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Preliminary Phytochemistry and Anti-Microbial Activity of Malachra Capitata Plant

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ABSTRACT

Methanolic, Chloroform and Benzene extract of the leaves of *Malachra Capitata* was screened for its phytochemical and antibacterial properties on *E. coli* and *Listeria monocytogenes* at varying concentrations. The Agar gel diffusion method was used to assay for the antibacterial properties on the test isolate. The results showed that the methanolic extracts at different concentrations inhibited the growth of *E. coli* and *L. monocytogenes*. The concentration of 50mg/ml inhibited the isolate with highest diameter zone of inhibition ranging from 1mm to 11mm. The extracts inhibited the growth of the bacterial isolate in a concentration dependent manner with MICs 10mg/ml. Phytochemical analysis of the leaf extracts revealed the presence of antimicrobial active agents such as alkaloids, Carbohydrates, Flavonoids and saponin. These established a good support to the use of this plant in herbal medicine and as base for the development of new drugs and phytomedicine.

keywords: Malachra Capitata, Phytochemistry, E.coli, Antibacterial Activity.

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INTRODUCTION

Medicinal Plants have contributed immensely to health care in Indian subcontinent. This is due in part to the recognition of the value of Traditional medical systems, particularly in Asian origin, and the identification of medicinal plant from indigenous pharmacopoeias and traditional knowledge, which have significant healing power. Among the plant family is malvaceae, these plant synonyms is Anabo, Ban bhind (Bengali), Pardesi bhindo (Gujarati). The malachra capitata is used in the mucilaginous and anthelmintics.

MATERIALS AND METHOD

Collection and authentication of plant material

The Plant material of *Malachra capitata* (L.) roots and leaves was collected from Tirupati, Chittoor district, in the Month of march 2018. The plant was authenticated by Dr. Ramakrishna, Research Officer Botany. C.C.R.A.S., Govt. of India. The voucher specimen of the plant was deposited at the college for further reference.



Figure 1: Malachra capitata

Preparation of plant extract

1. The collected plant material (Whole plant) *Malachra capitata* was washed thoroughly in water, and air dried for 30 min per hours at 35-40 °C temperature. The Extraction was done by using Soxhlet apparatus with 70% methanol as solvent. The extracts were concentrated under reduced pressure dried and store at 4 °C temp in air tight container for further studies.

2. The collected plant material (Whole plant) *Malachra capitata* was washed thoroughly in water, and air dried for 1 hours min per hours at 35-40 °C temperature. The Extraction was done by using

Soxhlet apparatus with 80% chloroform as solvent. The extracts were concentrated under reduced pressure dried and store at 5⁰ C temp in air tight container for further studies.

3.The collected plant material (Whole plant) *Malachra capitata* was washed thoroughly in water, and air dried for 30 min per hours at 35-40⁰ C temperature. The Extraction was done by using Soxhlet apparatus with 80% Benzene as solvent. The extracts were concentrated under reduced pressure dried and store at 4⁰ C temp in air tight container for further studies.

Test Microorganism:

The strain used in this work was *L.monocytogenes* type 4a (food origin) and *E.coli* obtained from Laboratory of Mycology and Plant Pathology ,Department of Gland institute of pharmaceutical science. The bacteria was maintained by weekly transfer in tryptic soy broth(TSB) and distributed in 5ml volume in screw –capped tubes ,cells were grown at 37⁰C for 48 hours and cultures were kept at 4⁰C.

Antibacterial Test

The antibacterial tests of the plant extracts were tested on the test isolate using the agar-gel diffusion inhibition test. In the agar-gel diffusion tests as described by Opara and Anasa,0.2ml of a 24 hours broth culture containing 1x10⁶ cells/ml of organism was aseptically introduced and evenly spread using bent sterile glass rod on the surface of gelled sterile Mueller-Hinton agar plates. Three wells of about 6.0mm diameter were aseptically punched on each agar plate using cork borer, allowing at least 30mm between adjacent wells and between peripheral wells and the edge of the petri dish. Fixed volumes(0.1ml) of the extract were then introduced into the wells in the plates. A control well was in the center with 0.01ml of the extracting solvent. The plates were allowed on the bench for 40 min for pre-diffusion of the extract to occur and then incubated at 37⁰C for 24hours.The resulting zones of inhibition were measured using a ruler Calibrated in millimeters. The average of the three readings was taken to be the zone of inhibition the bacterial isolate .

Maximum inhibitory Concentration(MIC)

The MIC of the potent extract was determined according to the macro broth dilution technique .Standardized suspensions of the test organism was inoculated into a series of sterile tubes of nutrient broth containing two-fold dilutions of leaf extract and incubated at 37⁰C for 24hours.The MICs were read as the least concentration that inhibited the growth of the test organisms.

Minimum Bactericidal Concentration(MBC)

The MBCs were determined by first selecting tubes that showed during MIC determination, a loopful from each tube was subcultured onto extract free agar plates, incubated for further 24 hours at 37⁰C. The least Concentration at which no growth was observed was noted as the MBC.

Phytochemical Screening

Phytochemical Screening was carried out according to the methods described by Trease and Evans.

RESULTS AND DISCUSSION

Table 1 shows the results of the antibacterial effect of the extract on the test isolate. In general ,the zone of inhibition decreased with decrease in concentration of the leaf extract. The highest zone of growth inhibition occur with a zone diameter of 11mm at a concentration of 50mg/ml ,while the lowest zone of growth inhibition occur with a zone diameter of 1mm at a concentration of 25mg/ml. Table 2 shows the MIC and MBC of the extract on the test isolate. The MIC results indicated that methanolic extract of the fresh leaf on the organism had MIC of 10mg/ml, while MBC had 2mg/ml for *L.monocytogenes* and 2.15mg/ml for *E.coli*. Table 3 shows the Preliminary Phytochemical profile of the methanolic, chloroform and benzene leaf extract of the plant. The Phytochemical screening showed that the leaf extract of *malachra capitata* contain alkaloids, carbohydrates ,flavonoids and saponin at different concentrations.

Table-1: Antibacterial activity of methanolic, chloroform and benzene extract of *malachra capitata* against *E. coli* and *L. monocytogenes*

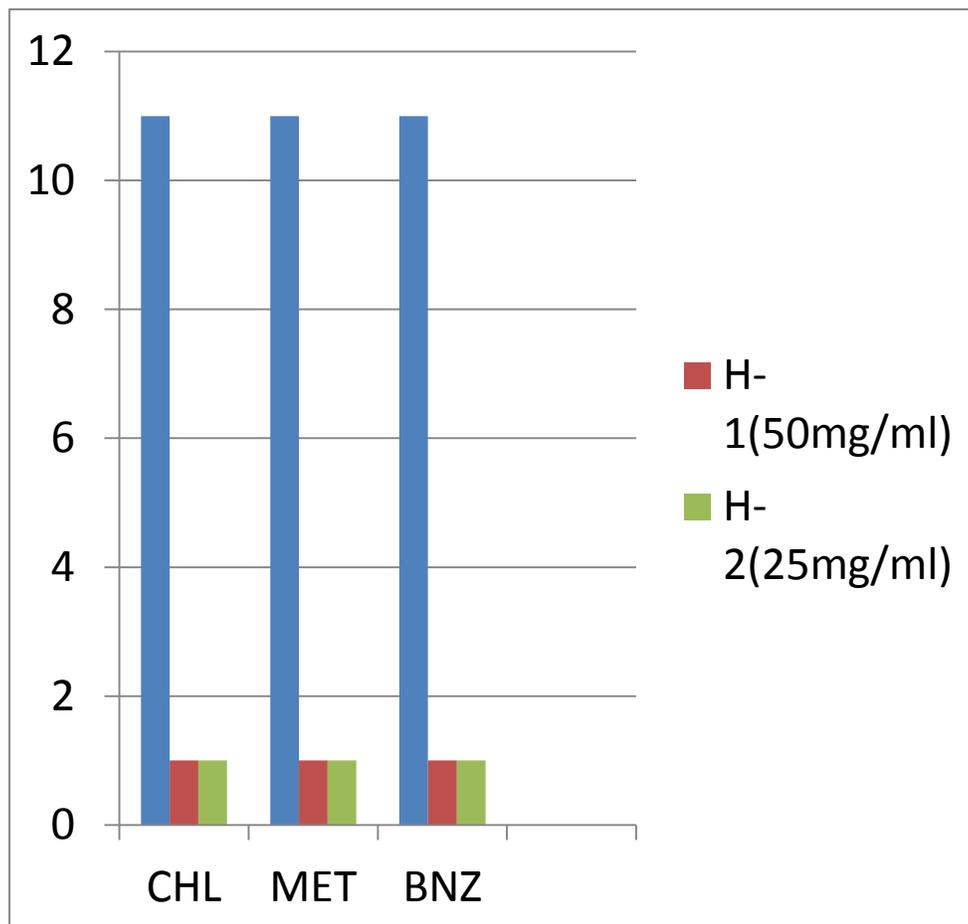
Extract	STD	-ve CONTROL	H-1(50mg/ml)	H-2(25mg/ml)
<i>M.capitata</i>	<i>E.coli</i> 5µg	<i>L.monocytogenes</i>	High conc	Low conc
Chloroform extract	11mm	0	11mm	1mm
Methanol extract	11mm	0	11mm	1mm
Benzene extract	11mm	0	11mm	1mm

Table 2: Maximum inhibitory concentration and minimum bactericidal concentrations and leaf extracts of *malachra capitata* (mg/ml)

Plant- <i>Malachra capitata</i>	MIC(mg/ml)	MIC(mg/ml)	MIC(mg/ml)
		<i>E.coli</i>	<i>L.monocytogenes</i>
	10.0	2.0	2.15

Table 3: Preliminary Phytochemical Screening:

S.No	Phytochemical Tests	Chloroform	Methanol	Benzene
1	Test for Alkaloids	+ve	+ve	+ve
2	Test for Carbohydrates	-ve	-ve	-ve
3	Test for Flavonoids	-ve	-ve	-ve
4	Test for Saponin	-ve	-ve	-ve



CONCLUSION

The Extraction of *Malachra capitata* plant using different solvents like methanol, chloroform, benzene was successfully carried out as per mention experimental procedure and its antibacterial activity was determined by using Disc diffusion method. Preliminary Phytochemical Screening was carried out alkaloids were detected. But the extract constituents responsible for antibacterial activity is not known further study yet to be carried out.

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