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Research Article

ANTIBACTERIAL ACTIVITY OF THREE SOURCE PLANTS OF *MOORVA*- AN INVITRO STUDY

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KEYWORDS: Antibacterial study, Agar diffusion Method, *Chonemorpha macrophylla, Clematis triloba, Jwara, Maerua arenaria, Moorva.*

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ABSTRACT

The plant *Moorva* is one of the *Jwarahara* plant explained in Ayurveda literatures. *Brihatrayees* explain extensively *Moorva* in *Jwarahara* formulations. *Moorva* is a controversial drug and currently many plants are being used in the name of *Moorva*. Controversy is probably due to scarcity and identical synonyms, which lead to substitution with locally available plants with structural similarity and same therapeutical actions. Efficacy of such plants as *Jwarahara* is evaluated. *Charaka* and *Ashtanga Hridaya Samhita* explain that *Jwara* causes decrease of strength and enthusiasm, reduces life span and immunity, and causes mental confusion involving body and mind. Harrison writes in Principle of Internal Medicine that antibacterial drugs are curative drugs in infectious diseases. Presently bacteria are developing resistance towards antibacterial agents and are responsible for worsening the life conditions in humans. Hence antibacterial screening of three species used as *Moorva* i.e. *Clematis triloba, Maerua arenaria* and *Chonemorpha macrophylla* was conducted. Materials and Methods: Antibacterial study of Methanol and aqueous extracts of above plants were done by *Agar* diffusion Method using Gram +ve strain *(staphyllococi Aureus)* and Gram –ve strain *(Escheria Coli).* Results: Overall results of study conclude that, *Maerua arenaria* with methanolic extract has inhibitory activity against Gram +ve strain at 1000µg. With the same extract it showed inhibitory activity against Gram –ve strain with 500µg and 1000µg concentrations. Aqueous extract of *Maerua arenaria* showed inhibitory activity against Gram +ve and Gram –ve strains at 100µg. *Chonemorpha macrophylla* showed inhibitory activity with methanolic extract on Gram –ve organism at 1000µg.

INTRODUCTION

Plants are the earliest component of creation. They make an important source of Ayurvedic Pharmacopoeia[1]. Literatures of Ayurveda documented a greater number of *Jwarahara* plants. Presently many of these species are not available in Indian Pharmacopoeias. The reasons could be improper identification, non-availability or controversy. *Brihatrayees* mentioned *Moorva* as *Jwarahara dravya*. Its roots are used in several *Jwarahara* formulations. Seven different plants are controversial in the name of *Moorva* and are being used in its name.[2] Antibacterial agents, either natural or synthetic are able to reduce the effect of microorganisms. Antibacterial drug sensitivity tests are done by Disc diffusion method. The inhibition of microbial growth under standardized condition may be utilized for demonstrating the therapeutic efficacy of different medicinal drugs. Comparisons of the zones of inhibition between the standard and test drug indicates the sensitivity of the trial drug.[3] In the present study three species of source plants of *Moorva* viz. *Clematis triloba, Maerua arenaria* and *Chonemorpha macrophylla* are selected. The aqueous and methanolic extracts of all the three

species were prepared and the anti-bacterial study was conducted at different concentrations.

AIMS AND OBJECTIVES

Collection of three source plants of *Moorva* from different areas and antibacterial study of these plants was conducted by Agar diffusion method over Gram +ve and Gram –ve bacterial strains.

MATERIALS AND METHODS

Antibacterial study of *Moorva* for *Clematis triloba, Maerua arenaria* and *Chonemorpha macrophylla* was conducted by Agar diffusion method over *Staphylococcus* and *Escherichia coli* bacteria[4,5,6,7] with Aqueous extract and Methanol extract with 25, 50, 100, 250, 500, 1000µg concentrations was screened.

Description [8,9]

Media Used: Peptone-10g, NaCl-10g and Yeast extract 5g, Agar 20g in 1000ml of distilled water Initially, the stock cultures of bacteria were revived by inoculating in broth media and grown at 37ºC for 18 hrs. The agar plates of the above media were prepared and wells were made in the plate. Each plate was inoculated with 18 hold cultures (100µl, 10^{-4} cfu) and spread evenly on the plate. After 20 min, the wells were filled with of compound and antibiotic at different concentrations. All the plates were incubated at 37ºC for 24 h and the diameter of inhibition zone were noted.

Abbreviations	Full Form
CT	*Clematis trilobaA.St.Hill.*
MA	*Maeruaarenaria- Hook f* and *Thoms*
CM	*Chonemorphamacrophylla- G. Don*
A	Aqueous extract
M	Methanolic extract

Anti-bacterial analysis of Staphyllococi Aureus

Sample	25µg	50µg	100µg	250µg	500µg	1000µg	MIC µg
CT – M	0	0	0	0	0	0	NF
CT – A	0	0	0	0	0	0	NF
MA – M	0	0	0	0	0	6	1000
MA – A	0	0	0	0	0	6	1000
CM – M	0	0	0	0	0	2	1000
CM – A	0	0	0	0	0	0	NF
Ciprofloxacin	25	28	31	34	36	*	25

Anti-bacterial analysis of Escheria Coli

Sample	25 µg	50 µg	100 µg	250 µg	500 µg	1000 µg	MIC µg
CT – M	0	0	0	0	0	0	NF
CT – A	0	0	0	0	0	0	NF
MA – M	0	0	0	0	2	5	500
MA– A	0	0	0	0	0	0	NF
CM – M	0	0	0	0	0	0	NF
CM – A	0	0	0	0	0	0	NF
Ciprofloxacin	26	29	32	34	38	*	25

*The inhibitions zones were too big to measure

NF- MIC not found

Note: In above tables, NF is MIC not found in the concentrations screened

DISCUSSION

Aqueous extract and methanolic extract of three source of plant *Moorva,* in different concentrations were subjected to antibacterial study with Ciprofloxacin as standard drug. Gram +ve and Gram –ve strains were used in which Staphylococci Aureus and Escheria Coli from both strains were selected.

Anti bacterial study on gram +ve organism (*Staphyllococi Aureus*)

Staphyllococi Aureus was incubated in agar media. methanol and aqueous extracts of *Clematis triloba, Maerua arenaria* and *Chonemorpha macrophylla* were tested in different concentrations over the incubated plates and zone of inhibition were observed. It was seen that methanol extracts of *Maerua arenaria* and *Chonemorpha macrophylla* showed inhibitory activity at 1000µg concentration. Aqueous extract of *Maerua arenaria* alone showed the inhibitory activity at 100µg concentration. Aqueous extract of *Chonemorpha macrophylla* and methnolic and aqueous extracts of *Clematis triloba* did not show any activity. Minimum inhibitory concentration was seen in methnolic extract of *Chonemorpha macrophylla* and methnolic and aqueous extracts of *Maerua arenaria*.

Anti bacterial study on gram -ve organism (Escheria Coli)

Methanolic and aqueous extract of *Clematis triloba*, and *Chonemorpha macrophylla* and aqueous extract of *Maerua arenaria* did not show any inhibitory activity against E. coli. But methnolic extract of *Maerua arenaria* showed inhibitory effect at 500µg and 1000µg concentrations. Minimum inhibitory concentration for methanolic extract of *Maerua arenaria* was 500µg.

CONCLUSION

From the present study, the conclusion is made that *Maerua arenaria* with methanolic extract showed inhibitory activity against Gram +ve strain at 1000µg. With the same extract it showed inhibitory activity against Gram –ve strain with 500µg and 1000µg concentrations.

Aqueous extract of *Maerua arenaria* showed inhibitory activity against Gram +ve and Gram –ve strains at 100µg.

Chonemorpha macrophylla showed inhibitory activity with methanolic extract on Gram –ve organism at 1000µg.

Clematis triloba did not show any activity on both the strains with neither aqueous nor methanolic extract.

***Clematis Triloba* - Plant**

***Clematis Triloba*- Stem**

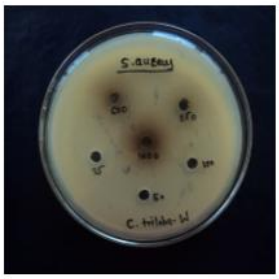
***Maerua Arenaria* - Plant**

***Maerua Arenaria*- Root**

Chonemorpha Macrophylla-Plant

Chonemorpha Macrophylla Root

Antibacterial Study – Staphylococci Aureus



CT - A

CT - M

MA - A

MA - M

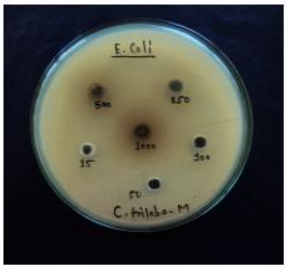
CM - A

CM - M

Anti bacterial study S.aureus

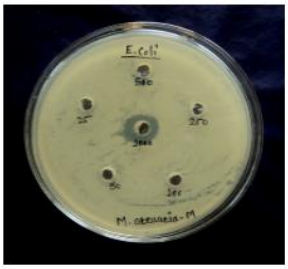
Antibacterial Study- *Escheria Coli*

CT - A

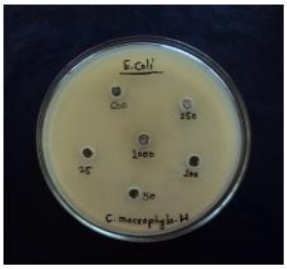


CT - M

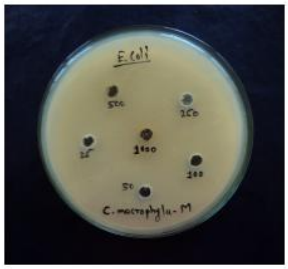
MA - A



MA - M



CM - A



CM - M

Anti bacterial study E.coli

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