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RESEARCH ARTICLE

Evaluation of antimicrobial and phytochemical profile of medicinally important herb *Mentha arvensis* (L) against various microorganism

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Abstract

The present study has been carried out to evaluate the Phytochemical analysis and antimicrobial potential of medicinally important herb *Mentha arvensis* belonging to family Lamiaceae commonly called as mint and Pudina. The antimicrobial potential of plant is measured against some of the important microorganism such as *E.coli*, *Streptococcus aureus* and *salmonella typhi*. The plant material has been extracted by using the solvent Methanol and chloroform. The present study reveals that the selected herb extracted of methanol found to be more bioactive against *salmonella typhi* and *E-colo* rather than *streptococcus aureus*, Similarly the chloroform extract is found to be more bioactive against the microorganism *E-coli* and *salmonella typhi* rather than *streptococcus aureus*.

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Introduction

India is rich in rare and useful herbs from which medicines can be prepared. medicinal plant have a long history of use and their use is over the worldwide. In higher aromatic plants have traditionally been used in folk medicine. It also extend the shelf life of foods. The genus *Mentha arvensis* from family Lamiaceae include large number of species family Lamiaceae possess maximum pharmacological and commercial significant. *Mentha arvensis* found in various countries which is popularly known as Pudina, common house hold remedy in India. It is highly consider as a antiseptic, antipyretic, antimicrobial, stimulant with anti-aging properties. The active components of herbal remedies have the advantage with many other substance. The effect of the plant extract on bacteria have been studied worldwide by large number of researcher such as Farnz Malik et al. (2012) has evaluated the phytochemical, anti-allergic and anti-inflammatory activity of against in animals. Similarly the same important antimicrobial work of *Mentha arvensis* also reported by Sunghandhi and Meera Bai (2011) with some microorganisms. Suresh et al. (2012), Gupta et al. (2010) John et al (2012), and Henrique et al. (2010) has studied the phtotoxic properties of *Mentha arvensis*.

Londonkar and Poddar (2009) has evaluated activity of extracts of *Mentha arvensis* Linn against drug induced gastric ulcer in some mammals. Srinivasand Arun has used and investigated the *Mentha* extract clinically for the treatment of UTI patients and found the improvement.

Material and Methods:

Fresh *Mentha arvensis* were collected aseptically from Marathwada Agricultural University Parbhani and brought to labrotary and only leaves were collected and washed under running tap water, washed leaves were dried under room temperature using blander dried leaves were grinding to fine powder. Powder was preserved in air tide container for the further studies

Solvent Extract Preparation:

50 gms of plant material were taken in soxhelt apparatus. For extraction different solvents were taken such as Ethanol and Chloroform were taken for extraction. Extraction process have been carried out 6-8 hrs with 250 ml of each solvent the extract was filtered through the whatman's filter paper No. 1 and clear liquid was collected and the solvent was

evaporated to make final volume one fourth of the original volume.

Qualitative Phyto chemical Analysis:

The Methanolic extract and Chloroform extract were used for the preliminary qualitative phytochemical analysis by using the standard biochemical procedure and method. The important phytochemical examination was carried out for the presence of Alkaloids, Polyphenols, Flavonoids, Tannins, Saponins, The Diterpenes were identified by using the methods of Harmoti and Amrani (2008). Roopshree et al.(2008), Ventura et al. (2008). The Alkaloids were detected by using Dragendorffs test and Wagners test, Polyphenols were determined by Ferric chloride test. Flavonoids were identified by using the Alkaline reagent test and lead acetate test. The Tannins was identified by Geletin test. Forth and foam Test was used for the Saponins, similarly the Diterpenes was detected by using Copper acetate test.

Microorganisms and preparation of bacterial Suspension:

The microorganism, E-coli, Streptococcus aureus and Salmonella typhi were obtained from microbial type culture from the same college Microbiology Department. The bacterial culture strain was cultured in nutrient broth at 37⁰ C and maintained on nutrient agar (Hi-media) slant at 4⁰ C. The previously identified microorganism was inoculated at 35 ± 2⁰C for 5 hours. A loop of pure slant culture is mixed with sterilised distilled water in a test tube under aseptic condition and content was thoroughly mixed to form a uniform suspension.

Determination of antimicrobial Activity:

For the evaluation of antimicrobial activity standard Agar Disc diffusion method was used described by shanti et al., (2011) in which Muller Helton Agar was used. The plates were swabbed with bacterial suspension of each species used. The sterilised filter paper disc were soaked with the test extract and dried and placed on surface of each inoculated plates. The plates were kept for overnight at 37⁰c. The organism was tested in triplicate. The test Methanolic and Chloroform extract showing the antimicrobial activity inhibiting the growth of selected microorganism such as E-coli, Streptococcus aureus and Salmonella typhi and a clear distinct zone of inhibition was found around the disc. The antimicrobial activity of the extracts was tested by measuring the diameter of zone of inhibition by Hi-media scale in mm.

Results and Discussion:

Preliminary phytochemical analysis

The preliminary qualitative phytochemical analysis of the Mentha arvensis leaf extract was carried out and the secondary metabolites like Alkaloids, Phenolic compound, Flavonoids, Tannin and Diterpenes was found to be present showing the positive test and the Saponins was found to be absent by the qualitative test. The table no.1 shows the presence and absence of secondary metabolite from the Mentha arvensis. The similar findings were also reported by John De Britto et al., (2012) suresh (2012) and Sugandhi and Meera Bai (2011). Thus indicating the plant extract is a good source of secondary metabolites having an important role in human life.

Antimicrobial activity:

For determination of antimicrobial activity the Mentha arvensis leaf was used to prepare the crude extract in solvent methanol and chloroform. The methanolic leaf extract was tested against pathogenic organisms like E-coli, Streptococcus aureus and salmonella typhi. The methanolic crude extract shows the higher degree of antimicrobial activity against salmonella typhi at higher concentration (50%) showing the 8.0mm zone of inhibition than with E-coli 7.0mm and streptococcus aureus. Thus the methanolic leaf extract is found to contain good bioactive compounds to inhibit the growth of salmonella typhi at higher concentration than the lower concentration (Graph -1). Similarly the crude chloroform extract was tested against the above pathogens and found to be more bioactive showing the maximum zone of inhibition 8.0mm against the E-coli with the higher concentration (50%) rather than the other test organisms like salmonella typhi with 7.0mm and S. aureus with 6.0mm zone of inhibition (Table - 2, Graph-2).

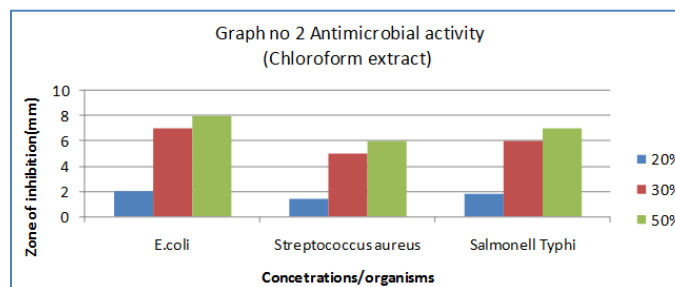
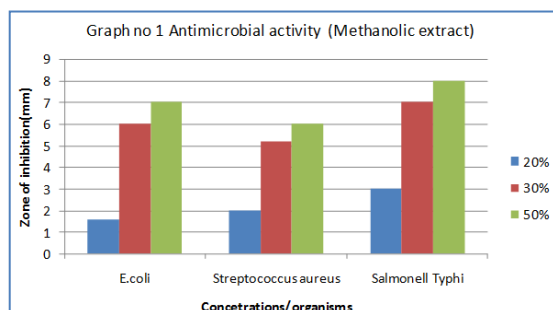
Thus the present study reveals that the Mentha arvensis contains the important bioactive compound as secondary metabolite and found to have antimicrobial potential against the selected microorganisms at the higher concentration with the different solvent.

Table No. 1 Preliminary phyto-chemical Analysis of the Mentha arvensis (L.)

Phytochemical compounds	Test	Results
Alkaloids	Dragendorffs and Wangners	+ve
Phenolic Compounds	Ferric chloride Test	+ve
Flavonoids	Alkaline reagent test lead acetate test	+ve
Saponin	Forth Foam Test	-ve
Tannins	Gelatin Test	+ve
Diterpenes	Cooper Test	+ve

Table No. 2 Antimicrobial activity of the Mentha arvensis by using various solvents.

Bacteria	Concentration %	Methenolic Extract Zone of Inhibition(mm)	Chloroform Extract Zone of Inhibition(mm)
E-Coli	20%	1.6	2.0
	30%	6.0	7.0
	50%	7.0	8.0
Streptococcus Aureus	20%	2.0	10.4
	30%	5.2	5.0
	50%	6.0	6.0
Solmonella Typhi	20%	3.0	1.8
	30%	7.0	6.0
	50%	8.0	7.0



Conclusion:

The antimicrobial potential of the plant may be attributed to the various compound present in the crude extracts. The purified compound may be more potential and significant against the selected microorganism. Further studies require isolation and characterization of individual bioactive compound for the pharmaceutical use.

Reference:

Famaz Malik, Shahzad Hussain, Alia Sadiq, Ghazala Parveen, Amina Wajid, Shazia Shafa, Rafique Ahmad Channa, Rashid

Mahmood, Humayun Riaz, Muhammad Ismail and Fahadiya Yasin Raja (2012): Phyto-chemical analysis, anti-allergic and anti-inflammatory activity of Mentha Arvensis in Animals. *Ajpp* Vol.6(9), pp.613-619.

Gupta S, Ahirwar D, Jhade D, and Sharma. (2010). Pharmacognostic Standardization, Physico and Phytochemical Evaluation of Aerial Parts of Mentha arvensis Linn. *Int. J. Pharm. Sci. Drug Res.*, 2(4):261-264.

Harnafi H, Amrani S (2008): Spectrophotometric methods for determination of plant polyphenols

content and their antioxidant activity :an overview. Pharm. Rev., 2(3).

Henrique Douglas C. Jose Galberto M. Costa. Joes Pinto Siqueira E.O.Lima (2010): In vitro screening by phototoxic properties of *Eugenia uniflora* L., *Momordica charantia* L., *Mentha arvensis* L., and *Turnera ulmifolia* L. Brazilian Journal of Biosciences. Vol.(8) p.299-301.

John D.B. Sebastian S.R. and R. Mary Sujin(2012): Antimicrobial activity of selected species of Lamiaceae against human pathogens .Indian journal of natural products and resources .,vol.3(3),pp,334-342.

Londonkar Ramesh and Poddar P.V.(2009): Studies on activity of various extracts of *Mentha arvensis* Linn against drug induced gastric ulcer in mammals., World journal of gastrointestinal oncology 15:1(1):82-88.

Rachel Madhuri Sugandhi B. and G. Meera Bai (2011): Antimicrobial Activity of *Mentha Arvensis* L. *Lamiaceae Journal of Advanced Laboratory Research in Biology* . Vol. II PP8-11.

Roopashree T.S, Dang R, Rani RHS, and Narendra C. (2008): Antibacterial activity of antipsoriatic herb: *Cassipourea*, *Momordica charantia* and *Calendula officinalis* . Int. J. Appl. Res. Nat. Prod., 1(3): 20-28.

Santhi, R., Lakshmi, G., Priyadarshini, A.M. and Anandaraj, L. (2011): Phytochemical screening of *Nerium oleander* leaves and *Momordica charantia* leaves, Int. Research J. Pharmacy, 2(1): 131-135.

Shrinivas pidugu et al., (2012): Antimicrobial activity and phytochemical screening of *Mentha arvensis* Linn. against *Proteus mirabilis* from Urinary Tract infected patients IJFamaTech Vol.4No.4, pp1735-1744.

Sharma N., and Jacob D. (2001) Antifertility Investigation and Toxicological Screening of Petroleum Ether of the Leaves of *Mentha Arvensis* Linn in male Albino mice. Journal of Ethenopharmacology.:75(1)5-12 .

Suresh S. N. Rathishkumar. S, Rajeshwari.V, P. Sagadevan, S. Gayathri And D. Vithya Eswari (2012): Studies On Phytochemical Composition And Antibacterial Potential Of Methanolic Leaf Extract of *Mentha Arvensis* .Linn. Ijpr, 2012; Vol 4(08): 001 – 004.

Ventura J, Belmares R, Aguilera-Carbo A, Gutiérrez-Sanchez. G, Rodríguez- Herrera R, and Aguilar C.N. (2008): Fungal biodegradation of tannins from Creosote Bush (*Larrea tridentata*) and Tar Bush (*Flourensia cernua*) for gallic and ellagic acid production. Food Technol. Biotechnol., 46(2): 213-217.
