Comparative Antibacterial Activity Of Aqueous and Ethanol Extracts Of *Commiphora Wightii* and *Commiphora Mukul*

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Abstract
Research conducted comparative study of *Commiphora wightii* and *Commiphora mukul* aqueous and ethanol extract of leaves. Extracts were prepared in soxhlet apparatus using aqueous and ethanol solvents. All five concentrations of extracts were studied against *Ecoli* and *Klebsilla*. Low concentrations of extracts did not showed significant zone of inhibition but higher concentrations show significant zone of inhibition.The aqueous and ethanolic extract of *Commiphora mukul* exhibited 6 mm maximum zone of inhibition against *Ecoli* but *Commiphora wightii* aqueous and ethanol extract showed 8 mm and 18 mm zone of inhibition against *Ecoli*. *Commiphora mukul* aqueous and ethanolic extract showed10 mm and 15 mm zone of inhibition against *Klebsilla* while *Commiphora wightii* aqueous and ethanolic extract showed 8 mm and 20 mm maximum zones of inhibition against *Klebsilla*. *Commiphora wightii* demonstrated higher susceptibility while *C. mukul* has been least for ethanol extracts. *Commiphora wightii* leaf extract possesses more antimicrobial activity than *C. mukul*.

Key Words: Antibacterial activity, *Commiphora wightii*, *Commiphora mukul*, Extract, Zone of inhibition etc.

INTRODUCTION

Pathogenic microbes adversely impact the quality and safety of life. Synthetic chemicals have been extensively utilized against microbes. Unfortunately, they developed resistance to numerous antimicrobial drugs. Bacterial resistance to antibiotics poses a significant challenge for clinicians and pharmaceutical industry, prompting extensive efforts to prevent this trend. One such initiative involves extensive screening of medicinal plants from traditional medicine systems, intending to discover novel, safer, and more effective agents for dealing with infectious diseases. Natural products, especially those derived from plants, have been essential in drug discovery. Certain drugs are entirely generated from natural products, while others utilize natural products as templates for the production of new pharmaceuticals (Cowan, 1999; Adam *et al*., 2020). The plant kingdom produces several active compounds that are beneficial for treating and managing certain disorders. These substances are primarily secondary metabolites. Certain active compounds exist either individually or in conjunction with other inactive substances that significantly impede the life activities of microorganisms, particularly pathogenic ones. Medicinal plants provide an economical and renewable source of pharmacologically active substances (Basile *et al*., 1999; Alabi *et al*., 2012). *Commiphora* plant is woody shrub or small tree characterized by spirally climbing branches. Leaves possess 1-3 foliate structures, with leaflets that are sessile to subsessile and exhibit rhomboid to oval morphology. Flowers are small, ranging from brown to pink and unisexual. Calyx exhibits glandular hairs, forming a cylindrical cap. Petals are four to five times length of sepals. Fruits are drupes, red and ovate with an acuminate shape. (Satyavati *et al*., 1976; Raghunathan, 1982; Raghunathan, 1992). *Commiphora* leaves possess an aromatic fragrance. Guggul gum is derived from *C. wightii* stem. It is significant for numerous medical and pharmacological attributes. Guggul is also utilized in many Ayurveda formulations. Guggul gum exhibits pharmacological activity in the management of rheumatoid arthritis, obesity and peptic ulcers (Atal *et al*., 1975).

MATERIAL AND METHOD

Collection and identification of plant material

Dr. Shaukat Sayeed Khan an emeritus professor of Botany identified and verified the plant material that was bought from a local market in Bhopal (M.P.) India. The plant material was shade-dried, ground into meal and stored in an airtight container till further use.

Preparation of extract

One Kilogram of *Commiphora wightii* and *Commiphora mukul* leaves shade-dried powder. They are individually packed in soxhlet extractors and extracted with aqueous and ethanol solvents. The Solid powder of the plant material was placed well in a water and ethanol solvent in soxhlet extractors until extraction. The filter was transferred while hot and the solvent removed by distillation. The extracts are stored in refrigerator for further experimental work.

Preparation of different concentrations of extracts

The test concentration of six different graded concentrations 10, 30, 50, 70, 90 mg/ml, drug ciprofloxacin using as a Positive control. The extracts had been aseptically dissolved using distilled water in different quantities. The antibacterial activity employed in current research was 'Disc diffusion test' given by (Bauer, 1972).

Sources of test organisms
Ecoli and *Klebsilla* were the test Gram-negative bacteria isolates in the urine sample. These specimens were provide by the Govt. Gandhi Medical College Bhopal (M.P.).

Antimicrobial susceptibility test Nutrient agar is available in powdered free-flowing, homogeneous form. The 28 gm prepared the nutrient agar powder in 1000 ml distilled water. The pH 7.4+/- 0.2 of the media was tested by digital pH-meter and adjusted using NaOH solution to the addition of agar. The conical flask containing agar was wrapped. The sterilization of media, Petri plates and Whatman filter paper disc were done in to autoclave. All glassware, media, Petri plates were put in a laminar airflow cabinet before using UV treatment was given for 15-20 minutes. The sterilized medium poured into each plate. They were kept for solidification inside the laminar airflow. The sterilized Whatman filter paper disc was lifted with the help of forceps and it was imbibed previously prepared different diluted extract. It was placed on the solid agar media with inoculums and was lightly pressed by using forceps. Nutrient agar plates with discs containing different concentrations of extracts were kept inside the incubator for 24 hrs at 37ºC.

Minimum Inhibitory Concentration The zone of inhibition of the growth was obtained after 24 hrs incubation. Zones diameter of each plate measured by antimicrobial zone reader (Ramar *et al*., 2000). Zone of inhibition is not significant less than 5 mm.

Table 1: Antibacterial activity of *C. mukul* against *E.coli*

Concentration of extract	Aqueous extract	Ethanol extract
10mg/ml	0mm	0mm
30mg/ml	0mm	2mm
50mg/ml	3mm	2mm
70mg/ml	4mm	4mm
90mg/ml	6mm	6mm
Positive Control (Ciprofloxacin)	15mm	16mm

Table 2: Antibacterial activity of *C. wightii* against *E.coli*

Concentration of extract	Aqueous extract	Ethanol extract
10mg/ml	0mm	0mm
30mg/ml	5mm	0mm
50mg/ml	5mm	5mm
70mg/ml	6mm	5mm
90mg/ml	8mm	18mm
Positive Control (Ciprofloxacin)	20mm	20mm

Table 3: Antibacterial activity of *C. mukul* against *Klebsilla*

Concentration of extract	Aqueous extract	Ethanol extract
10mg/ml	0mm	3mm
30mg/ml	0mm	5mm
50mg/ml	6mm	5mm
70mg/ml	6mm	8mm
90mg/ml	10mm	15mm
Positive Control (Ciprofloxacin)	18mm	21mm

Table 4: Antibacterial activity of *C. wightii* against *Klebsilla*

Concentration of extract	Aqueous extract	Ethanol extract
10mg/ml	0mm	0mm
30mg/ml	0mm	5mm

50mg/ml	5mm	7mm
70mg/ml	5mm	10mm
90mg/ml	8mm	20mm
Positive Control (Ciprofloxacin)	20mm	20mm

RESULTS

Similarities

Commiphora mukul concentrations of extract are 10, 70 and 90 mg/ml showed 0 mm, 4 mm and 6 mm zone of inhibition. The aqueous and ethanol extract against *E.coli*. *Commiphora wightii* same concentration of extract are 10, 50 mg/ml showed 0 mm and 5 mm zone of inhibition aqueous and ethanol extract against *Ecoli*. *Commiphora wightii* 10 mg/ml aqueous and ethanol extract showed no zone of inhibition.

Dissimilarities

Commiphora mukul extract concentrations are 30 and 50 mg/ml zone of inhibition 0 mm, 2 mm, 3 mm and 2 mm aqueous and ethanol extract against *Ecoli*. *Commiphora wightii* concentrations of extract are 30, 70 and 90 mg/ml zone of inhibition 5 mm, 0 mm, 6 mm, 5 mm, 8 mm and 18 aqueous and ethanol extract against *Ecoli*. *Commiphora mukul* concentration of extract 10, 30, 50, 70 and 90 mg/ml zone of inhibition 0 mm, 3 mm, 0mm, 5 mm, 6 mm, 5 mm, 6 mm, 8 mm, 10 and 15 mm aqueous and ethanol extract against *Klebsilla*. *Commiphora wightii* concentration of extract 30, 50, 70 and 90 mg/ml zone of inhibition 0 mm, 5 mm, 5 mm, 7 mm, 5 mm, 10 mm and 8 mm and 20 mm aqueous and ethanol extract against *Klebsilla*.

DISCUSSION

Antibacterial activity of *C. wightii* leaves extract in *Ecoli* and *Klebsilla*

The aqueous and ethanol extract of *C. wightii* 50 mg/ml showed 5 mm and 5 mm zone of inhibition. *Commiphora wightii* aqueous and ethanol extract 10 mg/ml showed no zone of inhibition. The extracts similar observation in *Ecoli* were reported by Qureshi and Chahar (2015); Amezouar *et al*., 2012; Omer *et al*., 2011; Al-shibly *et al*., 2022. Aqueous and ethanol extract of *C. wightii* 10 mg/ml did not demonstrate any zone of inhibition. Aqueous and ethanolic extract of *C. wightii* 50 mg/ml dilution showed 5 mm and 7 mm. The inhibitory zone of similar observations in *Klebsilla* were reported by Elastal *et al*., 2005; Adam *et al*., 2020; Kalaiselvam *et al*., 2017.

Antibacterial activity of *Commiphora mukul* leaves extract *Ecoli* and *Klebsilla*

The aqueous and ethanol extract of *C. mukul* 50 mg/ml showed 3 mm and 2 mm zone of inhibition. The aqueous and ethanol extract of *C. mukul* 10 mg/ml showed no zone of inhibition. The extracts similar observation in *E. coli* reported by Adam *et al*., 2020; Amezouar *et al*., 2012; Elastal *et al*., 2005; Al-shibly *et al*., 2022. The aqueous and ethanol extract of *Commiphora mukul* 50 mg/ml showed 6 mm and 5 mm respectively. The aqueous and ethanol extract of *Commiphora mukul* 10 mg/ml showed no zone of inhibition and 3 mm. The extracts similar observation in *Klebsilla* were reported by Adam *et al*., 2020; Kaliyaperumal *et al*., 2019; Al-shibly *et al*., 2022.

CONCLUSION

Plant-based antimicrobials have significant therapeutic and preferential potential. They may accomplish the intended impact without negative impacts of synthetic antimicrobials. The aqueous and ethanol extract of *C. mukul* 90 mg/ml showed similar maximum zone of inhibition against *Ecoli*. *Commiphora wightii* ethanol extract 90 mg/ml showed very closer zone of inhibition than positive control. It demonstrated significant zone against *Ecoli*. Aqueous and ethanol extract of *C. mukul* 50, 70 and 90 mg/ml showed significant increasing zone of inhibition against *Ecoli*. The ethanolic extract of *C. mukul* and *C. wightii* 90 mg/ml showed maximum zone of inhibition against *Klebsilla*. *Commiphora mukul* ethanol extract 90 mg/ml showed closer zone of inhibition than positive control. It showed significant zone against *Klebsilla*. *Commiphora wightii* ethanolic extract 90 mg/ml and positive control showed similar zone of inhibition against *Klebsilla*. Ethanolic extract of *C. mukul* 50, 70 and 90 mg/ml showed a significantly increasing zone of inhibition against *Klebsilla*. Antimicrobial activity of *C. wightii* ethanol extract and *C. mukul* leaves were illustrated in current investigation. Antibacterial activity against the test isolate indicates these plants are source antibiotics for novel antibacterial medicines.

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