

Therapeutic Uses of Peppermint –A Review

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Abstract:

Peppermint (*Mentha piperita*, also known as *M. balsamea* Willd), is a hybrid mint, a cross between watermint and spearmint. The plant, indigenous to Europe and the Middle East, is now widespread in cultivation in many regions of the world. It is found wild occasionally with its parent species. The concentrated oil of peppermint has a high menthol content. The oil also contains menthone and menthyl esters, particularly menthyl acetate. Dried peppermint typically has volatile oil containing menthol, menthone, menthyl acetate, menthofuran and 1,8-cineol. Peppermint oil also contains small amounts of many additional compounds including limonene, pulegone, caryophyllene and pinene. According to the German Commission E monographs, peppermint oil (as well as peppermint leaf) has been used internally as an antispasmodic (upper gastrointestinal tract and bile ducts) and to treat irritable bowel syndrome, catarrh of the respiratory tract, and inflammation of the oral mucosa. Externally, peppermint oil has been used for myalgia and neuralgia. According to Commission E, peppermint oil may also act as a carminative, cholagogue, antibacterial, and secretolytic, and it has a cooling action. Enteric-coated peppermint oil capsules (Colpermin) have been used as an orally administered antispasmodic premedication in colonoscopy.

Key Words : Mentha piperita, peppermint, menthone.

INTRODUCTION:

Peppermint or mentha piperta is a common herb that is grown in Europe and north America. The oil of ppeppermint has been used for various purposes since time imemorable, to treat headache, common cold, neuralgia etc. This review focuses on the antispasmodic effects of peppermint oil. Peppermint oil has a fresh, sharp, menthol smell, is clear to pale yellow in color and watery in viscosity. India is world's largest producer and exporter of mint oil. Mint oil and its constituents and derivatives are used in food, pharmaceutical and perfumery and flavouring industry. Its main constituent, menthol, is used in the manufacture of lozenges, toothpastes, pain balms, cold balms, Dabur Pudina Hara, etc. The basic raw material for mint oil is leaves of a plant *Mentha arvensis*. The oil is used for treating certain stomach disorders like indigestion, gas problem, acidity, etc. It is the main ingredient of ayurvedic medicines like Daburs 'Pudina Hara'. The oil is a natural source of menthol, which is the main ingredient of cough drops and ointments like Vicks Vaporub, etc. The capsules were found beneficial in reducing total procedure time, reducing colonic spasm, increasing endoscopist satisfaction and decreasing pain in patients during colonoscopy. Peppermint is taken internally as a tea, tincture, oil, or extract, and applied externally as a rub or liniment. It is often used in pediatric patients for treating abdominal pain, irritable bowel syndrome, nausea and symptomatic relief of coughs and colds.(20)

Historical and Popular Uses Peppermint's Latin name, *Mentha piperita*, comes from the Greek *Mintha*, the name of a mythical nymph thought to have metamorphosed into the plant, and the Latin *piper*, meaning pepper. It is one of the world's oldest medicinal herbs, and is used in both Eastern and Western traditions. Ancient Greek, Roman, and Egyptian cultures used the herb in cooking and medicine. Peppermint is currently one of the most economically

important aromatic and medicinal crops produced in the U.S. The world production of peppermint oil is about 8000 tons per year (1). Peppermint leaf and oil are used for folk medicine, as flavoring agents, and in cosmetic and pharmaceutical products throughout the world (2). Peppermint oil is the most extensively used of all the volatile oils (3). Herbalists consider peppermint an astringent, antiseptic, antipruritic, antispasmodic, antiemetic, carminative, diaphoretic, mild bitter, analgesic, anticatarrhal, antimicrobial, rubefacient, stimulant, and emmenagogue(4),(5). Peppermint oil vapor was used as an inhalant for respiratory congestion. Peppermint oil infused tea was a remedy used to treat coughs, bronchitis, and inflammation of the oral mucosa and throat. This method is still put to use. It has traditionally been used to treat a variety of digestive complaints such as colic in infants, flatulence, diarrhea, indigestion, nausea and vomiting, morning sickness and anorexia, and as a spasmolytic to reduce gas and cramping. Peppermint oil is currently used to treat irritable bowel syndrome, Crohn's disease, ulcerative colitis, gallbladder and biliary tract disorders, and liver complaints(6)(7). Peppermint oil is used to relieve menstrual cramps(8). Peppermint oil is used externally for neuralgia, myalgia, headaches, migraines and chicken pox(5)(6).

CHEMICAL CONSTITUENTS

Menthol is the primary component of the essential oil of peppermint and is mostly responsible for the agents anti spasmolytic effects. Various constituents of peppermint oil are limonene (1.0-5.0%), cineole (3.5-14.0%), menthone (14.0-32.0%), menthofuran (1.0 -9.0%), isomenthone (1.5-10.0%), menthyl acetate (2.8-10.0%), isopulegol (0.2%), menthol (55.0%), pulegone (4.0%) and carvone (max. 1.0%).

CARDIOVASCULAR PROPERTIES :

Peppermint has traditionally been used as a rubefacient.(12) It is said to have vasodilating properties on some animals. It has a lowering effect on the heart rate and the systolic pressure. Relaxation of bronchial smooth muscles, increase in the ventilation are also other cardiovascular effects of peppermint oil. (11)

PULMONARY PROPERTIES:

Inhalation of peppermint oil increases the nasal air force and thus supplies more air into the lungs.(10) In a few studies it was also claimed that it makes the lung surfactant more efficient enabling better pulmonary function. In a study where the effect of peppermint on athletic activity was tested it showed that the subjects had a faster breathing rate and as a result a lower arterial PCO_2 , decreased end tidal carbon dioxide tension and fractional end tidal carbon dioxide concentration. Lung function test are said to increase after intake of peppermint.(10) Also the inspiratory muscle strength will be increased with the intake of peppermint. Menthol stimulates the same reflex inhibition of respiration in humans. Peppermint and menthol do not have nasal decongestant properties, however, menthol does cause subjective improvement in nasal breathing.

DENTAL HEALTH:

Peppermint is used in making oral dentifrices as it can provide over all freshness in breath and also keep away bad breath. More studies are being done as to whether or not it directly contributes to preventing caries and plaque, however it is confirmed that it does create an un-favorable environment for bacteria.

GASTROINTESTINAL BENEFITES:

Peppermint is used for treatment of non-obstructive dyspepsia without any known side effects. It improves the gastric emptying rate. There is a significant antiemetic effect of peppermint in reducing postoperative nausea for patients with very sensitive gag reflexes.(20)

NEURO-PSYCHIATRIC EFFECTS:

Some studies have suggested that peppermint is a central nervous system stimulant. Studies have been conducted on the effectiveness of aromas on cognitive performance, perceived physical workload, and pain responses were conducted based on possible changes in the brain activity.

ENDOCRINE EFFECTS

Certain researches have proved that there was a statistically significant increase in the secretion of endocrine hormones.(11) In one study there was a noted segmental maturation arrest in the seminiferous tubules however, the effects of *M.spicata* extended from maturation arrest to diffuse germ cell aplasia in relation to the dose. Other than this there are not many significantly known effects on the human endocrine system.

EFFECT ON SKIN AND MUCOUS MEMBRANE :

Peppermint is said to be a good analgesic to be applied topically and also a coolant for the skin. Peppermint oil stimulates cold receptors on the skin and dilates blood vessels, causing a sensation of coldness and an analgesic effect (11). Menthol is a topical vasodilator that enhances the absorption of other topical skin medications. It is said that menthol enhances the absorption of cortisone, mannitol, indomethacin, morphine hydrochloride, and propranolol (22)(24). Menthol moderates oral sensations of warmth and coldness(25), (26.) In low concentrations, topical application of menthol causes a cooling sensation, while in high concentrations it causes irritation and local anesthesia(17). It also increases cutaneous blood flow, muscle temperature, and skin temperature after topical application of the oil. Some studies have claimed that menthol has reduced histamine induced irritation and itching.

IMMUNE MODULATION :

Menthol has anti-inflammatory effects when applied topically. In one study it was claimed that it could suppress antigen induced allergies. Menthol also has a property of inhibiting cutaneous anaphylaxis that's mediated by IgE antibody.

ANTIMICROBIAL EFFECT:

Menthol is virucidal against Influenza, Herpes and other viruses in vitro.(1) Aqueous extracts of peppermint . Peppermint oil and menthol have mild antibacterial effects against both Gram-positive and Gram-negative bacteria (22)(23)(25). Peppermint extracts are bacteriostatic against *Streptococcus thermophilus* and *Lactobacillus bulgaricus*.(24) Menthol is bactericidal against strains like *Staphylococcus pyogenes*, *S. aureus*, *Streptococcus pyogenes*, *Serratia marcescens*, *Escherichia coli*, and *Mycobacterium avium*.(22)(24) Menthol and peppermint oil are fungicidal against *Candida albicans*, *Aspergillus albus* and dermatophytic fungi(22)

ANTISPASMODIC EFFECT OF PEPPERMINT OIL:

Previous studies have shown that various kinds of mint were effective in reducing muscle pain (19),(20) muscle relaxation, and reduce fatigue (21). Until now, many researches have been done on the effectiveness of various kinds of natural products in the improvement of sport performances. Mint is a herb which is well known for its antispasmodic, painkilling (1)(3), anti-inflammatory, antispasmodic, decongestant, and antioxidant effects (4). Peppermint is one of the mentha species (*i.e.*, mentha piperita, peppermint oil, mentha arvensis, cornmint oil (5). Menthol and menthone are the major components of the peppermint essential oil. External application of peppermint extract raised the pain threshold in human (6). Peppermint aroma was also effective on perceived physical workload, temporal workload, effort, and anxiety (7). According to certain in vitro studies conducted on the antispasmodic effect of peppermint oil, peppermint relaxes gastrointestinal smooth muscle spasm by reducing calcium influx in both guinea pig large intestine and rabbit jejunum.

Peppermint oil and menthol have shown calcium channel blocking activity in rats and guinea pigs atrial and papillary muscle, rat brain synaptosomes, and chick retinal neurons(12),(19),(21),(22). In animals peppermint oil resolved a morphine-induced spasm on the sphincter of Oddi(13). In a study that was conducted on patients who underwent colonoscopy, the administration of peppermint oil during the procedure was confirmed to provide relief for colon spasms with a few seconds in each patient. Injecting prescribed doses of peppermint oil is also equally effective in decreasing motor activity in the colonic muscles. Peppermint oil is also used in the treatment of diverticular disease to keep the patients spasm free. It is confirmed that no adverse effects were reported in that study. In patients receiving barium enema peppermint oil can be used as a topical application to extend the suspension of the barium. Peppermint is said to relieve alleviating tension related headaches.(21)

TOXICITY AND CONTRAINDICATIONS:

All herbal products carry the potential for contamination with other herbal products, pesticides, herbicides, heavy metals, pharmaceuticals, etc. This is particularly concerning with imports from developing countries. Furthermore, allergic reactions can occur to any natural product in sensitive persons. Allergic reactions to peppermint have been reported. Potentially toxic compounds in peppermint: Pulegone, menthol. Pulegone, the toxic compound in pennyroyal, is also found in peppermint in much smaller proportions. Menthol causes hepatocellular changes in rats (11). Adverse reactions to enteric coated peppermint oil capsules are rare but can include hypersensitivity reaction, contact dermatitis, abdominal pain, heartburn, perianal burning, bradycardia and muscle tremor(3, 19). Inhalation of menthol can cause apnea and laryngoconstriction. In one case, patients were noted to have contact sensitivity to menthol and peppermint with oral symptoms including burning mouth syndrome, recurrent oral ulceration, or a lichenoid reaction. The excessive inhalation of mentholated preparation has caused reversible nausea, anorexia, cardiac problems, ataxia, and other CNS problems, which are thought to be due to the presence of volatile oils(10). There is a case report of a 13-year-old boy who, following inhalation of 5 ml of Oilbas oil (containing 200 mg menthol) instead of the recommended few drops, experienced ataxia, confusion, euphoria, nystagmus, and diplopia (12). In rat studies, chronic exposure to high concentrations of menthol vapor have shown no gross toxic effects(11). There are no chronic toxicity studies in humans. Limitations during other illnesses or in patients with specific organ dysfunction. Peppermint oil is contraindicated in obstruction of the bile ducts, gallbladder inflammation, and severe liver.

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