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Antimicrobial activity of *Moringa oleifera* Hydroalcoholic Leaf Extract against some Specific Microorganism

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ABSTRACT: The hydroalcoholic extracts of *Moringa oleifera* leaf was examined using a standard antimicrobial disk diffusion method to assess the antibacterial activity and to determine zone of inhibition. Extract was tested against two bacterial strains of Gram positive bacteria - *Bacillus subtilis,* and *Staphylococcus aureus.* The antimicrobial study of leaves of *Moringa oleifera was* evaluated for potential antibacterial activity against medically important bacterial strains. For antibacterial activity zone of inhibition of extracts were compared with that of different standards. The results showed that the remarkable inhibition of the bacterial growth against the tested organisms. The phytochemical analyses of the plants were carried out. The microbial activity of the *Moringa oleifera* was due to the presence of various secondary metabolites found as a result of phytochemical analysis. Hence, the plant can be used to cure some common infectious diseases.

Keywords: *Moringa oleifera*, antibacterial activity, zone of inhibition, disk diffusion.

I. INTRODUCTION

Moringa oleifera is the most widely cultivated species of family Moringaceae. It has been given several names including, horseradish tree, benzoil tree, kelor, marango, mlonge, moonga, saijhan, sajna and ben oil tree [1, 2]. It is a rapidly-growing tree utilized worldwide. *Moringa oleifera* is considered one of the world's most useful trees, as almost every part of the tree has some medicinal, nutritional and other beneficial properties [1]. In Indian subcontinent this tree have been using as a regular component of conventional eatables for nearly 5000 years [2, 3 & 4]. *Moringa oleifera* tree grows well in the humid or hot dry land with average height of 5 to 10 m. It can survive in harsh climate as well as drought resistant condition [5]. The medicinal properties have been attributed to phytochemical compositions of various parts of *Moringa oleifera*; the roots, bark, leaf, flowers, fruits, and seeds [8 & 9]. *Moringa oleifera* is one such plant that has been identified to contain good antioxidants property [6 & 7]. The dry leaves of *Moringa oleifera* is widely utilized in the developing countries as a good source of calcium and protein. The leaves, young shoots, are eaten in vegetable curries, as pickles and as salads. The leaf can be eaten fresh and cooked, or as reported that if leaves are stored as dry powder for many months without refrigeration then there is no loss of any nutritional value.

II. MATERIAL AND METHOD

A. Preparation of culture media and culture plates

Composition of nutrient agar media;

Agar	-	1.5 gm.
Beef extract	-	0.3 gm.
Peptone	-	0.5 gm.
Sodium chloride	-	0.55 gm.
Distilled water	-	to make 100 ml.

pH – 7

B. Method of preparation

This agar medium was dissolved in distilled water and boiled in conical flask of sufficient capacity. Dry ingredients are transferred to flask containing required quantity of distilled water and heat to dissolve the medium completely.

Sterilization of the culture media. The flask containing medium was cotton plugged and was placed in autoclave for sterilization at 15 lbs /inch^2 (121^{o}C) for 15 minutes.

Preparation of plates. After sterilization, the molten agar in flask was immediately poured (20 ml/ plate) into sterile Petri dishes. The poured plates were left at room temperature to solidify and incubate at 37^{o}C overnight to check the sterility of plates. The plates were dried at 50^{o}C for 30 minutes before use.

Table 1: List of microorganisms used.

S. No.	Name of microorganism	Strain	Characteristics
1	*Staphylococcus aureus*	Bacterial	Gram positive bacilli
2	*Bacillus subtilis*	Bacterial	Gram positive bacilli

C. Screening of antimicrobial activity

Disk diffusion method. The antimicrobial activity of the compounds *Moringa oleifera*, were measured by disk diffusion method [10 & 11] Screening of microbial activity of extract and standard drugs (Ciprofloxacin) it was performed using 24 hours incubation (for bacterial culture) and 48 hours (for fungal culture) at 37^{o}C in 20 ml of agar medium. The inoculums of the tested microorganisms were spread using a sterile cotton swab over the control and tested plates containing agar medium in order to get a uniform microbial growth on both the plates. The extract was dissolved in water and sterilized by filtration under aseptic conditions; empty sterilized discs (whatman no. 5, 6 mm diameter) were impregnated with 100µl of each of the extracts of different concentration and left to dry under laminar flow cabinet and placed on the agar surface. Paper disk moistened with aqueous extract was placed on the seeded Petri plates as a vehicle control. Standard discs containing Ciprofloxacin (25 µg/ml), were used as reference control. All petri dishes were sealed with sterile laboratory paraffin to avoid contamination and eventual evaporation of the test samples. The plates were left for 30 minutes at room temperature to allow the diffusion of test drugs and kept for incubation on 37^{o}C. After incubation, the plates were observed for the inhibitory zone formation.

III. RESULT AND DISCUSSION

A. Screening of anti-microbial activity

The screening of anti microbial activity was performed with the help of disc diffusion method. Following tables shows anti microbial activity of Hydro alcoholic extract of *Moringa oleifera at* different concentration against gram Positive bacteria.

Table 2: Zone of inhibition for various concentrations of *Moringa oleifera compared* to reference drugs: activity against gram positive bacteria.

Micro-Organism → **Name of drug ↓**	***Staphylococcus aureus*** **In mm Mean***	***Bacillus subtilis*** **In mm Mean***
Ciprofloxacin (25 µg/ml)	18.0±0.012	21.0±0.015
Hydroalcohlic Extract 1 (mg/ml)	12.0±0.025	10.0±0.025

*Mean value of diameter of zone of inhibition with standard error.

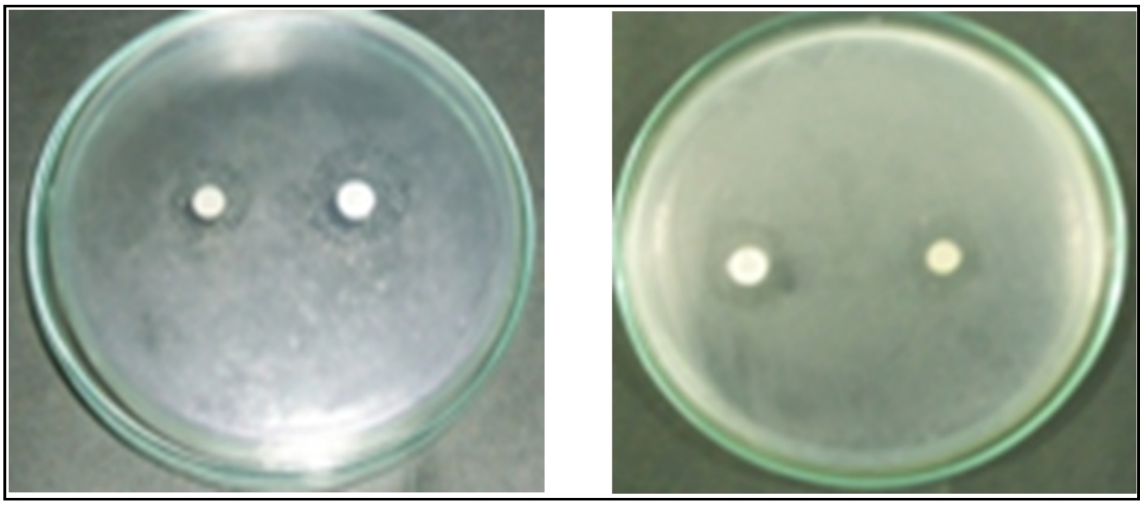

Fig. 1. Extract with *S. aureus.*

Fig. 2. Extract with *B. subtilis.*

IV. CONCLUSION

These findings suggest a new pathway in elucidating a potent antimicrobial agent from *Moringa oleifera*. Present study indicates that the plant contains antimicrobial compound that can be further developed as phytomedicine for the therapy of infection. Such screening of various natural organic compounds and identification of active agents is the need of the hour because successful prediction of lead molecule at the onset of drug discovery will pay off later in drug development. Lastly, to conclude the extracts were found to inhibit the growth of gram positive bacteria.

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