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RESEARCH ARTICLE

MENTHA ARVENSIS, PHARMACEUTICAL HERB: A REVIEW

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ABSTRACT

Mentha arvensis, commonly known as corn mint, field mint or wild mint is a species of flowering plant belongs to family Lamiaceae. The Corn mint used as a domestic herbal remedy, especially for its antiseptic properties and digestion. The whole Corn mint plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, and diaphoretic, and emmenagogue, galactofuge, refrigerant, stimulant and stomachic. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments. The leaves of *Mentha arvensis* are a classical remedy for stomach cancer. The essential oil in the leaves is antiseptic, though it is toxic in large doses. Mint extracts and menthol related chemicals are used in food, drinks, cough medicines, creams and cigarettes. Menthol is widely used in dental care, as a mouth wash potentially inhibiting streptococci and lactobacilli bacteria.

INTRODUCTION

Mentha arvensis, the corn mint species of flowering plant in the mint family Lamiaceae. It has a circumboreal distribution, being native to the temperate regions of Europe and western and central Asia, east to the Himalaya and eastern Siberia, and North America. It is a herbaceous perennial plant generally growing to 10–60 cm and rarely up to 100 cm tall. It has a creeping rootstock from which grow erect or semi sprawling squarish stems. The leaves of corn mint plants are in opposite pairs, simple, 2–6.5 cm long and 1–2 cm broad, hairy, and with a coarsely serrated margin. The flowers are pale purple, white or pink in whorls on the stem at the bases of the leaves. Each flower is 3 to 4 mm long and has a five lobed hairy calyx, a four lobed corolla with the uppermost lobe larger than the others and four stamens. The fruit is a two chambered carpel. Japanese mint (*M. arvensis*) is one of the important aromatic plants cultivated in India. Recently, the cultivation of Japanese mint has also been taken up by the farmers of Madhya Pradesh (Pandey *et al.*, 2000). *Mentha arvensis* popularly known as menthol mint is a source of natural menthol which is widely used in pharmaceutical and flavour industries. Xue-Qi Han *et al.* (1998) found variation in oil content and menthol content in micro propagated mint plants compared to control. Some soma clones exceeded controls in oil and menthol contents by 27.77% and 8.16–10.86%, respectively.

Saxena and Singh (1998) studied the effects of irrigation, mulch and nitrogen on yield and composition of Japanese mint and found that essential oil from the first harvest was richer in menthol (78.8%) than the oil obtained from second harvest (75.2% menthol). Plants always have great importance in many cultures. Human beings are users of plants for their basic requirements like feeding, clothing, sheltering, hunting and nursing. As source of medicines, plants have formed the basis for sophisticated traditional systems polymorphic. The flowers are very attractive to bees and butterflies. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests.

Chemical constituents: *Mentha arvensis* consists of menthol (35%-70%), menthone, menthyl acetate (4-14%) and pulegone (1-4%). It also consists of β pinene, β -phellandree, cadinene, methyl esters, amyl alcohol, acetaldehyde, cadinene, pinene, sabinene, terpinoline, transthujone, citronellol and luteolin-7-Orutinoside, limonene (1.0-5.0%), cineole (3.5-14.0%), menthofuran (1.0 -9.0%), isomenthone (1.5-10.0%), isopulegol (max. 0.2%), pulegone (max. 4.0%) and carvone (max. 1.0%),(Dr.Duke's Databases, 1985). *Mentha arvensis* plant extract with various solvents like Ethanol, Methanol, Aqueous and petroleum ether have a great importance to mankind. It has importance in phytochemical, antibacterial, antimicrobial, anti helminthic, antifungal etc, activities.

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Antibacterial activity: The ethanol extract of *Mentha arvensis* showed that growth inhibition of *E. coli*, *S. aureus*, *P.*

aeruginosa, *S. flexineri* and *K. pneumoniae* (John A De Britto, Steena Roshan, 2012)

Antifungal activity: The hydro alcoholic extracts of *Mentha arvensis* showed antifungal activity against *C. Albicans* and a potential use for human antifungal use (Bina and Usha, 2013).

Antioxidant activity: The antioxidant activity of methanolic and aqueous extracts of *Mentha arvensis* was done using free radical scavenging assays like 1,1-diphenyl-2-picrylhydrazine (DPPH), Ferric Reducing Antioxidant Power (FRAP), SO, NO and H₂O₂. The presence of greater amount of phenolic compounds lead to a more powerful radical scavenging effect as was shown by methanolic extract of the leaves when compared to the aqueous extracts. *Mentha arvensis* showed significant concentration of phenols and thus good activity against deleterious oxidants (Garg *et al*, 2012).

Antimicrobial activity: The antibiotic activity of *Mentha arvensis* plant using acetone, alcohol and petroleum ether extract was found to be effective against the tested isolated organism *Proteus mirabilis* and *MTCC 442 strain*. Minimal Inhibitory Concentration (MIC) and Minimal Bactericidal Concentration (MBC) were performed by agardilution method. The result showed that plant extract of MA showed high antibacterial activity against tested organism (Pidugu *et al*, 2012).

Antifertility activity: An uterotonic fraction of *Mentha arvensis* (UM-fraction) was tested for antifertility. It was observed that uterotonic fraction of *Mentha arvensis* has anti-implantation activity by enhancing the estrogenic effect of estradiol as it contains menthol, menthone, camphene (Khan *et al*, 2016).

Insecticidal activity: The essential oil of the leaf of *Mentha arvensis* showed repellence against larvae and adults of *T. castaneum*, they strongly repel *T. castaneum* even at low concentration. The percent repellence for *Mentha arvensis* was 97.66% (Hana H. Mohammed, *et al*, 2013).

Antidiabetic: The methanol extract of the root and aerial parts of *Mentha arvensis* were found to possess significant hypoglycaemic activity against alloxan induced diabetes (Mohd Habibullah Khan and Yadava *et al*, 2010).

Cisplatin induced nephrotoxicity: The nephroprotective activity of hydroalcoholic extract of the leaves of *M. arvensis* (MAHE) in the cisplatin induced nephrotoxicity (Rajneesh Kumar Singh *et al.*, 2014)

Hepatoprotective: The aqueous extracts of *Mentha arvensis* have found to stimulate liver regeneration after 67% partial hepatectomy in rats (Kowtirajash *et al.*, 2013).

Antiemetic activity: The efficacy of oil of *Mentha arvensis* for postoperative nausea was investigated and it demonstrated that inhalation of oil vapours significantly reduced postoperative nausea and the requirement for pharmacologic antiemetic following gynaecologic surgery (Tate *et al*, 1997).

Antidepressant activity: The aqueous and methanol extracts of *Mentha arvensis* were showed antidepressant activity by Tail suspension and Forced swim test in Swiss albino mice. Fluoxetine was used as a positive control. It was concluded that Methanol extract of *Mentha arvensis* showed significant

antidepressant activity as compared to aqueous extract (Tupe *et al*, 2010).

Analgesic activity: The ethyl acetate, ethanolic and aqueous extract of both root and aerial parts of *Mentha arvensis* showed very good central and peripheral analgesic activities (Nripendra Nath Biswas *et al.*, 2014).

Anti allergic activity: The ethanolic and aqueous extracts of leaves, stem and roots of *Mentha arvensis* was determined by histamine release inhibition test compared with standard drugs, disodium cromoglicate against allergy drug. It revealed that ethanolic extracts of leaf and root possessed marked inhibitory activity (Malik *et al*, 2012).

Anti inflammatory activity: Anti-inflammatory activity of ethanolic and aqueous extracts of *Mentha arvensis* were tested and compared with standard drug, diclofinac sodium. All ethanolic extracts of leaves, stem and roots showed more pronounced anti inflammatory effect as compared to their respective aqueous extracts. (Malik *et al*, 2012).

Anticataleptic activity: The aqueous extract of *Mentha arvensis* on haloperidol induced catalepsy in mice. The effects of the test drug, *Mentha arvensis* and the standard drug, trihexyphenidyl were assessed after their repeated dose administration in mice for fourteen days, 30 minutes prior to the administration of haloperidol. *Mentha arvensis* had significantly reduced the oxidative stress and the cataleptic score which was induced by haloperidol (Ahmad *et al*, 2012).

Cardiovascular Disease: The crude extract of *Mentha arvensis* was found to inhibit human platelet aggregation induced by arachidonic acid as well as by adenosine diphosphate but platelet activating factor was unaffected by *Mentha arvensis*. It indicates that inhibition of platelet aggregation may be important mechanism for observed beneficial effects of herb in patients with ischemic heart disease. It was also effective in enhancing glutathione peroxidase activity. (Saima *et al*, 2014)

Radio protective: The aqueous and ethanolic extract of *Mentha arvensis* observed reduction in the severity of symptoms of radiation sickness and mortality (Ganesh and Manjeswar, 2002).

Anticancer activity: The ethanolic extract of *Mentha arvensis* was studied for the in-vitro cytotoxicity against Human livercancer (Hep G2 cell line). The results demonstrated that *Mentha arvensis* significantly suppresses growth and induces apoptosis in Hep G2 cell lines by MTT assay.

Anti arthritic activity: The Methanolic leaf extracts of *Mentha arvensis* are reported to possess anti arthritic activity by complete adjuvant induced arthritis. (Jaya V Sankar Reddy, 2014).

Anti-helminthic: The anti-helminthic activity of the petroleum ether extract of *Mentha arvensis* against *Ascaridia lumbricoides* which resemble the nematode *Ascaris lumbricoides* (Nikesh *et al.*, 2011).

Antiulcerogenic Effect: Petroleum ether, chloroform and aqueous extract of *Mentha arvensis* are reported to have a protective effect against acid secretion and gastric ulcers in

ibuprofen plus pyloric ligation, 0.6 mol/L HCl and 90% ethanol induced ulcers. (Berman *et al.*, 1999).

In vitro thrombolytic activity: The Ethanolic, Methanolic, Acetone and chloroform extracts of *Mentha arvensis* are reported to possess significant blood clots lytic activity In vitro (Shah Md. Shahik *et al.*, 2014).

Antibiotic Resistance: The ethanolic extract of *Mentha arvensis* showed a potentiating effect on Gentamicin and presents a potential against bacterial resistance to antibiotics (Marta cristinatexeiradurate, 2005).

Sedative and Hypnotic: The methanolic and aqueous extracts of *Mentha arvensis* evaluated on mice showed potentiation of phenobarbitone induced sleeping time (Verma and Arora, 2003).

Clinical Studies: *Mentha* species in preventing chemotherapy induced nausea and vomiting (CINV). There are reductions in the intensity and number of emetic events due to use of *Mentha* without any adverse effects (Hassanzadeh *et al.*, 2013).

Traditional uses: Traditionally *Mentha arvensis* plants has been used as antiseptic, carminative, Headache, stomachic, and a refrigerant. It is also used in *Helmenthiasis*, flatulence, Vomiting, Diarrhoea, cough, Asthma, Bronchitis, skin diseases, dental caries, Jaundice, fever, general weakness, hypertension and ischemic heart diseases (Saima Gul *et al.*, 2014).

Economic importance: Mint extracts and menthol related chemicals are used in food, drinks, cough medicines, creams and cigarettes. Menthol is widely used in dental care, as a mouthwash potentially inhibiting streptococci and lactobacilli bacteria. The plant is used as an insect repellent. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain. Corn Mint leaves raw or cooked showed strong minty flavour with a slight bitterness, they are used as flavouring in salads or cooked foods. An herb tea is made from the fresh or dried leaves. An essential oil from the plant is used as flavouring in sweets and beverages. The leaves contain about 0.2% essential oil.

Conclusion

The utilization of herbal plants has drawn immense interest as they could accommodate therapeutic response and are promising candidate to be developed as pharmaceutical products like antioxidants, antibacterial, hepatoprotective, anti-inflammatory agents etc. *Mentha arvensis* is one of these herbal plants which have proved beneficial in a number of fields and research is going on.

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