

# COMPARATIVE STUDY OF ANTIMICROBIAL ACTIVITY OF DIFFERENT PART OF *MORINGA OLEIFERA* AGAINST SELECTED BACTERIA.

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**Abstract :** In the present study; The main aim was to evaluate comparative potential antimicrobial activity of aqueous extracts, chloroform extracts and ethanol extracts obtained from leaves, flowers and seeds of *Moringa oleifera* (Lam) against selected gram negative bacteria *E.Coli* and gram positive bacteria *S.aureus*. Nine extracts of leaves, flowers and seeds of *M.oleifera* were prepared with three solvent such as aqueous, chloroform and ethanol and antimicrobial activity checked by agar disc diffusion method. Generally, all extracts obtained by *M.oleifera* showed antimicrobial activity against selected microorganisms. The study showed that aqueous seeds extract of *Moringa oleifera* was show high inhibitory action against *Escherichia coli* (17mm) and *S.aureus* (15mm) while chloroform leaves extract of *Moringa oleifera* exhibited lowest antimicrobial activity against both tested bacteria *Escherichia coli* (8mm) and *S.aureus* (6mm). Chloroform flower extract was found to be the best extract to shown flower containing higher amount of antimicrobial compounds compared to leaves and seeds of the pant. Ethanol leaves and flowers extract was exhibited higher antimicrobial activity than ethanol seeds extract. Concluded that *M. oleifera* may be a potential source for the curing of various infectious diseases caused by the resistant microbes.

**Keywords:** Moringa oleifera L extract, Antimicrobial, disc diffusion, pathogens.

## I. INTRODUCTION

A number of medicinal properties can be described to the various parts of the *Moringa* tree. Almost all the parts of this plant: root, leaf, bark, gum, leaf, flowers, seed and fruit (pods) have been used for various ailments in the indigenous medicine of South Asia [1]. Antimicrobial agents are very important for the control of pathogenic microbes, especially for the treatment of infections caused by resistant microbes. Medicinal herbs with antimicrobial activities are considered a potent source of novel antimicrobial function. *Moringa oleifera* is widely used as a vegetable, functional food and medicinal plant that has rich nutritional composition with diverse pharmacological activities [2-4]. In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems [5]. *Moringa* leaf is a natural antihelminthic, antibiotic, detoxifier, outstanding immune builder used in some countries for the treatment of malnutrition and malaria [6]. A few researchers have investigated the antimicrobial activity of *Moringa oleifera* (Lam) extracts against some pathogenic bacteria [7-8]. In this present study we have evaluated aqueous extracts, chloroform extracts and ethanol extracts obtained from leaves, flowers and seeds of *Moringa oleifera* (Lam) for their antimicrobial activity against two selected pathogens.

## II. MATERIAL AND METHODS

### Collection of Plant Material

Fresh leaves, flowers and seeds of *Moringa oleifera* (family *Moringaceae*) were obtained from campus of Siddhartha College, Jafrabad, Jalna (Maharashtra). The leaves, flowers and seeds were identified and confirmed by the Botanist at the Botany Department of the present institution. All materials were washing with tap water to remove impurities. It were dried under shade for 1 week, all dried materials were ground in a mixer grinder separately, which were easily grinded into the powder form. Same processes repeated 4 to 5 times and it stored in an air tight container for further use.

### Preparation of Extracts

From each 30 gm of the powdered sample of leaves, flowers and seeds were separately extracted in 500ml conical flasks with 100 ml of deionised distilled water (aqueous extraction) while 100ml each of Chloroform, and ethanol (solvent extraction). The conical flasks were plugged with rubber corks, then shaken at 120 rpm for 30 min and allowed to stand at room temperature for 6 day. The extracts were separately filtered using Whatman filter paper no. 1. The resulting filtrates were centrifuged. After centrifugation, supernatants were labeled as "Extract AQU" "Extract AQUF" and "Extract AQU" for the aqueous extracts of leaves, flowers and seeds respectively. Similarly labeled for solvent extraction as "Extract CHO" and "Extract ETH" for chloroform and ethanol respectively. Totally nine extract of *Moringa oleifera* were prepared with different solvent and different part. All extracts were properly labeled and kept at 4°C until use.

### Antimicrobial properties of Moringa extracts

The antimicrobial activity of the various extracts was tested using the disc diffusion method and determine zone of inhibition (ZOI)

### The pathogenic microorganism

The two selected common pathogenic microorganism were used in the study, among these one was gram negative *Escherichia Coli* and another was gram positive *Staphylococcus aureus*

**Preparation of microbial cultures**  
7.2 g of Muller Hinton Agar is added to 200 ml distilled water and autoclaved at 121°C for 15 minutes at 15 lbs and poured in sterile Petri plates up to a uniform thickness of approximately 4mm and the agar is allowed to set at ambient temperature and used.

### Inoculums preparation:

To prepared bacterial inoculums, pure culture of micro-organisms was inoculated into 5 ml of sterile nutrient broth followed by incubation at 37°C. Till moderate turbidity developed. The density of suspension inoculated onto the media for susceptibility test was determined by comparison with 0.5 McFarland standard of Barium sulphate solution. [10]

### Antimicrobial activity by agar disc diffusion assay

The antimicrobial activity of each plant extracts was determined by disc agar diffusion technique described by Kirby Bauer et al (1966)[9]. The nutrient broth cultures of test bacteria were spreaded on the Muller Hinton Agar media in petriplates and microbes broth culture were applied on media by swabbing. The extracts were tested using 5mm sterilized filter paper discs which impregnated with 600mg concentration of test samples (aqueous, chloroform and ethanol) allowed to dry for few minutes at room temperature. The plates were then incubated at 37°C for 24 hours. Antibacterial activity was determined by measurement of zone of inhibition around each paper disc. The diameters of the Inhibition zones were measured in mm and results were recorded.

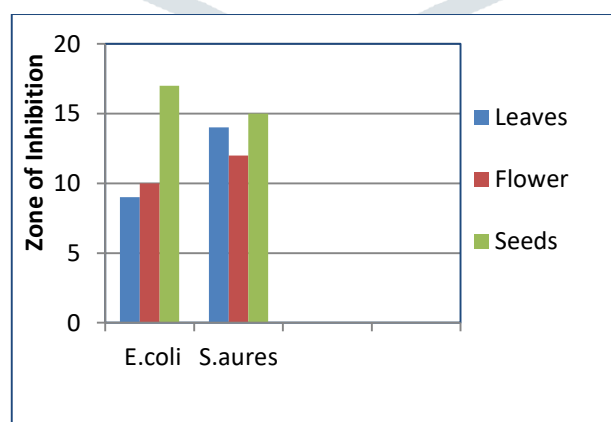
### III. RESULT AND DISCUSSION

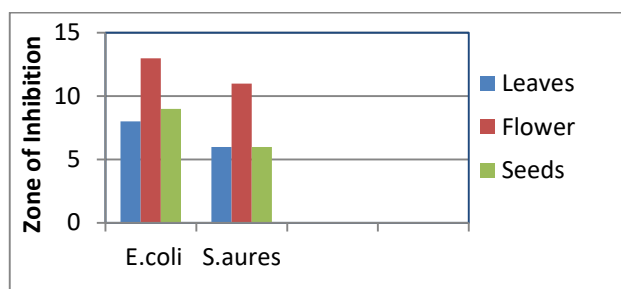
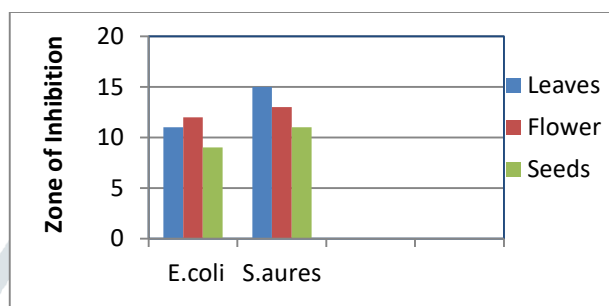
Antibacterial activity of different *Moringa oleifera* (Lam) extracts against gram negative and gram positive microbial pathogens, such as *Escherichia coli* and *Staphylococcus aureus* respectively were studied. Results of the study are shown in the table-1. All the extracts of *M.oleifera* exhibit varying degrees of antibacterial activity. The results were expressed as mean±standard deviation. Aqueous seeds extract of *M.Oleifera* showed maximum zone of inhibition against *E.coli* (17 mm) and chloroform leaves extract showed lowest activity against *S.aureus* (6 mm). Ethanol extract of leaves, flowers and seeds of *M.Oleifera* against *E.coli* ranges from 11 mm, 12 mm and 9 mm respectively, while against *S.aureus* ranges from 15 mm, 13 mm and 11 mm respectively. Chloroform flower extract showed higher zone of inhibition (13 mm) than leaves (8 mm) and seed (9 mm) against *E.coli*. The comparative zone of inhibition of leaves, flowers and seeds extract of different solvent such as aqueous, chloroform and ethanol showed in fig.-1, fig.-2 and fig.-3 respectively.

**Table.1 Antibacterial activity of different *Moringa oleifera* (Lam) extracts against *Escherichia coli* and *Staphylococcus aureus***

Sr.No	Type of extract	Zone of Inhibition	
		<i>E.Coli</i> (mm)	<i>S.aures</i> (mm)
1	AQUL	9	14
2	AQUF	10	12
3	AQUS	17	15
4	CHOL	8	6
5	CHOF	13	11
6	CHOS	9	6
7	ETHL	11	15
8	ETHF	12	13
9	ETHS	9	11

**Fig.1. Zone of Inhibition of aqueous extract of *Moringa oleifera* L**



**Fig.2.Zone of Inhibition of chloroform extract of Moringa oleifera L****Fig.3.Zone of Inhibition of Ethanol extract of Moringa oleifera L**

#### IV. CONCLUSION

The result of this research has demonstrated that *M.oleifera* could become promising natural antimicrobial agents with potential application in therapeutic drugs for controlling the pathogenic bacteria. Inhibition of both gram-negative and gram-positive organisms by this plant extract depicts that it can serve as a source of broad spectrum antibiotics, which justified the traditional use of this plant for therapeutic purposes.

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