

PEPPERMINT OIL, ITS USEFUL, AND ADVERSE EFFECTS ON HUMAN HEALTH: A REVIEW

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Received: 21 July 2020, Revised and Accepted: 11 October 2020

ABSTRACT

Fundamental oil of *Mentha piperita* are perplexing blends detached from sweet-smelling plants which may have antimicrobial, cooling receptor trigger, pesticidal, anticancer, hack, asthma, and use in painkiller, exercises of enthusiasm for the sustenance and corrective enterprises just as in the human well-being field in pharmaceutical. According to the German Commission E monographs, peppermint oil is greatly employed as an antispasmodic in the stomach and intestine in bile channel and for the treatment of peevish entrails disorder, inflammation of the respiratory tract, and aggravation of the oral mucosa. Remotely, *M. piperita* has been employed for myalgia and neuralgia. As indicated by German Commission E, *M. piperita* may likewise go about as a carminative, disinfectant, and pectolytic, having soothing activity. Enteric-covered peppermint oil containers (Colpermin) are mostly employed as an orally controlled antispasmodic premedication in the study of large intestine.

Keywords: Peppermint oil, Effects to human health, Medicinal effects, Pharmaceutical implications.

INTRODUCTION

A review on peppermint was done to find out the biogenic properties of *Mentha piperita* in daily life as well as in the medical field. Not only its useful effects were observed but also the adverse effects were also listed. Peppermint is also known as *M. piperita*. Following is the classification of peppermint in Table 1. Being close to the nature has helped Ayurveda to develop the principles which are time tested. The unique concept of commonness between the cosmos and human body is the strength of Ayurveda [1]. North America and Europe are the countries in which it is grown mostly. The United States being the principle develop speedy and house manufacturer of *M. piperita* is likewise known as American piperita. Even though India is growing satisfactory of *M. piperita* evaluating to the US crop, till now we have got no longer been able to develop successfully as in the US. Peppermint normally grows first rate in humid, dappled places, and grows using concealed stolons. Fledgling sprouts are taken from antique stocks and dibbled into the floor about 1.5 feet apart. The floor with wide-spreading roots if it's much enduringly wet. It grows tremendously fast when watered properly and receives proper sunlight [2]. The oil extracted from peppermint is called peppermint oil or just mint oil. Peppermint oil is widely used to cure and headache ailments such as neuralgia and the common cold.

Peppermint (*M. piperita*) could be an herbaceous rhizomatous, quick-spreading, lasting, and winter difficult plant (Fig. 1). It develops 0.3–0.9 m tall, with flat and regular stems, and has square cross-segment. The rhizomes are ubiquitous and extensive, meaty, and uncovered thread-like radicles. The takes off are mint green and stand crosswise inverse each other on the stem. The clears out are stretched, oval with an acute and ardent pinnacle, abrasively toothed edges, and striking menthol scent [3-5]. Peppermint grows in specific nicely in lands with high water holding limited soil. All business mint varieties are seed sterile and are proliferated the utilization of the underground stolons (sprinters or rootstock) created by way of current vegetation. In developing countries, medicinal plants are widely used for the treatment of different diseases. Amla (*E. officinalis*) is a well-known tree used for the production of herbal as well as pharmacological medicines [6]. The stolons cannot be put something aside for more prominent than a few days because they deteriorate rapidly due to warmth or drying out [7]. Mint bears harsh environmental conditions and can even stroke the heat of sunlight [8]. Few characteristics of *M. piperita* are as follows:

Mint oil is largely produced by India. Flavoring industries, pharmaceuticals, and food and perfuming industries use the derivatives and constituents of mint oil. Dabur Pudina Hara, cold balms, pan balms, toothpaste, and lozenges are prepared by methanol, that is, the main constituent of mint oil. *M. arvensis* plant leaves are the starting material for producing mint oil and are used for curing gas acidity problems and stomach disorders. It is also used in desi medicines like Pudina Hara. Ointments and cough drop such as Vicks Vaporub utilize peppermint oil as an essential ingredient. The pills were determined helpful in lowering total technique time, reducing colonic spasm, growing endoscopist delight, and reducing ache in sufferers at some point of endoscopy. Peppermint is taken orally as an oil, essence, and extract and tea also pragmatic outwardly as a burnish or embrocation (Tables 1-4).

It is commonly utilized in pediatric sufferers for treating abdominal pain, irritable gut syndrome, nausea, and symptomatic comfort of coughs and colds [11]. It is far one of the biosphere's most pro-therapeutic sages and is applied in each Eastern and Western conventions. Old Greek, Egyptian, and Roman societies utilized the mint in medication and cooking. Mint is as of now one of the principal financially essential fragrant and medicinal crops brought within the U.S. The sector technology of mint oil is about 8000 tons consistent with 12 months [12]. Peppermint has more than 101 local names in different countries (Table 5) [5,13].

Uses of *Mentha piperita*

Fig. 2 shows the uses of peppermint oil [14].

Key points of peppermint oil

Effectiveness of *M. piperita*

Mint is employed in various forms by human beings following are a few ways of usage of mint in daily life (Fig. 3).

The following are some uses of mint and mint oil:

Infantile colic

Chemical simethicone and peppermint oil are effective in curing infantile colic [17]. There is no such proper treatment for this disease (Tables 6 and 7).

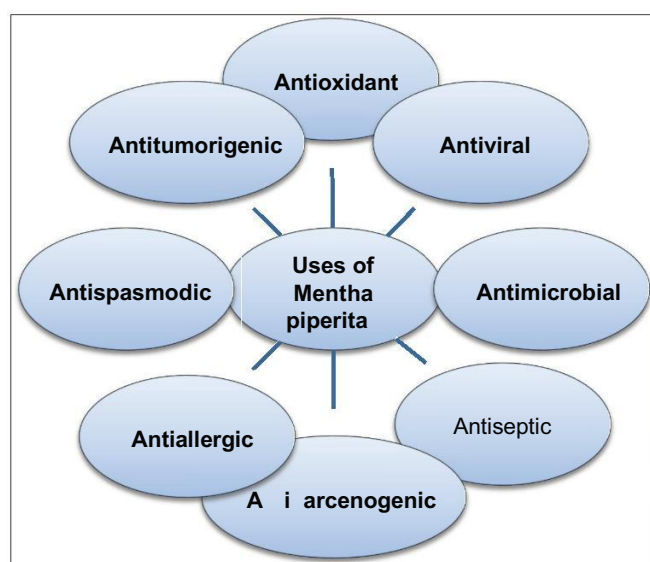
Fig. 1: *Mentha piperita*

Fig. 2: Uses of peppermint oil [14]



Fig. 3: (a) Peppermint soup, (b) peppermint oil, (c) peppermint salad, (d) peppermint tea

Irritable bowel syndrome

Since the late 90s, it was found that enteric-covered peppermint oil cases are protected and powerful in the treatment of this inexorably predominant issue. This valuable impact stretches out to the pediatric network. In one kids' preliminary, 75% of those getting peppermint oil had decreased seriousness of torment related to IBS inside about 14 days [18]. Another 2005 preliminary in grown-ups

Table 1:

Kingdom	Plantae
(unranked)	Angiosperms
(unranked)	Eudicots
(unranked)	Asteroids
Order	Lamiales
Species	Mentha
Binomial name	<i>Mentha piperita</i>

Table 2: Few characteristics

Peppermint oil	Properties
Smell	Fresh, sharp, and methanolic
Color	Clear to pale yellow
Viscosity	Watery

Table 3: [9]

Properties	Characteristics
Blossoms	Purple in color
Length of leaf	6–8 mm long
Corolla	4 lobed, 5 mm distance across, created in whorls around the stem, limiting spikes and shaping thick
Blossoming time	Mid of summer till the end of summer
Chromosome number	2n checks of 66, 72, 84, and 120

Table 4: Specifications of peppermint oil [10]

Properties	Values
Molecular weight	965.51672 g/mol
Density	0.896–0.908 g/cm ³ (25°)
Molecular formula	C ₆ H ₁₀ O ₇
Boiling point	82–93°C
Solubility	Slightly soluble in water and alcohol
Specific gravity	0.90 g/mL at 20°C
Refractive index	1.421

Table 5: [5,13]

Countries	Local name	Countries	Local name
Iran	Nanafelfeli	USA	Lab Mint, mint
Mexico	<i>Mentha piperita</i>	China	Po Ho
Germany	Peppermint	India	Mint, Pudina, Pudyana, Puthina
Iraq	Nana	Portugal	Hortelana pimentos

presumed that "Considering the right now accessible medication medicines for IBS Peppermint oil might be the medication of first decision in IBS patients with non-genuine clogging or looseness of the bowels to mitigate general manifestations and to improve nature of life." In another 2007 preliminary, 75% of patients accepting peppermint oil saw a great half decrease of "all-out peevish entrails disorder score" [19,20]. Most as of late, an examination distributed January of this current year found that peppermint oil was viable in assuaging stomach torment in the runs prevalent bad tempered gut disorder [21,22].

Gastrointestinal benefits

M. piperita is utilized for the cure of non-obstructive dyspepsia with no noted reactions. The gastric discharging rate is greatly enhanced by this. There may be a noteworthy anti-emetic impact of *M. piperita* in lessening the effects seen after operation illness for sufferers with an extremely touchy muffle neuron receptor system [11].

Table 6: [15]

Dosage	Grown-ups: 0.0002–0.0004 L of oil multiple doses day by day in Bayar-covered containers Children of more than 8 years: 0.0001–0.0002 L multiple doses every day
Adverse effects	Normal: Hypersensitive responses, acid reflux, perianal consuming, obscured vision, sickness, and heaving rare: Interstitial nephritis, intense renal disappointment
Potency	Irritable bowel syndrome symptoms: In all likelihood powerful non-ulcer dyspepsia: In all likelihood powerful lowering spasm throughout gastrointestinal processes: Likely powerful anxiety headache: In all likelihood effective
Bottom line	Safe at appropriate measurements and decently successful in patients with functional gastrointestinal conditions

Table 7: Annual consumption of essential oils in Pakistan [16]

Products	Consumption (metric tons)
Eucalyptus oil	10
Peppermint oil	10
Menthol	25
Lemon oil	15
Orange oil	15
Herbaceous oils	1
Other oils	10

Anti-headache activity

Peppermint oil is compelling in decreasing manifestations of pressure migraines [23,24]. The fragrance of peppermint improves memory and builds sharpness in human subjects [25].

Antispasmodic effects of peppermint oil

Mints are powerful in decreasing muscle torment, muscle unwinding, and lessen weariness. Mint is a seasoning that is tremendous for its meditational properties, pain relieving, calming, antispasmodic, decongestant, and cell reinforcement impacts [26,27]. *M. piperita* is one of the *Mentha* animal types (i.e., *M. piperita*, *Mentha arvensis*, and cornmint oil). *M. piperita* includes menthol and menthone as its real parts. Outer utilization of mint concentrate brought the agony edge up in human. Peppermint fragrance was likewise viable on seen physical remaining burden, the transient outstanding task at hand, exertion, and uneasiness [28]. Gastrointestinal muscles are made to soothe using *M. piperita* as it relaxes the muscles by the reduction influx of calcium ion concentration in the jejunum and large intestine [29,30].

Dental caries/foul breath

M. piperita concentrate has been observed to be better than the synthetic mouthwash chlorhexidine repressing *Streptococcus mutans* drives biofilm development related to dental caries. Powdered peppermint leaves were utilized to brighten teeth [31]. Peppermint is utilized as it helps to get rid of the foul breath giving freshness and ward off terrible breath [32]. More examinations are being done concerning whether it straightforwardly adds to anticipating caries and plaque, anyway it is affirmed that it creates an ungreat condition for microorganisms [33].

Allelopathy

Allelopathy is one type of hassle that plays a considerable role in agro-biological systems and affects the growth, satisfying the amount of the plants [34]. Water extract of peppermint (at concentration 10% v/v) can restrain the development of the tomato saplings [35,36]. Aqueous excerpts of peppermint (at concentration 15% v/v) declines non-photochemical and photochemical slaking and power index of photosystem in sunflower [37].

Cramp relieving

It is thought to have a tremendous effect on relieving menstrual cramps [38].

Cardiovascular properties

Peppermint has historically been used as a rubefacient [39]. It is said to have vasodilating properties in some animals. It has a decreasing effect at the beating rate of the heart and the systolic pressure. Relaxation of bronchial easy muscular tissues, growth within the airflow also is different cardiovascular results of peppermint oil [38]. Peppermint oil is greatly used to reduce coronary cardiac palpitations. It is also used to make the coronary heart beat better and enhance flow within the course of the body. This can assist in ease of several issues associated with flow difficulties. Peppermint oil keeps your blood pumping steady.

HOUSEKEEPING

Traditional peppermint (or fall mint) immediately with steed's leaf people to combat. Scatter clean or dried leaf to keep round food of mice away. Impute (fall mint) on a modern beehive using the usage of to drag. Use bathtub oil tobaccos fragrance to strain away. Peppermint oil as insect repellent: The use of peppermint essential oil as insect repellents is a natural manner to put off mosquitoes, moths, horseflies, aphids, cockroaches, ants, and so [40].

Neuropsychiatric effects

It is a great nervous system stimulator. It helps to reduce the physical pain and tension of workload [33].

Toxicity and contradictions

Every homegrown item conveys the tendency for tainting with other homegrown items, pest killers, herb killers, substantial salts, medical products, and so on. This is especially worried about imports from creating nations. Moreover, hypersensitive responses can jump out at any regular item in touchy people. Unfavorably susceptible responses to peppermint have been accounted for. Possibly risky mixes in *piperita* are menthol and pulegone. Pulegone is the lethal substituents in pennyroyal which is additionally found in peppermint in lots littler extents [11]. Menthol causes hepatocellular changes in rodents. Antagonistic responses to enteric covered peppermint oil containers are uncommon however can incorporate touchiness response, contact dermatitis, stomach torment, acid reflux, and perianal consuming, bradycardia, and muscle tremor. Inward breath of menthol can cause apnea and laryngo constriction. In one case, patients were noted to have contact affectability to menthol and *M. piperita* with oral indications including consuming oral disorder, intermittent oral ulceration, or a lichenoid response [38,41]. The intemperate inward breath of mentholated readiness has induced reversible sickness, anorexia, heart troubles, ataxia, and distinctive CNS problems that are believed to be because of the nearness of risky oils 102. There may be a case file of a 13-year-old child who, following inward breath of 5 ml of Olbas oil (containing 200 mg menthol) in preference to a prescribed couple of drops, skilled ataxia, perplexity, happiness, nystagmus, and diplopia. In rodent ponders, never-ending presentation to excessive groupings of menthol vapor has seemed internet deadly influences [38]. For the pregnant ladies, it is not recommended even in the authorized doses [15]. Unfavorable reactions to enteric covered mint oil tablets are rare, however can include hypersensitive reaction, touch dermatitis, abdominal ache, indigestion, and perianal burning, bradycardia, and muscle tremors [26,42-44].

CONCLUSION

According to the German Commission E monographs, peppermint oil is greatly employed as an antispasmodic in the stomach and intestine in bile channel and for the treatment of peevish entrails disorder, inflammation of the respiratory tract, and aggravation of the oral mucosa. Remotely, *M. piperita* has been employed for myalgia and neuralgia. As indicated by German Commission E, *M. piperita* may likewise go about as a carminative, disinfectant, and pectolytic, having soothing activity. Enteric-covered peppermint oil containers (Colpermin) are mostly employed as an orally controlled antispasmodic premedication in the study of large intestine. Peppermint has historically been used as a rubefacient. It is said to

References

1. Muneer, M., Mughal, S. S., Pervez, S., Mushtaq, M., Shabbir, N., Aslam, A., ... & Abbas, F. DIAGNOSIS AND TREATMENT OF DISEASES BY USING METALLIC NANOPARTICLES-A REVIEW.
2. Mughal, S., Abbas, F., Tahir, M., Ayub, A., Javed, H., Mamtaz, M., & Iram, H. (2019). Role of Silver Nanoparticles in Colorimetric Detection of Biomolecules. doi:10.7537/marsbnj050419.04
3. Pervez, S., Hassan, S. M., Mughal, S. S., Pando, A., Rafiq, A., & Shabbir, N. Structural, Morphological and Biototoxicity Studies of Biosynthesized CaO Nanoparticles Via Cuminum Cyminum.
4. SHABBIR, N., HASSAN, S. M., MUGHAL, S. S., PERVEIZ, S., MUNIR, M., MUSHTAQ, M., & KHAN, M. K. Peppermint oil, its useful, and adverse effects on human health: a review.
5. Pervez, S., Hassan, S. M., Mughal, S. S., Ullah, H., Shabbir, N., Munir, M., ... & Farman, M. A Review on Heavy metal contamination in water and the Strategies for the Reduction of Pollution Load of Commercial and Industrial Areas of Pakistan.
6. Hafeez, M., Hassan, S. M., Mughal, S. S., & Mushtaq, M. Evaluation of Biological Characteristics of Abelmoschus esculentus.
7. Hassan, S. M., Mubeen, N., Hassan, S. K., Ibrahim, A., Hassan, H., Mughal, S. S., & Haider, G. MORINGA Oleifera, A MULTIFUNCTIONAL PLANT: A REVIEW STUDY.
8. Mushtaq, M., S.M. Hassan, and S.S. Mughal, Synthesis, Characterization and Biological Approach of Nano Oxides of Calcium by Piper nigrum. American Journal of Chemical Engineering, 2022. 10(4): p. 79-88.
9. Khushi, A., Hassan, S. M., & Mughal, S. S. Antimicrobial and Structural Investigation of Green Synthesized ZnO Nanostructures from Bougainvillea glabra Leaves Extract.
10. Khan, Aysha, Syeda Mona Hassan, and Shahzad Sharif Mughal. "Biological Evaluation of a Herbal Plant: Cichrorium intybus." *Science and Technology* 6.2 (2022): 26-38.
11. Muneza Munir, Syeda Mona Hassan, Shahzad Sharif Mughal, Alvina Rafiq, Evaluation of Biological Approaches of Green Synthesized MgO Nanoparticles by *Syzygium aromaticum*, *International Journal of Atmospheric and Oceanic Sciences*. Volume 6, Issue 2, December 2022 , pp. 44-53. doi: 10.11648/j.ijaos.20220602.12
12. Lashari, Aamna, Syeda Mona Hassan, and Shahzad Sharif Mughal. "Biosynthesis, Characterization and Biological Applications of BaO Nanoparticles using Linum usitatissimum." *American Journal of Applied Scientific Research* 8.3 (2022): 58-68.
13. Sarfraz, S., Javed, A., Mughal, S. S., Bashir, M., Rehman, A., Parveen, S., ... & Khan, M. K. (2020). Copper Oxide Nanoparticles: Reactive Oxygen Species Generation and Biomedical Applications. *Int. J. Comput. Theor. Chem*, 8, 40-46.
14. Rafique, S., Hassan, S. M., Mughal, S. S., Hassan, S. K., Shabbir, N., Pervez, S., ... & Farman, M. (2020). Biological attributes of lemon: a review. *Journal of Addiction Medicine and Therapeutic Science*, 6(1), 030-034.
15. Hanif, M. A., Hassan, S. M., Mughal, S. S., Rehman, A., Hassan, S. K., Ibrahim, A., & Hassan, H. (2021). An overview on ajwain (*Trachyspermum Ammi*) pharmacological effects: current and conventional. *Technology*, 5(1), 1-6.
16. Khalid, Z., Hassan, S. M., Mughal, S. S., Hassan, S. K., & Hassan, H. (2021). Phenolic Profile and Biological Properties of *Momordica charantia*. *Chemical and Biomolecular Engineering*, 6(1), 17.
17. Hassan, S. M., Mughal, S. S., Hassan, S. K., Ibrahim, A., Hassan, H., Shabbir, N., ... & Shafiq, S. (2020). Cellular interactions, metabolism, assessment and control of aflatoxins: an update. *Comput Biol Bioinform*, 8, 62-71.
18. Khattak, A. K., Syeda, M. H., & Shahzad, S. M. (2020). General overview of phytochemistry and pharmacological potential of *Rheum palmatum* (Chinese rhubarb). *Innovare Journal of Ayurvedic Sciences*, 8(6), 1-5.
19. Latif, M. J., Hassan, S. M., Mughal, S. S., Aslam, A., Munir, M., Shabbir, N., ... & Pervez, S. (2020). Therapeutic potential of *Azadirachta indica* (neem) and their active phytoconstituents against diseases prevention. *J. Chem Chem Sci.*, 10(3), 98-110.
20. Khalid, Z., Hassan, S., Shahzad, S., & Khurram, H. (2021). A review on biological attributes of *Momordica charantia*. *Adv Biosci Bioeng*, 9(1), 8-12.
21. Hafeez, M., Hassan, S. M., Mughal, S. S., Munir, M., & Khan, M. K. (2020). Antioxidant, Antimicrobial and Cytotoxic Potential of *Abelmoschus esculentus*. *Chemical and Biomolecular Engineering*, 5(4), 69.
22. Afzal, N., Hassan, S. M., Mughal, S. S., Pando, A., & Rafiq, A. (2022). Control of Aflatoxins in Poultry Feed by Using Yeast. *American Journal of Chemical and Biochemical Engineering*, 6(1), 21-26.
23. Shabbir, N., Hassan, S. M., Mughal, S. S., Pando, A., & Rafiq, A. (2022). *Elettaria cardamomum* and Greenly Synthesized MgO NPs: A Detailed Review of Their Properties and Applications. *Engineering Science*, 7(1), 15-22.
24. Mubeen, N., Hassan, S. M., & Mughal, S. S. (2020). A Biological Approach to Control Aflatoxins by *Moringa Oleifera*. *International Journal of Bioorganic Chemistry*, 5(2), 21.
25. Mubeen, N., Hassan, S. M., Mughal, S. S., Hassan, S. K., Ibrahim, A., Hassan, H., & Mushtaq, M. (2020). Vitality and Implication of Natural Products from *Moringa oleifera*: An Eco-Friendly Approach. *Computational Biology and Bioinformatics*, 8(2), 72.
26. Aslam, A., Hassan, S. M., Mughal, S. S., Hassan, S. K., Ibrahim, A., Hassan, H., ... & Shafiq, S. (2020). Comprehensive Review of Structural Components of *Salvia hispanica* & Its Biological Applications. *International Journal of Biochemistry, Biophysics & Molecular Biology*, 5(1), 1.
27. Mughal, S. S., & Hassan, S. M. (2022). Comparative Study of AgO Nanoparticles Synthesize Via Biological, Chemical and Physical Methods: A Review. *American Journal of Materials Synthesis and Processing*, 7(2), 15-28.
28. Rafique, S., Hassan, S. M., Mughal, S. S., & Afzal, N. (2020). Asma Shafi 2, Sehrish Kamran 3 Department of Chemistry, Lahore Garrison University, Lahore, Punjab, Pakistan 2 Department of polymer, Punjab University Lahore, Pakistan 3 Department of Allied sciences, FMH

29. Aslam, A., Hassan, S. M., Mughal, S. S., Perveiz, S., Mushtaq, M., Munir, M., ... & Ayub, A. R. Investigation of Biological Activity of *Salvia hispanica*.

30. Tahir, M. U., Abbas, F., Tahira, M., Shahzad, H. M., Sharif, S., Raza, A., ... & Ziad, M. SYNTHESIS OF MANGANESE-TIN BIMETALLIC MATERIALS AND STUDY OF ITS CATALYTIC APPLICATIONS.