



## **Studies of antibacterial activity ethnolic plant extract of *Mollugo pentaphylla* Linn**

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### **Abstract**

The present study describes the antimicrobial activity of *Mollugo pentaphylla* fruit extract against microorganism. *Bacillus substils*, *Staphylococcus aureus*, *Staphylococcus epidermis*, *Escherichia coli*, *Staphylococcus flexinera* and *Pseudomonas aeruginosa*. For this purpose aqueous extract of fruit were prepared and tested by “Disc Diffusion Method”. As a result of this study it was found that the extract of fruit generally revealed anti microbial activity against both gram-positive bacteria (*B. subtilis*, *S. aureus* and *S. epidermis*) and gram-negative bacteria (*E. coli*, *S. flexinera* and *P.auriginosa*).

**Keywords:** Antibacterial activity, *Mollugo pentaphylla*, Disc diffusion method.

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### **Introduction**

Traditional medicines hold a great promise as source of easily available effective therapy for skin diseases to the people, particularly in tropical developing countries, including India. One of the factors aiding the spread of fungal disease has been the widespread use of broad-spectrum antibiotics, which eliminate or decrease the non-pathogenic bacterial populations that normally compete with fungi. Another has been the increased number of individuals with reduced immune responses caused by the acquired immunodeficiency syndrome or by the action of immunosuppressant drugs, or cancer chemotherapeutic agents. Besides their increasing frequency, fungal infections are still associated with an unacceptably high mortality, up to 40% in bloodstream infections caused by *Candida albicans* [1] and more than 50% in invasive aspergillosis [2]. The most commonly recognised causes of opportunistic invasive fungal infections (IFIs) traditionally are *Candida albicans*, *Cryptococcus neoformans* and *Aspergillus fumigatus* [3]. Along with the widespread use of antifungal prophylaxis, the epidemiology of IFIs has shifted towards *non-albicans Candida*, *non-fumigatus Aspergillus*, opportunistic yeast-

like fungi (e.g. *Trichosporon* and *Rhodotorula* spp.), zygomycetes and hyaline moulds (e.g. *Fusarium* and *Scedosporium* spp.) [4]. The limitations of current antifungal drugs, increased incidence of systemic fungal infections, and rapid development of drug resistance have highlighted the need for the discovery of new antifungal agents, preferably with novel mechanism of action[5]. The emergence and spread of antimicrobial resistance has become one of the most serious public health concerns across the world. Antimicrobial resistance refers to micro-organism that have developed the ability to inactivate, exclude or block the inhibitory or lethal mechanism of the antimicrobial agents [6-9]. *Mollugo pentaphylla* Linn. named Pitta saga (Oriya) is a perennial herb found throughout India, also cultivated in some part of Orissa. Roots are creaper and adventitious, leaves are trifoliate small oval shape; flowers are small pinkish color, pentameric and bisexual. The urban people used this plant medicinally in paste form orally and externally for treatment of skin allergic condition, antimicrobials etc [10-12]. The present investigation was carried out to investigate the chemical and therapeutically potential by evaluating antifungal profile of the fresh leaf extract of *Mollugo pentaphylla* Linn is being reported here.

## **Materials and Methods**

### ***Plant material***

All other chemicals and reagents were procured from authorized suppliers and were of analytical grades. The plant material *Mollugo pentaphylla* whole parts were collected from local area of Ater Dist. Bhind Madhya Pradesh India.

### ***Preparation of Extract***

The plant was taken and air dried in shade for three days. Then whole dried plants are made coarse powder. Now the extraction was occurred by the soxhlet apparatus using the petroleum ether (50-60°C), 95% Ethanol, Benzene, chloroform and acetone in their increasing order of polarity. as a solvent. From the extract the successive fractions like ethyl acetate and n-butanol were made by sub fraction method in a separating funnel. Then the extracts were concentrated by putting the extract on water bath or by distillation. The extracts so obtained were concentrated to dryness by evaporating the solvent under reduced pressure using rotary evaporator. Yield of extracts was petroleum ether (5.5.0%), chloroform (12.5 %) and acetone (1.0 %). All the extracts were dissolved in sterile dimethyl sulphoxide (DMSO) for antibacterial as well as antifungal activity.

### ***Formulation of extract***

For anti-microbial activity study on the day of experimentation, the different amount of powder was suspended in distilled water to get different concentration of suspension.

### ***Micro organism***

The micro organisms used in this study were *B.subtilus*, *S.aureus*, *S.epidermis*, *E.coli*, *S.flexinaria*, and *P.auriginosa*.

### ***Antimicrobial activity***

The anti microbial activity of the aqueous extract was carried by disc diffusion method [13]. A suspension of tested micro organisms was spread on Muller-Histon Agar (MHA) (Oxoid)

medium. The filter paper discs (9 mm in diameter) were individually impregnated with different concentration of extract and then placed into the agar plates which had previously been inoculated with the tested micro organisms. The plates were subsequently incubated at 37°C for 31 hrs. After incubation the growth inhibition rings were quantified by measuring the diameter of the zone of inhibition in mm. All the tests were performed in triplicate. Cephalixin, amoxicillin and ampicillin served as positive control.

## Results and Discussion

The antimicrobial affect of plant extract against the different strains are illustrated in Table 1. The extract of *Mollugo Pentaphylla Linn* at the concentration of 100% has antimicrobial activity on the tested micro-organism form high to low respectively. *P.auriginosa* (19 mm), *E.coli* (23 mm), *S. epidermis* (24 mm), *S. aureus* (20mm), *S. flexinaria* (17 mm), and *B.subtilus* (16 mm) showed in (Table-1). The data indicated that gram negative *S. epidermis* was the most sensitive strain of those tested with the extract of *Mollugo Pentaphylla Linn* with strongest inhibition zone of 24 mm. The extract concentration of 100 % also exhibit high antimicrobial activity against *B.subtilus* with modest activity against, *S. aureaus*, *P.auriginosa*, *S. flexinaria*. *E.coli*. The 75 % concentration of the extract of *Mollugo Pentaphylla Linn* also show strongest inhibition zone against different strains of microorganisms. The data indicates that anti-microbial activity of extract (at 50 % concentration) with strongest inhibition zone of 20 mm for the strain of *B.subtilus*, *S. aureaus* *E.coli*.The Table - 1 shows that different concentration (50%, 75% and 100 %) of plant extract were having good antimicrobial activity against *B.subtileaus*, *S.aureaus*, *S.epedermis*, *E.coli*, *S.flexinaria* and *P.auriginosa*. *In vitro* preliminary screening of the antimicrobial activity of the plant extracts from *Mollugo Pentaphylla Linn* was studied against some micro-organisms using the filter paper disc diffusion method.

**Table -1 Antimicrobial activity of *Mollugo Pentaphylla Linn* aqueous extract of different micro organisms**

Sample Conc.in %	Zone of Inhibition in (mm)					
	<i>S. Aureus</i>	<i>B. Subtillis</i>	<i>E. Coli</i>	<i>P.auriginosa</i>	<i>S.epidermis</i>	<i>S.flexinaria</i>
100	21	16	23	19	24	17
75	19	15	22	18	23	13
60	18	15	23	18	24	14
50	17	12	21	19	21	15
40	16	14	22	16	23	16
25	15	15	20	18	20	11
20	16	16	15	17	22	13
10	13	11	17	14	17	15
5	16	10	16	15	19	12

**Table 2: Antimicrobial activity of antibiotics on different micro organisms**

Micro-Organisms	Microorganisms (inhibition zone in mm)					
	Gram-positive			Gram-negative		
	<i>S. aureus</i>	<i>B.subtilus</i>	<i>S. epiderms</i>	<i>E.coli</i>	<i>S.flexineria</i>	<i>P.auriginosa</i>
Ampicillin	20	18	23	17	17	18
Cephalexin	19	17	-	-	18	11
Amoxicillin	18	15	19	13	17	15

**Table 3. Phytochemical group test for the Petroleum ether, Chloroform, Extract of leaves of *Mollugo Pentaphylla Linn***

S. No.	Phytoconstituents	Extract of leaves of <i>Mollugo Pentaphylla Linn</i>
1	Alkaloid	+
2	Amino acid	-
3	Flavonoids	-
4	Glycosides	+
5	Tannins	+
6	Saponins	+
7	Gums	-
8	Triterpenoids	-
9	Steroids	-

+Present, - Absent.

**Conclusion**

Further pharmacological and clinical studies are required to understand the mechanism and the actual efficacy of these herbal extracts in treating various infections and skin diseases like psoriasis. Aqueous extracts of rhizomes of *Mollugo Pentaphylla Linn* exhibited better

antibacterial activity as compared to their petroleum ether, methanolic and ethanolic extracts. Among the organisms tested *S.epidermis* *S.flexinaria*, was more susceptible to the aqueous extracts of all the three herbs.

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