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ANTIMICROBIAL ACTIVITY OF *MORINGA OLEIFERA* (MORINGACEAE) AND *BARLERIA PRIONITIS* (ACANTHACEAE) METHANOLIC CRUDE LEAVES EXTRACT

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ABSTRACT

The nature provides the mankind vast therapeutic flora with a wide variety of medicinal potential. According to WHO world's 80% population depends on traditional medicines for healthcare. Phytochemical screening show the presence of saponin, flavonoids, carbohydrate, glycosides, terpenes and steroids in *Moringa oleifera* methanolic crude leaves extract. Phytochemical screening of *Barleria prionitis* showed the presence of terpenes, glycosides and flavonoids. Both the plants showed the anti microbial activity in the dose dependent manner. *M. oleifera* mehanolic crude leaf extract showed antimicrobial activity against *Pseudomonas aeruginosa* with zone of inhibition of 6.0 ± 0.05, 10.0 ± 0.02, 11.0 ± 0.01, 14.0 ± 0.033 mm in concentration of 25,50,75,100 % respectively of crude extract as compare to Streptomycin 9.9 ± 0.47 with concentration of 10µg/disc. *B. prionitis* methanolic crude extract showed antimicrobial activity against *Streptococcus mutans* with zone of inhibition of 6.0 ± 0.05, 10.0 ± 0.02, 6.0 ± 0.01, 7.0 ± 0.033 mm in concentration of 25,50,75,100 % respectively of crude extract as compare to Streptomycin 9.9 ± 0.47 with concentration of 10µg/disc.

KEYWORDS: antimicrobial, medicinal potential, flavonoids, saponin, steroids, terpenes.

INTRODUCTION

Since time immemorial man has been using nature based therapeutics for treatment of various ailments. These nature based remedies not only possess potential for uprooting various deadly diseases but also act without any side effect. The potential for such properties lies in some chemical components present in plants known as secondary metabolites. The most

important of these bioactive compounds of plants are flavonoids, terpenes, alkaloids, tannins, saponins and phenolic compounds. There must be a continuous research for new drugs to cope up with multidrug resistance in pathogens which is one of the most serious threats to successful treatment of microbial diseases. [1] The increasing failure of the chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has lead to the screening of several medicinal plants for their potential antimicrobial activity.[2] *Pseudomonas aeruginosa* is a common gram-negative rod-shaped bacterium that can cause disease in plants and animals, including humans. It is a species of considerable medical importance, due to multidrug resistant pathogen and its association with serious illnesses like nosocomial infections such as ventilator-associated pneumonia and various sepsis syndromes. In higher plants *P. aeruginosa* induces symptoms of soft rot, for example in *Arabidopsis thaliana* (Thale cress) [3] and *Lactuca sativa* (lettuce).[4,5] It is also pathogenic to invertebrate animals, including the nematode *Caenorhabditis elegans*,[6,7] the fruit fly *Drosophila melanogaster*[8] and the moth *Galleria mellonella*.[9] The associations of virulence factors are the same for plant and animal infections.[10]

Streptococcus mutans is facultative anaerobe gram-positive bacterium commonly found in the human oral cavity and is a significant contributor to tooth decay and various oral caries. [11, 12]

MATERIALS AND METHODS

Collection of plant material

The plants of *Moringa oleifera* (Moringaceae) were collected from areas around Bhopal, and *Barleria prionitis* (Acanthaceae) from BHEL area, Bhopal, M.P. in India. The plant material was thoroughly washed with water and was kept for drying in shade at room temperature for 20days. The air dried plant material was grinded to powder to about 40-60 mesh size weighted and stored in large plastic bottles.

Crude Extraction

The plant powder was extracted according to Harborne and Baxter. [13] In this method the 40-60-mesh size powdered plant material was extracted with soxhlet apparatus using 50 % methanol after defatting with petroleum ether for 24 hr. The extraction was done for 48 hr. duration. Almost all the chlorophyll and lipid is deposited on the side of the flask and with skill it was removed. The crude was pipette off skilfully almost completely free of lipid

impurities and filtered through Whatmann filter paper no.1. Filtrate is then evaporated to 1/10th volume (<40°C).

Phytochemical screening

Phytochemical screening were performed to assess the qualitative chemical composition of different crude extracts using commonly employed precipitation and coloration reactions to identify the major secondary metabolites like alkaloids, flavonoids, saponins, phenolic compounds, tannins. The phytochemical analyses were carried out using standard procedures.[14, 15]

Antibacterial assay

The plate disc diffusion assay was used to determine the growth inhibition of bacteria by plant crude extract.[16] The bacterial cultures were maintained on nutrient agar media (Himedia). The bacteria were incubated at 37°for 24 hr. Nutrient agar media was prepared and poured in autoclaved Petri dishes. Inoculum containing 106 CFU/ml of test bacteria was spread on solidified plates with a sterile swab moistened with the bacterial suspension. Sterilized Whatmann filter paper discs were placed on the poured plates using sterile forceps and the 10µl of the crude extract was poured on the discs. The four different concentrations (25, 50, 75, 100 %) of leaves extract were prepared by dissolving in DMSO (Dimethyl Sulphoxide) and were tested for antibacterial activity. The experiment was performed in triplicates and the mean values were presented with standard deviation. Streptomycin (10µg/50µl) was used as standard. Control was prepared using DMSO only. Zone of inhibition were measured in mm.

OBSERVATIONS

Table 1. Phytochemistry of methanol crude extract of *M. oleifera* and *B. prionitis* leaves

S.No.	Compound	Methanolic Crude Extract	
		M. oleifera	***B. prionitis***
1	Carbohydrate	+ve	-ve
2	Glycosydes	-ve	+ve
3	Terpenes	+ve	+ve
4	Flavonoids	+ve	+ve
5	Alkaloids	-ve	-ve
6	Saponin	+ve	-ve
7	Phenolic Compounds	-ve	-ve

Table 2. Antimicrobial activity of methanol crude extract of *M. oleifera* on *P.aeruginosa*

S.No.	Bacterial Strains	Standard (Streptomycin)	Zone Of Inhibition(mm) Methanol Crude Extract (%)			
		10µg/disc	25	50	75	100
1	*Pseudomonas aeruginosa*	9.9 ± 0.47	6.0 ± 0.05	10.0 ± 0.02	11.0 ± 0.01	14.0 ± 0.033

Table 3.Antimicrobial activity of methanol crude extract of *B. prionitis* on *S. mutans*

S.No.	Bacterial Strains	Standard (Streptomycin)	Zone Of Inhibition(mm) Methanol Crude Extract (%)			
		10µg/disc	25	50	75	100
1	*Streptococcus mutans*	9.9 ± 0.47	6.0 ± 0.05	10.0 ± 0.02	6.0 ± 0.01	7.0 ± 0.033

RESULTS AND DISCUSSION

Phytochemical screening show the presence of saponin, flavonoids, carbohydrate, glycosides, terpenes and steroids in *Moringa oleifera* methanolic crude leaves extract. Phytochemical screening of *Barlaria prionitis* showed the presence of glycosides, terpenes and flavonoids. Both the plants showed the antimicrobial activity in the dose depended manner. *M.oleifera* methanolic crude leaves extract showed antimicrobial activity against *Pseudomonas aeruginosa* with zone of inhibition of 6.0 ± 0.05, 10.0 ± 0.02, 11.0 ± 0.01, 14.0 ± 0.033 mm in concentration of 25,50,75,100 % respectively of crude extract as compare to 9.9 ± 0.47 with concentration of 10µg/disc. *B. prionitis* methanolic crude extract showed antimicrobial activity against *S. mutans* with zone of inhibition of 6.0 ± 0.05, 10.0 ± 0.02, 6.0 ± 0.01, 7.0 ± 0.033 mm in concentration of 25,50,75,100 % respectively of crude extract as compare to 9.9 ± 0.47 with concentration of 10µg/disc. As flavonoids are synthesized by plants in response to microbial infection it should not be surprising that they have been found invitro to be effective antimicrobial substances against a wide array of microorganisms. Generally alkaloids are extremely toxic though they do have a marked therapeutic effect in minute quantities. For this reasons alkaloids were not often used in folk medicine but for external application only. Pure isolated plant alkaloids and their synthetic derivatives are used as basic medicinal agents over the world for their analgesic, antispasmodic and bactericidal effects.[17] This antibacterial activity would support the folk therapy of infections whose symptoms might involve bacteria.[18] Antibiotics provide the base for treatment of bacterial infections. But, for the possession of high genetic variability bacteria easily develop antibiotic resistance. Thus, there has been a continuing search for new and more potent antibiotics.[19]

CONCLUSIONS

The two botanicals showed antibacterial activity in dose dependent manner.Methanolic crude extract from *Moringa oleifera* (Moringaceae) and *Barleria prionitis* (Acanthaceae) leaves showed potent antibacterial activity thus this plant can be used for isolation of bioactive compounds, as lead compound for development of novel antibiotics.

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