria

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Abstract:- ***Moringa oleifera*** **is a species of the family Moringaceae.** ***Moringa oleifera*** **contain proven to be a high quality natural sources of antibacterial and antioxidants property. The present study was formulated to analysis the anti-inflammatory effect of** ***Moringa oleifera*** **. Different bacterial species was isolated from the wound sample such as** ***Escherichia coli, Klebsiella pneumonia, Staphylococcus aureus, Pseudomonas auroginosa and Bacillus subtillus*****. Isolated bacteria were subjected to antibacterial stability against ampicillin, gentamycin, carbencillin, Tobramycin and Ciproflaxacin antibiotics. The results revealed that P.auroginosa and E.coli showed resistant against selected antibiotics. The** ***Moringa oleifera*** **extract was used to study the inhibition against the above selected bacterial strain. Antibacterial study showed higher zone of inhibition against** ***E.coli*** **followed** ***by S. aureus*****.** ***Moringa oleifera*** **would become a talented natural antimicrobial agent with prospective application in pharmaceutical industry for scheming the pathogenic bacteria.**

Keywords:- *Antibacterial, Seed Extract, Multi Drug Resistance.*

I. INTRODUCTION

The pathogens causing enteric infections include developed resistance to the usually prescribed antibiotics (Winstanley *et al*.,1997). Bacterial resistance to β-lactam antibiotics has significantly increased in recent years. Increasing incidence of multiple resistances in human pathogenic microorganisms, largely due to the indiscriminate use of commercial antimicrobial drugs in the treatment of infectious diseases (Osler, 1983). In view of the fact that medicinal plants have been used for centuries as preparation for human diseases because they contain mechanism of therapeutic value (Nostro *et al*., 2000). *Moringa oleifera* Lam. (horseradish tree, drumstick tree) is the most widely cultivated species of a monogeneric family, the Moringaceae (Morton, 1991). *Moringa olifera* is valued as a versatile plant due to its multiple uses. The leaves, fruits, flowers are edible and they form a part of long established diets in many countries (Siddhuraju, 2003). On the other hand, if plant extract are to be used for medicinal purposes with the subject matter of the safety and toxicity will always need to be considered.

II. MATERIALS AND METHOD

A. Collection of Plant Material

Fresh plant *Moringa oleifera* was collected in Erode district, Tamil Nadu. Also fresh seeds was collected, air dried and processed to formulate powder form. 100g of *Moringa olifera* power were soaked separately in 500 ml of acetone and water for 72 hours at room temperature. Filtered extracts were dried using rotary evaporator at 45°C. The extracts were stored at 4°C for further use.

B. Phytochemical Analysis

Phytochemicals like Alkaloids, flavonoids, saponins, steroids, tannins, tritrpenoids, cardic glycodiside, aminoacids are analyzed.

C. Isolation of Bacteria from Wound Sample

Pus samples were collected aseptically with the aid of sterile swab sticks from 10 patients with different wounds infection at Erode District adjoining hospitals. Standard biochemical tests were used to identify the microbes.

D. Assay for Beta Lactamase Production

Broth culture of the test organisms was spot inoculated on Mueller Hinton agar and 1% starch agar was incubated at over night at 37°C. The plates were then flooded with freshly prepared phosphate buffered saline containing potassium iodide, iodine and penicillin. The presence of clear colorless zones around the bacterial growth is an indication of beta lactamase production. (Lateef*et al)*

E. Anti Bacterial Stability

The standard analysis was done by Kirby Bauer disk diffusion method to resolve the anti microbial report for the isolates against five antimicrobial agents Ampicillin, Gentamycin, Carbencilin, Tobramycin and Ciprofloxacin. The isolates were then inoculated in the Muller Hinton agar plates and antibiotic disc were placed in it. Then plates were incubated at 37°C for 18 to 20 hours.

F. Assay for Antibacterial Activity of Plant Material

Antibacterial activity of crude plant seed extract were examined by the well diffusion method of Rios *et al.,*. The Plant extract was dissolved in respective solvent such as petroleum ether and acetone tested at four different concentrations (5.00, 3.75, 2.50, 1, 25mg/ml). Test organism

(0.1ml) were seeded on Muller-Hinton agar plate. Wells were made of 6mm in the agar plate with sterile cork borer in it. The plant extract was added in the wells and then plates were incubated at 37°C for 24hours. The anti bacterial activity of plant extract was determined by measuring the diameter of the inhibition zone formed.

III. RESULTS AND DISCUSSION

A. Phyto Chemical Analysis

Present study revealed that *M.olifera* in acetone extract consist of Alkaloids, flavonoids, saponins, steroids, tannins, tri terpenoids but at the same time cardic glycodiside was found absent in acetone extract but present in aqueous extracts. Results showed the presence of these bioactive compounds to account for the exertion of anti microbial activity. *(*Cox *et al*,.1994*)*

Table 1: Phytochemical Analysis of Moringa Oleifera

S. No.	Phytochemicals Test	Acetone Extract	Water Extract
1.	Amino acid	-	-
2.	Alkaloids	+	+
3.	Fehlings	+	+
4.	Flavonoids	+	+
5.	Cardiac glycosides	-	+
6.	Saponins	+	+
7.	Steriods	+	+
8.	Tannins	+	+
9.	Triterpenoids	+	-
10.	Marphine Alkaloid	-	-

(+) – Present, (-) – (Absent)

B. Identification of Bacterial Isolates

The wound samples from 5 patients were collected. Among the 5 samples 15 bacterial isolates were obtained, this means that some samples yielded more than one organism namely as *Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Bacillus subtilis, Staphylococcus aureus.* Microbiological analysis revealed *Staphylococcus aureus* was the leading etiological agent of wound infection and second most was *P.aeruginosa and K.pneumonia* followed by *E.coli and B.cereus.* In this study, we observed seed powered materials active against both gram positive and gram negative bacteria. The action of the plant against both gram positive and gram negative bacteria may be indicative of the presence of broad spectrum antibiotic compounds in the plant. (*siddhuraju et al*.,).

C. Betalactamase Production

Among the 15 isolates all produce the beta lactamase except Bacillus species. Betalactamase producing isolates was highest in *P.aeruginosa and E.coli*(100%) followed by *S.aureus* (75%) and *K. pneumoniae*(66%), *S.aureus*(50%) and *Bacillus(*40%)

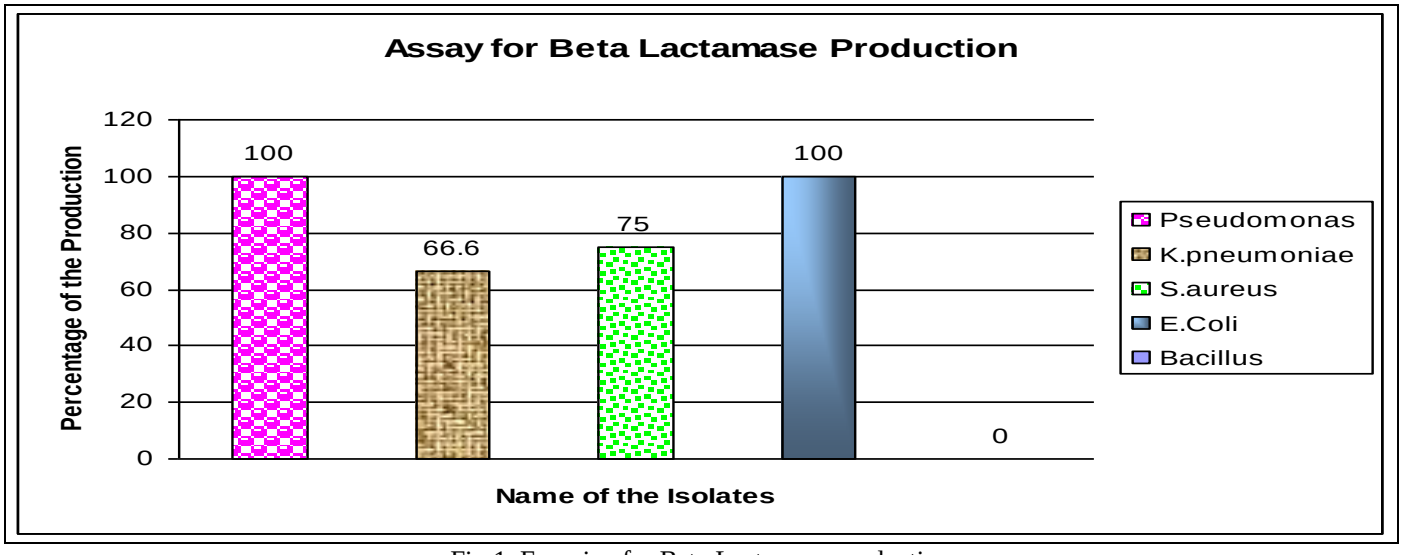

Fig 1: Examine for Beta Lactamase production

D. Antibacterial Stability

All the isolates showed resistance to one or more antibiotics. A prototype of multiple drug resistance was observed among 15 isolates. Among the five type of antibiotics, thehighst resistance against to Gentamycin (92.3%) followed by Carbencillin (69.2%), Ampicillin and Tobramycin (61.5%) and Ciprofloxcin(53.8%).

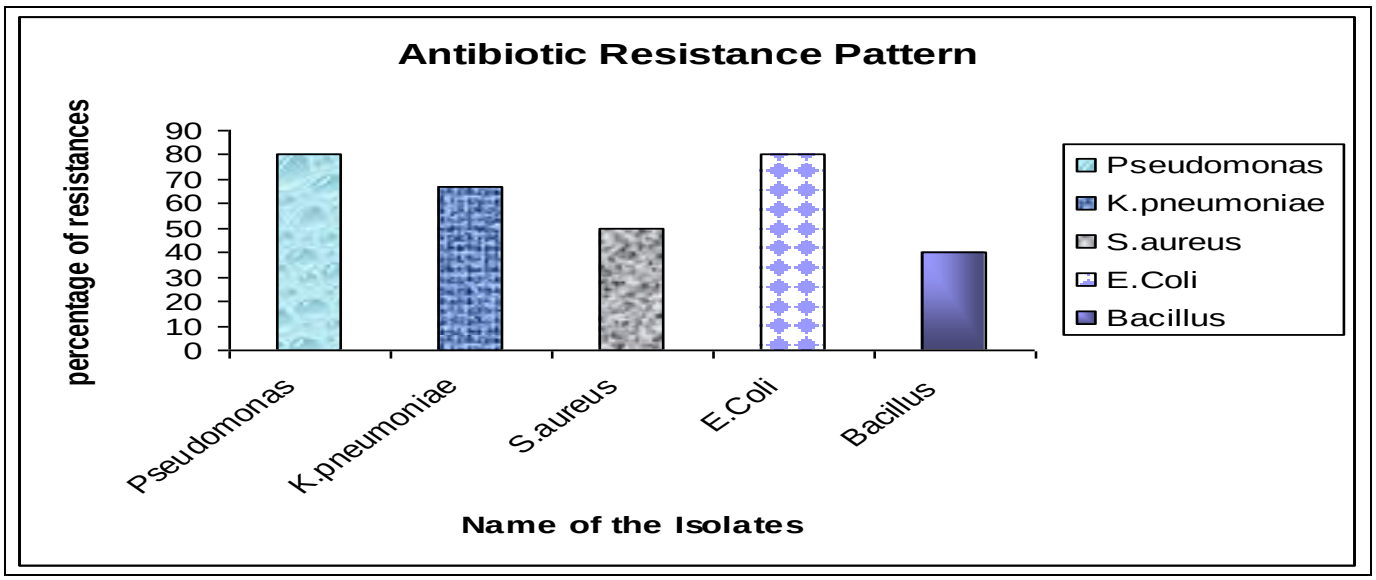

Fig 2: Antibiotic Resistance Pattern

E. Antibacterial Activity of M.olifera

In antibacterial study, a considerable reduction was observed in the growth of test bacteria.Among the five bacteria tested, more inhibition was observed in E. coli(19mm) followed by S.*aureus* (18mm). Among the two extracts, aqueous extract was found to exhibit good result compared to acetone. *M.olifera* seed extracts showed antibacterial activity against *E.coli, .S. aureus and K. pneumonia* mentioned in the Table 2.

Table 2: Anti Bacterial Assay for the Activity of *Moringa Oleifera* against *S.aureus*

S. No	Name of the Extract	Isolates Zone of inhibition (mm)			
		Sa1	Sa2	Sa3	Sa4
1.	Acetone	15	17	15	14
2.	Aqueous	18	16	15	18

Table 3: Assay for Antibacterial Activity of Moringa Oleifera Against Pseudomonas Aeruginosa (Pa)

S.No	**Name of the Extract**	**Isolates Zone of Inhibition (mm)**		
		Pa1	**Pa2**	**Pa3**
1	Acetone	11	13	16
2	Aqueous	15	18	15

The efficacy of *M.olifera* seed on coliform in raw water was about 88% and 97.50% of the total bacteria and coliform were reduced in the surface water after 24hrs treatment (Olufuro*etal.*, 2007). In the present study the *in vitro* assays showed that *M.olifera* methanol extracts had more phenolic content and higher antioxidant activity than acetone extracts. Furthermore, in the pretreatments with methanol extracts showed a protective effect against H_2O_2 induced oxidative damage through increasing the cell viability and reducing free radicals property (Elena, 2021).

IV. CONCLUSION OF THE RESEARCH

In this research work, the result showed the seed extracts of *Moringa olifera* was found to have the potential antimicrobial activity against multidrug resistance wound infecting bacteria. It was proved and believes that these findings will be helpful to many researchers.

REFERENCES

[1]. Bauer. A. W., Kirby, W. M. M., Sherris, J. C & Turck. M (1966). Antibiotic susceptibility of testing by standardized single disk method. Am. J. Clin.pathol.45:493-496.

[2]. Cox, P. A and M. J. Balick.1994. The ethno botanical approach to drug discovery. Sci.Amer.270:60-65.

[3]. Lateef, A., J. K. Oloke and E. B. Gueguimkana. Afri. J. Biotechnol. (2004). Antimicrobial resistance of bacterial strains isolated from orange juice products. 3(6):334-338.

[4]. Morton. J. F., 1991, Economic Botany,45(3):318-333.

[5]. Nostro, A., M. P. Germano, A. D. Angelo, A. Marino, M. A. Cannatelli.2000. Extraction methods and bio autography for evaluation of medicinal plants antimicrobial activity.Lett.Appl.microbiol.30(5):379-385.

[6]. Osler,W. 1983. Chemotherapy. In : Thomas CG. Medicinal Microbiology. 5th ed. Baillier tindall, London,192.
[7]. Rios,J.L, Recio.M.V., Villar,A. Screening methods for natural products with antimicrobial activity; A review of the literature. J.Ethanopharmocology. 1988; 23(23):127-149.
[8]. Siddhuraju,P., and K.Backer.2003.Antioxidant properties of various solvent extracts of total phenolic constituents from three different agro-climatic origins of drumstick tree (Moringaolifera Lam).J.Agric.FoodChem.15:2144-2155.
[9]. Winstanley,T.G.,D.L. Limb,R. Egginton,F. Hancock.1997. A 10 year survey of the antimicrobial susceptibility of urinary tract isolates in the UK: the microbe based project .J. Antimicrob.Chemother.40:591-594.
[10]. Elena González-Burgos, Isabel Ureña-Vacas, Marta Sánchez, and M. Pilar Gómez-Serranillos. Nutritional Value of *Moringa oleifera* Lam. Leaf Powder Extracts and Their Neuro protective Effects via Anti oxidative and Mitochondrial Regulation. Nutrients. 2021 Jul; 13(7): 2203.