

Antimicrobial Activity of Hydroalcoholic Twigs Extract of *Moringa Oleifera*

Sandhya Pandey¹ Madhuri Singhal²

Research Scholar, Department of Chemistry M.V.M College, Bhopal, Madhya Pradesh, India.¹

Professor, Department of Chemistry M.V.M College, Bhopal, Madhya Pradesh, India²

ABSTRACT: The potential for developing antimicrobials from higher plants appears rewarding as it will lead to the development of a phytomedicine to act against microbes; as a result, plants are one of the bedrocks for modern medicine to attain new principles. Plant based antimicrobials represent a vast untapped source of medicine. Plant based antimicrobials have enormous therapeutic potential as they can serve the purpose without any side effects that are often associated with synthetic antimicrobials. Further continued exploration of plant derived antimicrobials is needed today. Historically, plants have provided a source of inspiration for novel drug Compounds, as plant derived medicines have made large contributions to human health and well-being. In this study, hydro alcoholic extracts of *moringa oleifera* samples with different concentration were screened for antimicrobial activity against two Gram positive bacteria and two Gram negative bacteria by agar well diffusion assay.

KEYWORDS: Antimicrobials, *Moringa oleifera*, Gram positive bacteria, Gram negative bacteria and Infection.

I. INTRODUCTION

The potential for developing antimicrobials from higher plants appears rewarding as it will lead to the development of a phytomedicine to act against microbes; as a result, plants are one of the bedrocks for modern medicine to attain new principles [1]. Plant based antimicrobials represent a vast untapped source of medicine. Plant based antimicrobials have enormous therapeutic potential as they can serve the purpose without any side effects that are often associated with synthetic antimicrobials. Further continued exploration of plant derived antimicrobials is needed today. [2] Historically, plants have provided a source of inspiration for novel drug Compounds, as plant derived medicines have made large contributions to human health and well-being. [3] The primary benefits of using plant derived medicines are that they are relatively safer than synthetic alternatives, offering profound therapeutic benefits and more affordable treatment. The medicinal plants around the world contain many compounds with antibacterial activity.[4] Many efforts have been made to discover new antimicrobial compounds from various sources such as microorganisms, animals, and plants. Systematic screening of them may result in the discovery of novel effective antimicrobial compounds. [5]The use of botanical medicines is generally on the rise in many parts of the world [6]. The screening of plant extracts and plant products for antimicrobial activity has shown that plants represent a potential source of new anti-infective agents. [7-8 - 9]Numerous experiments have been carried out to screen natural products for antimicrobial property. [10-11] Considering the above, it can be stated that plants are valuable sources for new compounds and should receive special attention in research strategies to develop new antimicrobials urgently required in the near future. [12-13] *Moringa oleifera* is medicinal species. *Moringa oleifera* is the most widely cultivated species of a monogeneric family, the Moringaceae; it is a fast-growing, drought-resistant tree that is native to the sub-Himalayan tracts of India, Pakistan, Bangladesh and Afghanistan.[14] The “Moringa” tree is grown mainly in semi- arid, tropical and sub- tropical areas. While it grows best in dry sandy soil, it tolerates poor soil, including coastal areas. Compounds purified from *Moringa oleifera* have been to be biologically active against several diseases activity including antioxidant, cardiovascular, antidiabetic, antibacterial, anticancer, Analgesic, Antipyretic & Wound Healing Activity, anti antiulcer, infertility anti-inflammatory. [15] However, not so extensive work on its antimicrobial properties has been studied and more so, some

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 12, December 2018

of its, morphological parts unexplored. The objective of present study screening of hydroalcoholic extract twigs of *Moringa oleifera*.

II. RELATED WORK

MEDICINAL USES OF MORINGA OLEIFERA: In aurveda the medicinal properties of *Moringa oleifera* are very well explained, this plant is light to digest and cause dryness of tissue . Due to these properties the usage of plant vitiates pitta and alleviates vata and kapha. It is also used to treat headache, hiccough, paralysis, appetite, reduce stomach cramps, intestinal worms, menstrual cramps, ulcer, mental illness, tumors , infections and its reduce blood cholesterol, piles.[15]

CHEMICAL CONSTITUENTS OF MORINGA OLEIFERA: The main consitutents of Moringa plant are: deic, palmtic and stearic acid, saponins, glycosides, gum, protein vitamins: A (8855 IU per 100g), B1, B2, B3, C Minerals: calcium, iron, phosphorus, magnesium. The leaves, flowers and pods are used as significant sources of vitamins A, B and C, riboflavin, nicotinic acid, folic acid, pyridoxine, ascorbic acid, beta-carotene, calcium, iron, and alpha-tocopherol .The root bark contains two alkaloids: moringine and moringinine. Other isolateted compounds from plants are 4-(4'-O-acetyl- α -L-rhamnopyranosyloxy)benzyl,4-(-L-rhamnopyranosyloxy)benzyl isothiocyanate, niazimicin, pterygosperrin, benzyl isothiocyanate, and 4-(α -L-rhamnopyranosyloxy)benzyl glucosinolate4. [16]

III.MATERIAL & METHOD

EXTRACTION & CHEMICALS: In present study extraction was performed using continuous hot percolation 'Soxhlation'. Chemicals and standard antibiotics used in this work were purchased from Hi-Media, Mumbai, India.

TEST MICRO-ORGANISMS: The reference bacterial strains used in this study were obtained from Pinnacle Biomedical Lab Bhopal, India. These included; Gram positive bacteria *Staphylococcus aureus* MTCC No. 87), *Bacillus subtilis* (MTCC No. 441)and Gram negative bacteria *Escherichia coli* (MTCC No. 739), *Pseudomonas aeruginosa* (MTCC 741).

PREPARATION OF MEDIA (NUTRIENT AGAR MEDIA (1L))

All glassware's were sterilized by autoclaving. Agar media were prepared from a commercially available Nutrient agar (Hi-media, M012), with 1% peptone according to the manufacturer's instructions. One liter of nutrient agar media was prepared by dissolving 35.0 g of commercially available nutrient agar medium (Hi-Media) in 1000ml distilled water and boiled to dissolve the medium completely. The medium was sterilized by autoclaving at 15 lbs pressure (121°C) for 15 minutes.

STANDARD DRUG USED

Ofloxacin (100 μ g/ml)

PREPARATION OF SUSPENSION OF BACTERIA

Approximately 4 to 5 well isolated colonies of the bacterial strain are inoculated into 5 ml of Nutrient broth and incubated at 37°C.

SCREENING OF ANTIMICROBIAL ACTIVITY OF *M. OLEIFERA*.

After standardization of bacterial suspension, sterile cotton swap was immersed in it and the swap was rotated several times, with firm pressure on the inside wall of the tube to remove excess fluid. Nutrient agar media plate was prepared with a depth of 4mm. Dried surface of nutrient agar plate was inoculated the by streaking the swab 3 times over the entire agar surface. A sterile 5mm cork borer was used to punch holes after solidification of media. The wells formed were filled with different concentrations of the sample which were labeled accordingly. The plates were then left on the bench for 1 hour for adequate diffusion of the extracts and incubated at 37°C for 48 hours in upright condition. After incubation, the diameter of the zones of inhibition around each well were measured to the nearest millimeters along two axis i.e. 90° to each other and the mean of the four reading were then calculated included 5mm well.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 12, December 2018

IV. EXPERIMENTAL RESULTS

TABLE1: ANTIBACTERIAL ACTIVITY HYDROALCOHOLIC EXTRACT OF *MORINGA OLEIFERA*

PARAMETER - ZONE OF INHIBITION (MM):

In this study, we tested the hydroalcoholic extract of *Moringa oleifera* for their antimicrobial activity. The plant extract showed antimicrobial activity against all four of the types of micro-organisms tested, as exhibited by disc diffusion assay (Table1).

S. No.	Organism	Zone of Inhibition				Standard (Ofloxacin) 100 µg/ml
		100 mg/ml	200 mg/ml	300 mg/ml	400 mg/ml	
1	<i>Staphylococcus aureus</i>	21.25±0.957	23.50±0.577	26.00±0.816	30.75±0.957	39.75±0.645
2	<i>Bacillus subtilis</i>	21.75±0.957	25.50±1.291	28.50±1.291	32.25±0.957	38.75±0.645
3	<i>Escherichia coli</i>	20.00±0.816	22.75±0.500	26.75±1.258	31.50±1.291	36.88±0.854
4	<i>Pseudomonas aeruginosa</i>	18.00±0.816	22.50±1.291	26.75±0.957	31.25±0.957	37.63±0.750

V. CONCLUSION

The hydroalcoholic extract of *moringa oleifera* could be possible source to obtain new and effective herbal medicine to treat infection caused diseases. However, it is necessary to determine the toxicity of active constituent, their side effects and pharmacokinetics properties. In the table dose 400mg/ml showing good result.

REFERENCES

1. Evans CE, Banso A, Samuel OA, "Efficacy of some nupe medicinal plants against *Salmonella typhi*: an *in vitro* study". Journal of Ethnopharmacology vol.80, pp. 21–24, 2002.
2. Hussain MA, Gorski MS, "Antimicrobial activity of *Nerium oleander* Linn. Asian Journal of Plant Sciences" Vol.3, pp.177-180, 2004.
3. Iwu MM, Duncan AR, Okunji CO "New antimicrobials of plant origin" Janick J (ed.), ASHS Press, Alexandria, VA 1999.
4. Marjorie MC, "Plant products as antimicrobial agents". Clinical Microbiology. Reviews, American Society for Microbiology. Department of Microbiology, Miami University, Oxford, OH, USA, vol. 12: pp.564-582,1999.
5. Tomoko N, Takashi A, Hiromu T, Yuka I, Hiroko M, Munekaju I, Totshiyuki T, Tetsuro I, Fujio A, Iriya I, Tsutomu N, Kazuhito W, Antibacterial activity of extracts prepared from tropical and subtropical plants on methicillinresistant *Staphylococcus aureus*. Journal of Health Science vol. 48, pp. 273-276, 2002.
6. Bbosa GS, Kyegombe DB, Ogwal-Okeng J, Bukonya-Ziraba R, Odyek O, Waako P, "Antibacterial activity of *Mangifera indica* (L.)". African Journal of Ecology vol.45, pp.13-16, 2007.
7. Amani S, Isla MI, Vattuone M, Poch M, Cudmani N, Sampietro A "Antimicrobial activities in some Argentine medicinal plants". Acta Horticulture vol. 501, pp.115-122, 1998.
8. Salvat A, Antonnacci L, Fortunato RH, Suarez EY, Godoy HM Screening of some plants from Northern Argentina for their antimicrobial activity. Letters in Applied Microbiology vol. 32, pp.293-297, 2001.
9. Costa ES, Hiruma-Lima CA, Lima EO, Andrade FDP, Vilegas W, Souza-Brito "Antimicrobial activity of some medicinal plants of the Cerrado, Brazil" Phytotherapy Research vol. 22 pp.705-707, 2008.
10. Ateb DA, Erdourul T, "Antimicrobial activities of various medicinal and commercial plant extracts" Turkish Journal of Biology, vol.27, pp. 157-162, 2003.
11. Nair R, Chanda S *In vitro* antimicrobial activity of *Psidium guajava* L. leaf extracts against clinically important pathogenic microbial strains. Brazilian Journal of Microbiology, vol. 38, pp.452-458, 2007.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 12, December 2018

12. Ndhala AR, Stafford GI, Finnie JF, Van Staden J *In vitro* pharmacological effects of manufactured herbal concoctions used inKwaZulu-Natal South Africa. *Journal of Ethnopharmacology*, vol. 122, pp. 117-122, 2009.
13. Aslim B, Yucel N, " *In vitro* antimicrobial activity of essential oil from endemic *Origanum minutiflorum* on ciprofloxin-resistant *Campylobacter* spp", *Food Chemistry*, vol.107, pp.602-606, 2008.
14. R.K. Gupta, "Medicinal & Aromatic Plants". CBS publishers & distributors, pp.151-152, 2010.
15. K.M. Nadkarni, "Indian Materia Medica. Bombay Popular Prakashan", Vol. I, PP. 811-816, 2009.
16. Garima mishra et, al, "Traditional uses, phytochemistry and pharmacological properties of *Moringa oleifera* plant: An overview". *Der Pharmacia Lettre*, Vol. 13(2), pp. 141-164, 2011.