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Review Article

Mentha Spicata – Scent of Wellness: Investigating the Health Benefits of Spearmint (Mentha Spicata) From Ancient Times to Modern Science

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ABSTRACT

Mentha spicata, also referred to as *Mentha viridis*, is a member of the Lamiaceae family of medicinal plants that is valued for its capacity to produce and release secondary metabolites, mainly essential oils. The aerial components of this plant are used by various populations to create tea, and ethnopharmacological surveys carried out globally have revealed that this tisane has a range of effects. These acts are caused by several compounds found in *M. spicata*, the biological consequences of which have recently been demonstrated through experiments. *M. spicata* extracts and essential oils were investigated for their potential health benefits, including their antibacterial, anticancer, antiparasitic, antioxidant, and antidiabetic properties. Extensive benefits were shown in both in vitro and in vivo investigations, which were linked to a variety of bioactive compounds present in *M. spicata*. Indeed, a number of microbiological organisms, such as bacteria, fungi, and parasites, appear to be effectively inhibited by volatile compounds through a variety of mechanisms. Additionally, *M. spicata* has demonstrated promising antioxidant, antidiabetic, anti-inflammatory, and anticancer activities in certain studies, suggesting that it may be used as a natural medicine source to combat cellular oxidative stress and related illnesses. Crucially, research on *M. spicata*'s toxicity has shown that it is safe to use for lengthy periods of time and at different doses, supporting its use as a tea tisane in traditional medicine. In terms of botanical description and geographic distribution, phytochemical components, pharmacological activity, and toxicological evaluations, we summarize, explore, and highlight available data on *M. spicata*. Four microorganisms - *Escherichia coli*, *Bacillus subtilis*, *Aspergillus niger*, and *Candida albicans*—were shown to be inhibited in growth by spearmint oil. With the best antibacterial effect against *E. coli* and the highest inhibitory level against the mold *Aspergillus niger* at higher oil concentrations (19mm inhibition zone), spearmint oil showed excellent antimicrobial activity against all examined species. The study demonstrated the antibacterial, antimicrobial, and preservation properties of spearmint and spearmint oil [1, 2, 3].

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INTRODUCTION

Within the Lamiaceae family, specifically the Subfamily Napithoidae, spearmint (*Mentha spicata* L.) is found in around 38 species across all agroclimatic zones across the globe. It is a fragrant, rhizomatous, perennial herb that grows up to 75 cm tall and has slender, glabrous stems with four angles that bear opposite decussate leaves. It is grown all across India. Other name: (English – Mint, spearmint) (Gujrat – Fudino) (Mal, – Pahari pudina) (Tam, – Podina) (Beng., Hindi, Marathi, Tel. – Pudina). This family of

plants possesses strong antioxidant properties due to their high polyphenol content. Native to northern England, spearmint is grown around the world in regions with tropical to temperate climates, including America, Europe, China, and South Africa. Sage of Bethlehem, brown mint, garden mint, and lady's mint are some other names for spearmint. There are significant serrations on the broad leaves. The brand of the family is the square-shaped stem. Long, right-angled blossoms of pink or white on slender stems characterize spearmint. Spearmint leaves have a powerful flavor and a delightful perfume.

Table 1: Medicinal uses [2]

Used parts	Dosage form	Traditional use
Leaf	Decoction	Diabetes Against stomach disorders
Leaf	Infusion	Cold & flu Toothache
Leaf	Powder	Skin diseases
Leaf, stem	Decoction	Against the ailments of intestines
Leaf, stem	Infusion	Headache & Tiredness
Leaf, stem	Decoction and infusion	Diabetes
Leaf, flower	Infusion and decoction	Asthma, bronchitis, chest pain, lungs disorder, kidney problems, diuretic
Aerial parts	Infusion	Throat affection
Whole plant	Infusion	Aphrodisiac, cold, flatulence, headache, tonic, toothache

A wide variety of *Mentha* species are grown for their essential oils. *Mentha spicata* L., *Mentha condensens* L., *Mentha aquatica* L., and *Mentha piperita* are the most important commercial species for essential oil production. Mint oil is currently one of the most valuable essential oils produced worldwide, valued at over \$400 million. Unlike peppermint and Japanese mint, spearmint does not have the same cooling effect after consumption. In addition to foul breath, *Mentha spicata* is used to treat problems related to the respiratory system, the gastrointestinal tract, carminatives, anti-spasmodics, sedatives, and PCOS. In traditional Iranian medicine, spearmint has been prepared in a variety of ways (tinctures,

pills, and decoctions) to alleviate flatulence. Since ancient times, *Mentha* plants have been utilized for their flavour and medical and aromatherapeutic capabilities in cooking, medicine, and commercial products. They are among the most widely used herbs. The use of spearmint as medicine dates back many years. It was used as a home treatment to alleviate digestive issues by breaking down fat in the form of tea. The Ames test revealed no indication of mutagenicity for spearmint essential oil. Aside from that, spearmint essential oil has a host of other health benefits, including antibacterial and antioxidant properties that can lower fever, relieve depression, asthma, and obesity. A flavouring ingredient used in

toothpaste, cosmetics, and chewing gum is spearmint oil. Mint has long been used as a herbal treatment for stomach and chestaches. In the Middle Ages, teeth could be whitened using powdered mint leaves. Its tea contains strong diuretic properties. Additionally, it is often necessary to have natural extracts with a pleasant flavour or aroma in addition to a preservative function, as this is necessary to stop bacteria from oxidizing, degrading, and spoiling lipids. Because of its antioxidant properties and extensive usage as a seasoning in South Asian cuisine, it has been investigated as an addition to radiation-processed lamb meat. It was discovered to be useful in postponing fat oxidation and lowering the production of toxic compounds, which may be identified with the use of thiobarbituric acid as a reagent. It was found that spearmint essential oil possessed certain antifungal qualities. In addition to spearmint's health benefits, which can be attributed to intercropping it with maize at a 42-cm interrow spacing, spearmint followed by a 36-cm interrow spacing is more profitable, biologically efficient, and offers producers opportunities compared to planting alone. Herbs are abundant in volatile oil, which has a pleasant scent. Herbs may also include glycosides and alkaloids, both of which have strong medicinal effects. The effectiveness of essential oils against a variety of storage fungus, plant and human infections, bacteria, insects, pests, and other dangerous microbes has been the subject of much research. Nearly every essential oil found in herbs and spices, either alone or in combination, has a strong inhibitory effect on a variety of pathogenic and spoilage microbes. The mint species known as spearmint is indigenous to Egypt, Morocco, and North Africa. First observed in the Great Lakes region in 1843, it is an invasive species. Spearmint has a lengthy history of medical applications. It was used as a tea to address nonspecific gastrointestinal issues. Because of its flavorful and

fragrant properties, spearmint is frequently utilized in cooking, pharmaceuticals, and commercially created products. The purpose of this investigation was to identify the antibacterial activity of spearmint oil, as well as to ascertain the physico-chemical characteristics of spearmint and its chemical makeup. This herb is renowned for its distinctive spear-shaped leaves and delicate, sweet flavor profile, which sets it apart from its close relative, peppermint. Spearmint is a beloved ingredient in both culinary and medicinal realms, offering a spectrum of benefits and applications. In cuisine, spearmint leaves serve as a popular ingredient in teas, cocktails, salads, and savory dishes, imparting a refreshing and aromatic essence. Its culinary applications extend from classic mint sauces to desserts like ice creams and chocolates. Beyond its culinary prowess, spearmint boasts several health benefits. Rich in antioxidants and essential oils, it is celebrated for its digestive properties, aiding in soothing stomach discomfort, and promoting digestion. Tea made with spearmint leaves is highly valued for its ability to induce calmness and ease headaches and nausea. Because of its antispasmodic and anti-inflammatory qualities, spearmint has been used in traditional medicine to treat menstrual cramps, respiratory conditions, and muscle aches. Whether brewed as a soothing tea, garnishing culinary creations, or incorporated into holistic remedies, spearmint remains a cherished herb, celebrated for its refreshing taste and diverse applications in both culinary and wellness domains. Adulteration of spearmint, like many other natural products, can occur due to various factors. Here are some common forms of adulteration that may affect spearmint: 1) Mixing with Other Mint Varieties: Spearmint may be adulterated by mixing it with other mint varieties, such as peppermint or pennyroyal. This adulteration alters the flavor and aroma profile of spearmint and can affect its therapeutic properties. 2) Addition of Artificial



Flavors or Fragrances: In some cases, spearmint products may be adulterated by adding artificial flavors or fragrances to enhance their aroma or taste. This adulteration may compromise the authenticity and purity of the spearmint. 3) Presence of Contaminants: Adulteration can also occur when spearmint is contaminated with foreign substances such as pesticides, heavy metals, or microbial contaminants. Improper cultivation, harvesting, or storage practices can contribute to the presence of contaminants in spearmint products. 4) Mislabeling or False Advertising: Adulteration may involve mislabeling or false advertising of spearmint products. This can include inaccurate labeling of the botanical species, origin, or purity of the spearmint [1, 4, 5].



Fig. no : 1

Macroscopic

Dried leaves are opposite, ovate to ovate-lanceolate, 5 to 6 cm in length and 2.5 to 3 cm in width, obtuse, coarsely dentate, symmetrical at the base, nearly sessile or with a short petiole, glabrous above, glandular below, venation reticulate, lateral veins many, almost running parallel to each other. Taste pungent, odour aromatic

Microscopic

Leaf: The leaf's T'S, which passes through the midrib, is shallowly grooved on the upper side and

broadly convex on the lower. It also exhibits narrow laminar extensions on both sides and a linearly positioned, shallow boat-shaped meristele embedded in the midrib's ground tissue. Detailed TS shows upper and lower epidermii embedded with stomata, cells of the upper epidermis being bigger in size than the lower one, covered with thin cuticle and bearing simple, multicellular trichomes, short or long, straight or bent, with blunt or pointed apex and striated cuticle; glandular trichomes with short unicellular stalk and oval unicellular head; sessile trichomes with big spherical multicellular head; underneath both the epidermii of the midrib lie 1 to 2 rows of collenchymatous tissue, meristele is composed of radially arranged xylem vessels, 2 to 3 in rows, an arc of phloem placed underneath it being narrow. Lamina shows a layer of palisade underneath the upper epidermis and 4 to 6 rows of spongy parenchyma traversed with vascular bundles.

Petiole

Diagrammatic TS of petiole is concavo-convex or boat shaped, shows centrally located shallow boat shaped meristele and two small spherical rudimentary accessory meristeles, each located under the narrow-extended terminals of the petiole. The epidermal trichomes are identical to that of leaf.

Powder

Shows fragments of epidermis of leaf in surface view embedded with diacytic stomata and sessile glandular trichomes with spherical multicellular head. The anticlinal walls of both the epidermii are wavy, the cells of upper epidermis are bigger in size than that of the lower one. Fragments of simple, covering, multicellular straight or bent, short or long trichomes with striated cuticle scattered as such throughout or attached with the cells of the epidermis, transversely cut fragments

of upper epidermis with underlined palisade layer: fragments of transversely cut lower epidermis with collenchymatous tissue; longitudinally cut fragments of reticulate vessels; short glandular trichomes with unicellular stalk and unicellular head.

Geographical Distribution

Though it originated in Europe and Asia, spearmint (*Mentha spicata*) has been widely grown and allowed to naturally occur over most of the world. It thrives in temperate climates and is often found in regions with moist soil and ample sunlight. Spearmint is commonly grown in various countries for its culinary and medicinal uses. It is cultivated in regions with suitable conditions for mint cultivation, including:

- 1) Mediterranean Region: Countries like Italy, Greece, and Turkey have favorable climates for spearmint cultivation.
- 2) North America: Spearmint is extensively grown in the United States, particularly in the Pacific Northwest region, Michigan, and other areas with temperate climates.
- 3) Middle East: Countries like Iran and Syria also cultivate spearmint, often for culinary and medicinal purposes.
- 4) Asia: Asia's spearmint is grown in China, Japan, and India, where it is utilized in traditional cookery and medicine.
- 5) Europe: Besides its native regions, spearmint is grown in various European countries for both commercial and domestic use.

The distribution of spearmint is not limited to these regions, as it can adapt to a range of environmental conditions. Its popularity in herbalism and culinary practices has contributed to its widespread cultivation across the globe [6].

Collection

The collection of spearmint primarily involves harvesting its leaves for various purposes, such as culinary uses, herbal teas, or essential oil extraction. Here's how to collect spearmint:

- 1) Timing: Begin harvesting spearmint leaves once the plant reaches a height of around 8 inches. This is typically when the leaves are most flavorful.
- 2) Harvesting: Use clean, sharp scissors or garden shears to cut stems just above a set of leaves. Avoid cutting more than one-third of the plant at a time to allow for continued growth.
- 3) Frequency: You can harvest spearmint leaves throughout the growing season, as needed. Regular harvesting promotes bushier growth and prevents the plant from becoming too leggy.
- 4) Method: Choose whether you want to harvest individual leaves or entire stems, depending on your intended use. For teas or culinary purposes, individual leaves are often preferred, while for drying or essential oil extraction, entire stems can be harvested.
- 5) Storage: For best flavour, use fresh spearmint leaves that have been gathered within a few days. As an alternative, you can use a dehydrator or hang the leaves upside down in a well-ventilated place to dry them. Once dried, store the leaves in an airtight container away from direct sunlight.
- 6) Repeat: Continue harvesting spearmint leaves as needed throughout the growing season, being mindful not to over-harvest and allowing the plant to regenerate between harvests.



By following these steps, you can effectively collect spearmint leaves for various culinary, medicinal, or aromatic purpose [7].

Cultivation

To cultivate spearmint:

1) Choose the Right Location: Choose a location that receives full to partial sunlight and well-drained soil. Spearmint can tolerate some shade but prefers sunlight for optimal growth.

2) Prepare the Soil: Work on the soil to loosen it and remove any weeds or debris. Spearmint prefers fertile, moist soil with a slightly acidic to neutral pH (around 6.0 to 7.0).

3) Planting: Spearmint can be grown from seeds, but it's more commonly propagated from cuttings or divisions of established plants. Plant cuttings or divisions in the prepared soil, spacing them about 18 to 24 inches apart.

4) Watering: Make sure the soil is constantly damp but not soggy. Because spearmint has shallow roots, it may require frequent watering, particularly in hot and dry weather.

5) Mulching: Mulch the area surrounding the plants to help them retain moisture and keep weeds at bay.

6) Fertilizing: Spearmint generally doesn't require much fertilization, but you can apply a balanced fertilizer sparingly if growth seems slow or leaves appear pale.

7) Harvesting: You can start harvesting spearmint leaves once the plant reaches about 8 inches in height. Clip stems just above a set of leaves and avoid cutting more than one-third of the plant at a time. Regular harvesting promotes bushier growth and prevents the plant from becoming too leggy.

8) Maintenance: Look out for pests and illnesses, such as powdery mildew or aphids, and take the required action to control them if needed.

9) Also, periodically thin out overcrowded plants to maintain good airflow and prevent disease.

10) Overwintering: Spearmint is perennial and can survive winter in many climates. Mulch around the base of the plants in colder regions to help insulate the roots or consider bringing potted plants indoors during the winter months.

By following these steps, you can successfully cultivate spearmint and enjoy its fresh, aromatic leaves for culinary use or herbal remedies. [8, 16]

Phytoconstituents



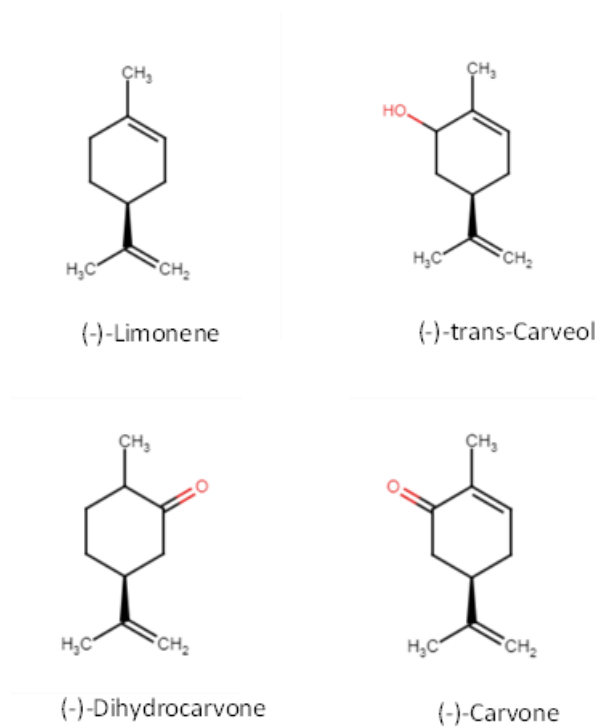


Fig. no : 2

Table 2: Chemical constituents of spearmint [2]

Parts used	Compounds	Reference
Phenolic	Pentadecanoic acid (7.47%) 7-Oxabicyclo[4.1.0] heptane (9.56%) 3-Penten-2-one,4-(2,2,6-trimethyl-7-oxabicyclo[4.1.0]hept-1-yl)-, (12.20%) stigmast-4EN-3-one (18.99%)	[40]
Aerial parts	Carvone (49.62-76.65%) Limonene (9.57-22.31%) 1,8-Cineole (1.32-2.62%) trans-Carveol (0.3-1.52%)	[39]
Aerial parts	trans-Muurolo-4 (14%) 5-Diene (27.28%) Piperitenone oxide (22.22%) β -Caryophyllene (10.48%) Geranyl propanoate (6.55%) Sibirene (3.45%) Borneol (1.98%) Allo-ocimene (1.71%) β -Elemene (1.34) Germacrene D-4-ol (1.02%)	[41]
Aerial parts	Carvone (57.49-72.47%) Limonene (10.70-24.81%) Myrcene (0.25-2.02%)	[42]

	1,8-Ceneole (0.2-2.0%)	
Aerial parts	Carvone (48.60%) Limonene (11.30%) cis-Carveol (21.30%) Linalool (1.30%) 1,8-Cineole (2.55%) cis-Carvyl acetate (2.10%) cis-Dihydrocarvone (1.30%)	[43]

Uses:

Table 3: Pharmacological, Ethnomedical, Phytochemistry & Biological Properties of Spearmint [4]

Pharmacological properties	Ethnomedical use	Phytochemistry	Biological properties
Antibacterial	Diarrhea	Essential oil	Antimicrobial
Antifungal	Respiratory disorder	Flavonoids	Insecticidal
Antioxidant	Digestive problems	Lignans	Anticancer
Antidiabetic	Diabetes		Hepatoprotective
Cytotoxic	Jaundice		Neuroprotective
Anti-inflammatory	Arthritis		Antihyperlipidemic
Antipyretic	Fever		Gastrointestinal protective
	Cough, cold & asthma		Anticonvulsant
	Wound healing		Sedative

1) Causes of PCOS

The condition is caused by an imbalance of reproductive hormones, which results in cystic ovarian follicles. The fluid (usually water)-filled sac enclosing the egg takes the shape of cysts (functional cyst), impeding the normal physiological process of egg release for fertilization. Thus, ovulation blocking disturbs the menstrual cycle and results in amenorrhea. PCOS is distinguished by numerous cysts in the ovary. In certain clinical conditions, each cyst can be 8-10 mm wide. The restriction in egg release eliminates any possibilities of conception because the fertilization stage is hampered. In some clinical

situations of PCOS, even if implantation of the fertilized egg occurs, there are serious possibilities of termination. Premature birth, hypertension, gestational diabetes, and preeclampsia are among the additional clinical effects of PCOS. The menstrual cycle and normal sexual function are regulated by the pulsatile release of follicle-stimulating hormone (FSH), luteinizing hormone (LH), and gonadotropin-releasing hormone (GnRH) from the hypothalamus. High prolactin levels and increased testosterone levels impair GnRH secretion. PCOS disrupts the LH and FSH ratios. Thus, egg release is hampered, or eggs are not generated in some circumstances, resulting in



amenorrhea. Amenorrhea is classified into two types: primary, which refers to chromosomal abnormalities that prevent menarche, and secondary, or hypothalamic amenorrhea, which is characterized by the absence of menstruation for months, resulting in a variety of physiological disorders. The human body is controlled by a complicated network of hormone systems. Disruption of one impairs the functioning of others [9].

Herbal tea for PCOS :

PCOS is a condition characterized by hormonal imbalance. The Rotterdam Criteria is the standard used for diagnosing PCOS and it has three criteria, of which at least two need to be true to be diagnosed. One of these criteria includes androgen excess. Studies show that 9.13%-22.5% of women with PCOS in India suffer from hyperandrogenism.

- 1) **Reduce free testosterone** - Spearmint tea could have a beneficial effect in reducing testosterone in the body, thereby reducing related symptoms like male pattern baldness and acne. Though it cannot get rid of already existing facial/ abnormal hair growth in the body, it has been shown to have a positive response to reducing/ slowing the pace of abnormal hair growth.
- 2) **High antioxidant quality** - Low-grade chronic inflammation is a sword that hangs over a PCOS cyster constantly. Spearmint tea has a high antioxidant quality which brings down oxidative stress in the body and can curb inflammation. This is a definite win-win situation in PCOS.
- 3) **Takes care of gut issues** - Your gut quality is compromised in PCOS, one may suffer from bloating, nausea, acidity, and an array of other symptoms that affects the health of the gut even further. Spearmint tea is not caffeinated and is rather a herbal drink and it can come in handy to get rid of gut-related symptoms and tackle indigestion.
- 4) **May help to reduce blood sugar level** - Given that spearmint tea is not a calorie-dense drink and has 0% caffeine, it is a practical replacement for other hot beverages like milk tea, coffee, etc. If one has PCOS driven by insulin resistance or is prediabetic, then spearmint tea can be used to gain control over blood sugar levels. More research needs to be done in this aspect to understand this reaction better.
- 5) **Helps balance the hormones** - Hormones tend to talk to each other, when there is an imbalance of a single hormone, it can cause a chain reaction and other hormone levels also could get affected. The androgen lowering ability of spearmint tea could also lower other hormones such as luteinizing hormone and follicle-stimulating hormone. Due to this hormone lowering quality, prolonged intake of spearmint tea might help regularize periods.
- 6) **Improves focus** - If you have PCOS, you know to expect some mood swings, constant tiredness, and even some kind of brain fog. Spearmint tea has been shown to improve focus, memory, and cognitive functions. This might be owing to their high antioxidant quality which reduces stress greatly[9].



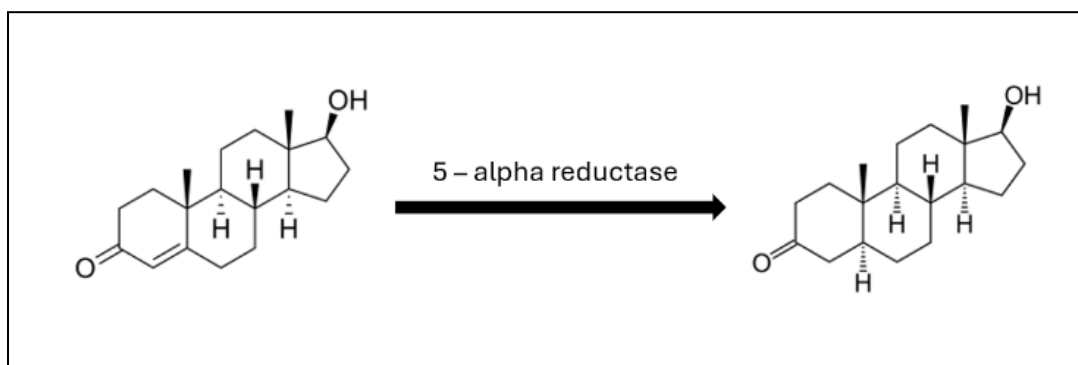


Fig 3: Mechanism of PCOS

Mechanism - Spearmint contains compounds such as flavonoids and essential oils that may help regulate hormone levels, including androgens like testosterone. Symptoms of polycystic ovarian syndrome (PCOS), including irregular menstrual periods, acne, and hirsutism (excessive hair growth), are caused by high testosterone levels. It contains a substance that inhibits 5-alpha reductase, an enzyme that transforms testosterone into the more potent form of dihydrotestosterone (DHT). By reducing DHT levels, spearmint help alleviate symptoms associated with excess androgens in PCOS [9].

2) **For scenting and perfuming** - Mints are probably most known for their sweet, pleasing aroma, which is why embalming funeral procedures have included them from ancient times. The aristocracy in Christian Europe continued to embalm bodies into the Middle Ages. Indeed, mint was recently discovered among the covered dead people of John Plantagenet, the first Duke of Bedford, and King Richard the Lionheart. In addition to providing the body with a nice odor like to that of the body of Christ, the use of aromatic plants, including mints, in these rituals served to preserve the body throughout time (i.e., the sanctity odor). Mints were also used to make perfumes and cover up unpleasant ingredients in medications. In his encyclopedia Medical Compendium, Paulus Aegineta, a Byzantine

Greek physician and editor of Greek-Roman medicine, discussed the use of ground pennyroyal in a mint decoction as one of numerous additives to hide the unpleasant taste of therapeutic draughts for hygienic purposes. Many formulations that contain either morphine (the primary ingredient in opium) or laudanum (an opium tincture) include peppermint essential oil. Peppermint essence was listed in The Standard Formulary by renowned late 19th-century pharmacist Albert Ethelbert Ebert as a component of a complicated mixture that also contained morphine. Later, similar applications were made to cover up the smell of laudanum, fish oil, and cod liver oil. The famous nostrum Shiloh's consumption remedy for colds, coughs, bronchitis, asthma, and throat irritation is one example of the most recent incidence. Menthol is with no a doubt the most studied mint ingredient for fragrance and perfuming. This is readily explained by its ability to elicit a feeling of coldness, which has a powerful impact on mood, behavior, and thought processes. Given that many diseases have an inflammatory component that manifests topically as redness and warmth, it makes sense to seek a cooling or fresh sensation to oppose the effect.

3) **For gastrointestinal disorders** - From classical antiquity to modern medicine, most

philosophers and physicians who discovered mints mentioned using them medicinally for gastrointestinal ailments. Mints have been traditionally used to aid in the treatment of gastrointestinal ailments and to aid in digesting due to its carminative and anti-emetic effects. He suggested consuming "a draught of endive juice sprinkled with mint or a mixture of juice of kernel, pomegranate, and mint" to treat gastrointestinal issues. A number of recipes started to surface in the royal apothecaries' arsenals as a result of the widespread use of mints throughout Europe. Recent research studies have identified the supposed gastrointestinal benefits of mints. Mint oils contain compounds that help to aid digestion and relax the gut by increasing gastric emptying. Because it helps lessen postoperative nausea and vomiting brought on by chemotherapy, it has significant antiemetic effects.

- 4) **For modulating libido** - There are many conflicting and varied reports about how mints affect libido. This could be partially explained by variations in the species employed, as well as in the amount and quality of food consumed. It is evident that antique thinkers agreed that watermint had aphrodisiac properties. This idea was proposed by Aristotle, Dioscorides, Galen, and, centuries later, by Nicholas Culpeper in *The English Physician Enlarged* and Muhammad ibn Zakariya al-Razi, a Persian polymath. There are contradictory documents that date back to the very peculiar Middle Ages. In order to reduce sexual desire, Avicenna suggested ingesting watermint as a remedy; Hildegard von Bingen's *Physica* has a similar account. Trotta also said that one might calm a suppressed sexual urge by giving mints. Later, in line with Hippocrates' theories, Italian doctor Paolo Zacchia—regarded as one of the

founding founders of forensic medicine—thought that consuming watermint was the cause of erectile dysfunction. But afterward, there has only been a slight curiosity due to the mints' effect on libido. Mints have been shown in recent animal and clinical research to have an anti-androgenic effect on males, which may have an impact on erection and lower desire.

- 5) **For Keeping Insects Away and Preventing Animal Bite** - Since ancient times, mints have been used as adjuncts in animal bite treatments and as insect repellents. This is because humans have always been concerned with providing protection against the various elements of the natural world, including animals. Pliny quoted Xenocrates to suggest that patients suffering from tertian fevers, which were common in Hellenistic Greece and Egypt, should smell pennyroyal and place it next to them. This is likely a reference to malaria. Trotta also discussed the use of Tyriaca diatesereon and Saint Paul's potion as medicinal drinks for individuals suffering from quartan fever, which is likely a form of malaria. These practices would likely have been intended to prevent Plasmodium protozoa from spreading, the causative agents of malaria from mosquito bites based on herbs' insect repellent activity. Paulus Aegineta noted that spreading herbs, including pennyroyal, was useful for repelling reptiles. It has already been established that Mentha herbs, especially pennyroyal, have repellent, larvicidal and growth/reproduction regulatory activities against a wide variety of insects, including the mosquitoes responsible for spreading malaria (*Anopheles* sp.), yellow fever, dengue (*Aedes aegypti*), and Zika (*Culex quinquefasciatus*). During the Middle Ages, when the Black Plague killed at least one-third of Europe's

population, mints were prized for their aroma as well.

- 6) **For reproductive purpose** - Mints have been used for several reproductive objectives, including abortifacient qualities, feminine hygiene, and contraception. In ancient Greece, when contraception was largely restricted to "barrier methods," the first records on female health may be found. Perhaps because mints have a cooling or relaxing effect, they were put to pessaries, notably balls of wool that were placed inside the female reproductive system. As for hygienic precautions, female genitalia were cleaned with mints after coition. The Greek physician Soranus of Ephesus, who is most known for his work on obstetrics and gynecology, recommended pennyroyal for sitz baths. Likewise, watermint was recommended by the renowned English physician John of Gaddesden, who wrote *Rosa Medicinae* in the fourteenth century, as a sanitary wash for female genitalia. The most well-known application of mint herbs for female health is definitely due to their known ability to strengthen uterine contractions (oxytocic contractions). They served as emmenagogues, particularly in the context of dysmenorrhea in therapeutic settings. In his book *On the Mixtures and Powers of Simple Drugs*, Galen recommended using pennyroyal and watermint in addition to bloodletting, which is a common remedy for a wide range of illnesses. He also said that these herbs "bring on an abundant menstrual flow." Centuries later, pennyroyal was also recommended as a remedy for menstruation retention by Luis de Mercado, the Spanish emperor Philip II's physician. Pennyroyal, the most well-known mint for its abortifacient qualities, has been mentioned in numerous medical treatises and legendary writings. There were several

concerns about the potential impact of mints on sperm production with relation to male fertility and health. According to Pliny, milk that has been infused with watermint doesn't curdle, thicken, or get sour. Presuming that a comparable outcome would transpire with semen, Pliny claimed that consuming watermint might alter semen's consistency and hence impact fertility. Additionally, Dioscorides thought that excessive mint use altered the quality of sperm and impacted erection. Consuming watermint "generates much semen, but of a feeble nature," according to Syrian physician and bishop Aëtius of Antioch. Watermint was used as a female suppository before to coition and was described by Avicenna as a spermicide. In contrast, Trotta claimed that among other things, men should use pennyroyal (perhaps topically) to promote fertility. Pennyroyal was therefore a highly prized herb for female health throughout history; however, in the 20th century, its use gradually decreased primarily as a result of the development of abortifacient drugs and growing public awareness of the toxicity profile of this herb. Today, there are very few records of its use.

- 7) **For respiratory conditions** - Although there are few literary references, mints were also used to treat respiratory conditions. Plutarch in his *Moralia* wrote of the habit of Heraclitus, the Greek philosopher of Ephesus, of drinking cold water with spigs of pennyroyal before giving a speech. Pliny made a similar reference and advised taking watermint juice 'when a person is about to engage in a contest of eloquence, but only when taken just before'. For lower respiratory tract problems, Theodorus Priscianus, a physician from the 5th century Byzantine empire, used pennyroyal in a herbal mixture for chestpain. Aëtios of



Amida wrote of a cough medicine containing pennyroyal in a mixture of pepper, hyssop, terebinth, fresh butter, and honey. *Códice Eboense CXXI/2-19* contains recipes for mint-based medical remedies written by Portuguese Dominican physician and friar Gil Rodrigues de Valadares (Giles of Santarém). Giles of Santarém advised a tongue-application mixture comprising mint juice, crushed pepper, malva seeds, egg yolk powder, and honey for aphonia.

8) For Cardiovascular and Urinary Disorders

- The use of mint herbs for the urinary and cardiovascular systems is mentioned very infrequently. According to Pliny, pennyroyal is a diuretic and can be used to remove bladder stones; Aulus Cornelius Celsus also supported this claim regarding spearmint. Trota later recommended the use of pennyroyal and horsemint in fumigations or baths to help with strangury, which is the painful and delayed release of small amounts of urine. This is probably because these herbs have a diuretic effect. Remarkably, menthol does, in fact, have positive benefits on the urinary system, according to current research. In female patients suffering from interstitial cystitis, for instance, menthol treatment is linked to a better inflammatory profile and clinical symptoms. Avicenna described watermint as a useful herb for heart disorders, particularly palpitations, in his opus *Canon of Medicine*. The *Mentha x villosa* species may have a hypotensive effect by bradycardia and vasodilation, according to recent studies. While this vasoactive action may be present in numerous mint compounds, menthol has been found to exhibit it.

9) Regarding Pain and Inflammation: Celsus understood the basic concept of inflammation several centuries before the pathophysiological mechanisms of

inflammation were identified, which occurred in the twentieth century. Therefore, from classical antiquity, mints have been used topically or systemically to decrease the inflammatory symptoms of numerous ailments, including pain, erythema, and fever. Pliny employed mints in his remedies for oral and ocular irritation. Giles of Santarém recommended treating otalgia and abscess pain with a complicated blend of vegetable products, including mint juice. People who had limb atrophy—likely from poliomyelitis, demyelinating illnesses, or even trauma—were treated with one of these formulations as a rubefacient. Thomas Sydenham treated patients with "scrophular diseases," which most likely relate to rickets and cervical tuberculous lymphadenitis, locally in the belly and armpits using liniments comprising several plants, including mints. The painful swelling of joints caused by the precipitation of uric acid crystals is the hallmark of gout, an inflammatory arthropathy. Mints are one of the many remedies for this illness that have been attempted historically. Pliny extolled the benefits of using pennyroyal to treat gout, probably by applying the herb to the diseased area of the body. Hildegard von Bingen also noted the benefits of mints in her writings while treating gout. Having suffered from gout in his final years, Sydenham provided highly realistic descriptions of the condition and incorporated mints in a number of electuaries—that is, pills that patients would take in a palatable form—as well as for rheumatism.

10) For oral health - An Egyptian papyrus from the fourth century, according to a Christian monk, contains the earliest known mention of mint leaves being used for dental health. It also includes a recipe for toothpaste. Twenty grains



of pepper, two drachmas of mint, one drachma of dried iris flowers, and one drachma of rock salt were combined to make this toothpaste. The toxic effects of topically applied mercury—a metal already utilized in Islamic medicine for its therapeutic value—were the reason Abu Al Qasim Al Zahrawi (Albucasis) advised washing or gargling with mint decoctions to help with the "swelling and erosion of the mouth, tongue, and throat." He also suggested that if a uvula swelled, one should inhale the fumes of pennyroyal fumigation in absinthe and vinegar. To improve mouth hygiene, he mixed mint with borax. The benefits of mints for mouth, palate, and tooth inflammation were documented by the 13th-century physician Nikolaos Myrepsos, who practiced at the court of John III Doukas Vatatzes in Nicaea. His *Dynameron* is considered one of the most extensive treatises of the late Byzantine period. Chauliac recommended using wine mixed with pepper, sage, mint, and pellitory as an antiseptic gargle for teeth with caries. Rev. Townsend mentions odontalgia and cites one of Boerhaave's own recipes for a tablet that should be put to the tooth that is decaying. The medication contains opium, camphor, oil of cloves, and essential peppermint oil.

- 11) **For Cutaneous problems:** Using these herbs to treat skin ailments is mentioned a few times. Elephantiasis treatment is one well-known result that seems to have been discovered by accident. When Gnaeus Pompeius Magnus (Pompey the Great) ruled, Pliny claimed that elephantiasis, which had been imported from Egypt, was common. He reported on a patient who, feeling humiliated about having a facial variant of the illness, applied watermint shamelessly to his face and recovered. A comparable story is found in Paulus Aegineta,

who refers to a concoction of "watermint, juniper, and mezereon," which was earlier employed by Quintus Serenus Sammonicus and Marcellus Empiricus, two late Roman medical writers. Theophanes describes a mixture that can be used to tint hair blonde, consisting of mint, Egyptian rose, and celandine (swallow-wort). Trotula suggests applying "juice of mint," or *Theriaca magna Galeni*, topically to address lip thickness. Peppermint essential oil is used in a mixture with carbolic acid, glycerin, and water that is sprayed onto the skin using an atomizer to relieve generalized pruritus in urticaria and papular eczema, according to William Augustus Hardaway's *Manual of Skin Diseases*. According to recent study, a number of treatments with a mint base seem promising for treating skin issues. In addition to reducing irritation and inflammation, peppermint essential oil works well in managing pruritus.

- 12) **For nervous problems:** Mint preparations have been used as restoratives for centuries, helping people regain their vigor and influencing their emotions and intelligence. The earliest known account of mints' impact on the central nervous system comes from Aretaeus of Cappadocia, who suggested that epileptics stroll amid pungent and aromatic herbs like pennyroyal and mint. Apart from its ability to alleviate hangovers, Pliny mentioned using watermint to control epileptic seizures. On the other hand, the Hippocratic Corpus says that those with epilepsy shouldn't consume mint due to its "pungent nature." There are numerous reports regarding the use of mints as a headache remedy as well. Paulus Aegineta used watermint and pennyroyal to alleviate throbbing headaches and those brought on by exposure to heat. A head compress containing "sulfurwort (hog-fennel), rue, mint and other

herbs in rose oil" was described by Galen. It was first mentioned by Asklepiades, but it is most likely credited to Nikomedes IV of Bithunia. Lastly, using mints to treat mental illnesses has been attempted. Galen wrote about hysteria as well, and he used a variety of plants, including valerian, laudanum, mint, hellebore, and belladonna extract, in his therapies. Trota claims that Potio Sancti Pauli, which contains horsemint, was used to treat a range of neurological disorders, including "epileptics, cataleptics, and analeptics." Centuries later, English pharmacist and medical writer John Quincy mixed pennyroyal water with peppermint essential oil to cure hysterical episodes, but both men had mixed results[10, 11].

13) Diabetes

The potential antidiabetic effects of *Mentha spicata* (spearmint) are thought to involve multiple mechanisms of action, including:

- 1) **Enhanced insulin sensitivity:** Spearmint may improve insulin sensitivity in cells, allowing them to respond more effectively to insulin. This can lead to better regulation of blood sugar levels, as insulin facilitates the uptake of glucose by cells.
- 2) **Inhibition of carbohydrate-digesting enzymes:** Spearmint contains compounds that can inhibit enzymes responsible for breaking down carbohydrates into glucose in the digestive system. By slowing down this process, spearmint may help reduce the rapid increase in blood sugar levels after meals.
- 3) **Stimulation of glucose uptake:** Certain chemicals found in spearmint may operate similarly to insulin in stimulating cells' absorption of glucose. This can assist in

lowering blood sugar levels by encouraging the body to use glucose for fuel.

- 4) **Antioxidant activity:** Antioxidants like flavonoids and phenolic compounds, which are abundant in spearmint, can help scavenge free radicals and lessen oxidative stress. Insulin resistance and damage to pancreatic beta cells, which create insulin, are linked to chronic oxidative stress.
- 5) **Anti-inflammatory effects:** Diabetes patients frequently have chronic low-grade inflammation, which exacerbates insulin resistance and other issues related to the illness. Anti-inflammatory substances found in spearmint may help lower inflammation and increase insulin sensitivity.
- 6) **Regulation of lipid metabolism:** Spearmint lowers blood triglycerides and cholesterol, which may assist control lipid metabolism. Diabetes frequently results in dyslipidemia, which is defined by high lipid levels and increases the risk of cardiovascular problems.

Overall, *Mentha spicata* may have antidiabetic effects due to the combination of these mechanisms. To completely understand the precise substances causing these effects and their mechanisms of action, more investigation is necessary. Furthermore, to ascertain the safety and efficacy of spearmint as a medicinal agent for the management of diabetes, clinical investigations are required [2, 15].

14) Antioxidant

The antioxidant effects of *Mentha spicata* (spearmint) are primarily attributed to its rich content of various bioactive compounds, including flavonoids, phenolic acids, and essential oils. The mechanism of action of these antioxidants involves several processes:



- 1) Free radical scavenging: Antioxidants included in spearmint oil can counteract free radicals, which are extremely reactive substances that can oxidatively harm tissues and cells. By donating electrons to unstable free radicals, antioxidants stabilize them, preventing them from causing harm to cellular components.
 - 2) Inhibition of lipid peroxidation: Antioxidants in spearmint can inhibit lipid peroxidation, a process in which free radicals react with lipid molecules in cell membranes, leading to the formation of lipid peroxides. Lipid peroxidation can compromise cell membrane integrity and function, contributing to various diseases and aging processes.
 - 3) Metal chelation: Spearmint contains some antioxidants that have the ability to chelate transition metal ions, such iron and copper, which are involved in Fenton reactions that produce free radicals. By binding to these metal ions, antioxidants prevent them from participating in oxidative reactions and generating harmful free radicals.
 - 4) Induction of antioxidant enzymes: Certain compounds in spearmint may stimulate the expression and activity of endogenous antioxidant enzymes, such as superoxide dismutase (SOD), catalase, and glutathione peroxidase. These enzymes play crucial roles in detoxifying reactive oxygen species (ROS) and maintaining cellular redox balance.
 - 5) Reduction of oxidative stress: By scavenging free radicals and inhibiting oxidative damage, spearmint antioxidants help reduce overall oxidative stress levels in cells and tissues. Chronic oxidative stress is implicated in the pathogenesis of numerous diseases, including cardiovascular diseases, neurodegenerative disorders, and cancer.
 - 6) Protection against inflammation: Oxidative stress and inflammation are closely interconnected processes, with each exacerbating the other. Spearmint antioxidants can help mitigate inflammation by neutralizing ROS and modulating inflammatory signaling pathways.
- Overall, *Mentha spicata's* antioxidant properties support its potential health advantages, which include reducing inflammation, guarding against oxidative damage, and possibly preventing a number of chronic illnesses. Because spearmint fights oxidative stress and its negative consequences, including it in the diet or employing it as a medicinal agent may help support overall health and well-being [2, 15].

15) Antidiuretic

The diuretic effects of *Mentha spicata* (spearmint) are attributed to several mechanisms of action:

- 1) **Increased renal blood flow:** Spearmint has been shown to increase renal blood flow, which enhances the filtration rate of the kidneys. This increased blood flow helps improve the efficiency of the kidneys in filtering waste products and excess fluid from the bloodstream.
- 2) **Inhibition of sodium reabsorption:** Spearmint contains compounds that inhibit the reabsorption of sodium ions in the kidneys. By blocking the reabsorption of sodium, more sodium remains in the urine, which draws water with it, increasing urine volume and promoting diuresis.
- 3) **Stimulation of urine production:** Certain constituents of spearmint, such as flavonoids and essential oils, have diuretic properties that

stimulate urine production by increasing the secretion of water and electrolytes by the kidneys.

4) **Antioxidant effects:** Spearmint's antioxidant properties may contribute to its diuretic effects by reducing oxidative stress in the kidneys and improving their overall function. Oxidative stress can impair renal function and lead to fluid retention, so reducing oxidative stress may help promote diuresis.

5) **Anti-inflammatory effects:** The anti-inflammatory properties in spearmint may help lessen renal inflammation and enhance the kidneys' capacity to eliminate waste and extra fluid.

Overall, it is believed that a combination of enhanced renal blood flow, decreased sodium reabsorption, increased urine output, and possible antioxidant and anti-inflammatory properties explain *Mentha spicata*'s diuretic effects. To completely comprehend the precise processes at play and the therapeutic applications of spearmint as a diuretic, more study is necessary [2,15].

16) Stomachache:

Spearmint is thought to aid in stomach disorders through several mechanisms. It contains compounds like menthol, which may help relax muscles in the gastrointestinal tract, potentially easing digestive discomfort. Additionally, it may have carminative properties, reducing gas and bloating. To completely comprehend the exact causes and efficacy in treating particular gastrointestinal problems, more research is necessary [2, 15].

Physicochemical properties of spearmint oil:

The AOCS methods were used to determine the spearmint oil's physicochemical characteristics. The percentage of acid, the peroxide value, the

iodine value, the free fatty acid, the refractive index, and the density at room temperature were among these characteristics.

Antimicrobial & Antifungal activity of spearmint oil

At different doses, spearmint oil showed significant antibacterial activity against *Escherichia coli*, with inhibition zones measuring 17 mm and 15 mm, respectively. This demonstrated the strong inhibitory effect of spearmint oil against *E. coli*. According to this finding, spearmint oil significantly inhibits the growth of *E. coli* bacteria. At high and low concentrations, respectively, the spearmint oils demonstrated antibacterial activity against *Bacillus subtilis* inhibition zones (16 mm and 14 mm). According to this investigation, spearmint oil exhibited antibacterial properties against *Bacillus subtilis*. At higher and lower doses, the spearmint oil exhibited an 18 mm inhibitory zone, demonstrating its exceptional antifungal efficacy against *Candida albicans*. Furthermore, the antifungal effectiveness of spearmint oil against *Aspergillus niger* was demonstrated. The inhibitory zone was 19 mm at high concentration and 15 mm at low concentration. The study discovered that three fungus strains were tested against essential oils derived from a wide variety of plants, including caraway, chamomile, fennel, basil, coriander, rosemary, and spearmint. which are members of the species that are known to consume food. Food degradation and food poisoning can be caused by *Aspergillus* and *Candida albicans*. They found that the oils of thyme and spearmint were more efficient in inhibiting the fungus species in Niger where *Penicillium spp.* were present.

Table 4 : The antibacterial property of different concentrations of the extract against standard organisms (*E. coli* and *Bacillus subtilis*)



Oil concentration	Inhibition zone E.c	Diameter (mm) B.s
20%	17	16
10%	17	15
5%	15	14

E.c: *Escherichia coli*

14-15: Intermediate

B.s: *Bacillus subtilis*

<14mm: Resistance

>15mm: Sensitive

Table 5 : The antifungal activity of different concentrations of the extract against standard organisms (*Aspergillus niger* and *Candida albicans*)

Oil concentration	Inhibition zone As.n	Diameter (mm) C.a
20%	19	18
10%	17	17
5%	15	14

As.n: *Aspergillus niger*C.a: *Candida albicans*

>15mm: Sensitive

14-15: Intermediate

<14mm: Resistance

Benefits Of Spearmint Oil

- 1) Uplifting aroma therapy:** It is renowned for its uplifting and invigorating aroma. Inhaling the refreshing scent can help elevate mood, increase alertness, and create a positive and energized atmosphere. Diffuse the oil in your living spaces to enjoy its aromatic benefits.
- 2) Natural respiratory aid:** The menthol content in oil makes it a natural respiratory aid. Inhaling the vapor or using it in steam inhalation can help open up airways and provide relief from congestion, making it beneficial during seasonal challenges.
- 3) Cooling sensations for muscles:** When diluted and applied topically, this oil creates a cooling sensation on the skin. This makes it a popular choice for massage blends, providing a soothing and refreshing experience for tired muscles and joints.
- 4) Focus and clarity:** It is known to promote mental focus and clarity. Inhaling the aroma while working or studying may help enhance concentration and cognitive function, making it a valuable tool for tasks that require mental alertness.
- 5) Natural drug repellent:** The aromatic properties of Spearmint Oil act as a natural bug repellent. Create a DIY insect repellent spray



by mixing the oil with water and a carrier oil. This natural blend can help keep insects at bay during outdoor activities.

- 6) **Calming Nausea:** Its soothing properties extend to calming feelings of nausea. Inhaling the aroma or applying a diluted blend to the wrists may help alleviate occasional nausea or motion sickness.
- 7) **Oral health support:** It has been traditionally used for oral health. Add a drop to your toothpaste or mouthwash for a refreshing and minty boost. Its natural antiseptic properties may contribute to maintaining a healthy oral environment.
- 8) **Stress relief:** The calming and uplifting properties of oil make it effective for stress relief. Diffuse the oil in your home or workspace to create a serene and relaxing atmosphere, promoting a sense of tranquility.
- 9) **Hair and Scalp Refresher:** Incorporate oil into your hair care routine for a refreshing and invigorating experience. Add a few drops to your shampoo or create a DIY hair mist with water to revive your scalp and leave your hair smelling minty fresh [12].

Adverse Effect

Spearmint is generally safe when consumed in moderate amounts, such as in culinary uses or herbal teas. However, excessive consumption or long-term use of spearmint may lead to some adverse effects:

- 1) **Potential Hormonal Effects:** Spearmint contains compounds that may have anti-androgenic effects, which could interfere with hormone levels. In some cases, excessive consumption of spearmint tea has been associated with reduced testosterone levels in men.

- 2) **Gastrointestinal Issues:** Like many herbal teas, consuming large quantities of spearmint tea may cause gastrointestinal discomfort, including heartburn, nausea, or upset stomach.
- 3) **Allergic Reactions:** Some individuals may be allergic to spearmint or other related plants in the mint family. Allergic reactions may manifest as skin rashes, itching, or respiratory issues.
- 4) **Interactions with Medications:** There may be interactions between spearmint and some drugs, especially ones that are processed by the liver. If you take any drugs, it's best to speak with a healthcare provider before taking spearmint.

All things considered, spearmint is generally safe for most individuals when used in moderation, but it's vital to be aware of any potential risks, particularly if used excessively or over an extended period of time. Before using spearmint consistently, like with any herbal therapy, it's a good idea to speak with a healthcare provider, particularly if you have any underlying health disorders or concerns [13].

Precautions

Pregnancy: Foods containing spearmint and spearmint oil are frequently consumed. But taking significant doses of spearmint orally while pregnant may be dangerous. Spearmint tea in excessive amounts may harm the uterus. When pregnant, stay away from spearmint in high quantities.

Breast-feeding: We often eat foods that contain spearmint, including spearmint oil. Is it okay to breastfeed if you take larger spearmint dosages? There isn't enough reliable information available. Be cautious and follow meal recommendations.



Kidney disorders: Tea with spearmint may exacerbate renal impairment. Large doses of spearmint tea may exacerbate renal problems.

Liver disease: Tea with spearmint may exacerbate liver disease. Drinking a lot of spearmint tea may exacerbate liver illness [13].

Marketed Formulations

Table 5:

Dosage Form	Brand name	Company name	Dose	Price	Reference
Candy	Center fresh	Perfetti Van Melle India PVT, LTD	60 gm	Rs.68	[18]
Sampoo	VLCC Wellscience	VLCC Online Service Private Limited	200 ml	Rs. 395	[19]
Capsule	BIO KRAUTER	BIO KRAUTER LLC	1000 mg	Rs.4290	[20]
Tablet	Georganics	Fresh Geode Muthcare	215 gm	\$ 599	[21]
Tincture	Curate Essentials	Herb Pharm	30-60 Drops (1.5-3 ml)	\$ 1300	[22]
Cream	Bianca Rosa	Bianca Rosa	60 ml	\$ 54.77	[23]
Essential oil	MNT	KAZIMA	15 ml	Rs. 199	[24]
Tea	Traditional medicinals	Traditional medicinals INC	24 gm	Rs. 1150	[25]
Toothpaste	Birdsong	Crunchbase	100 gm	Rs. 400	[26]
Mouthwash	Listerine	Johnson & Johnson	500 ml	Rs. 650	[27]
Soap bar	Spearmint soap bar	Susan's soap & more	4OZ	\$ 14	[28]



Fig.no: 4

Home Remedies

Food: These peppermints are particularly useful in cooking; they're great chopped into salads, sprinkled over fruit, or combined with cilantro or basil to produce a mint pesto. To make minted veggies, we like to add a few teaspoons of freshly chopped mint to peas, green beans, carrots, cauliflower, or zucchini

Drinks: Use the ice cubes from frozen trays of strong mint tea to make refreshing summertime concoctions! Incorporate mint leaves or cubes into fresh lemonade, iced tea, or mojitos.

Tea: Since making mint tea is so simple, why buy it? Traditional tea herbs include peppermint, spearmint, apple mint, and other varieties that we commonly refer to as "mints." Simply soak five

minutes or so of fresh mint leaves in hot water before serving. After dinner, it's an excellent digestive help. One of my favorites is apple mint; it has less aftertaste and more mint flavor.

Hair rinse: For a conditioning rinse that you may rinse off or leave in, mix one part cider vinegar to one part strong mint tea (particularly rosemary). After drying, the scent of vinegar fades.

Facial astringent: In a cup of witch hazel, add a few finely minced fresh peppermint or other mint leaves. Keep in a glass jar with occasional shaking for at least one week. After a week, strain the herbs from the mixture.

Mouthwash: Chop up a quarter cup of fresh mint, oregano, basil, thyme, beebalm, or lemon balm leaves, and steep them in one quart of boiling

water. After the herbs have cooled, sieve them and keep them refrigerated. **Mint bath:** After steeping a pint of boiling water with a handful of mint leaves for around ten minutes, filter. Add to bath water for a stress-free, revitalizing soak.

Ease sunburn pain: After brewing a potent peppermint tea, let it sit in the fridge for a few hours. Use cotton pads to apply a gentle layer to the burned area.

Breath freshener: Prepare a potent peppermint tea and let it steep for a few hours in the fridge. Use cotton pads to gently apply the solution to the burned area.

Scent up a space: Add a few drops of mint essential oil to your preferred unscented cleanser to keep your house smelling great, or simply dab a cotton ball onto a lightbulb.

Mouth repellent/scented sachet: Stuff a handful of leaves or a few ties of strongly scented mint (peppermint, sage, lavender, rosemary, beebalm) inside the leg of an old nylon stocking. Hang from a rope within a garment bag, stuff into bags of folded wool clothing, or just stash in your drawers to infuse your garments with aromatherapy. To keep the fragrance fresh, frequently refresh.

Bug repellent: In the summer, it works wonders to keep ants out of the kitchen by scattering a few softly crushed mint stems near possible access sites. Every few days, you must change the mint with new material. Additionally, pack a tiny pillow with fresh thyme and spearmint and place it next to your pet's bed to keep them flea-free [14].

CONCLUSION

The plant spearmint is widely used. It has been applied to traditional medicine, food preservation, and flavor improvement. According to the study, spearmint has antibacterial, antifungal, and antiseptic qualities that make it a good choice for

food preservation. To evaluate the antibacterial effects of spearmint and spearmint oil on other organisms that cause foodborne diseases and food degradation, more research is necessary. The ethnobotanical, phytochemical, and pharmacological characteristics of *M. spicata* (*M. viridis*) were investigated in this work. Numerous scientific investigations have demonstrated the plant's intriguing biological properties, and it is commonly utilized in traditional medicine to cure various conditions. This species has a high concentration of bioactive compounds, especially terpenoid components, which have significant biological benefits, according to phytochemical studies. A range of pharmacological properties, including antibacterial, antiparasitic, insecticidal, anti-inflammatory, antidiabetic, antioxidant, diuretic, analgesic, antipyretic, antihemolytic, and protective activities, were found in *M. spicata* extracts and essential oils, according to pharmacological biology investigations. But because these effects were often investigated using in vitro and in vivo techniques, more study is required to confirm these results and identify the mechanisms of action. According to certain research, *M. spicata* is a safe plant based on its toxicity. However, clinical trials were not conducted, despite the fact that they are desperately needed to advance the plant's use, especially in light of toxicological studies that have shown the plant to have an exceptional safety profile. To fully comprehend the bioavailability and mechanisms of action of the bioactive molecules derived from *M. spicata* on different targets, further investigation is needed into the pharmacodynamic and pharmacokinetic aspects of these compounds.

REFERENCES

1. Review on Health Benefits of Spearmint (*Mentha spicata* L.) and Its Inter-cropping Advantage with Maize (*Zea mays* L.)



- <https://auctoresonline.org/article/review-on-health-benefits-of-spearmint-mentha-spicata-l-and-its-inter-cropping-advantage-with-maize-zea-mays-l#:~:text=The%20main%20bioactive%20compounds%20in,and%20ascorbic%20acid%20in%20leaves>
2. 2) Medicinal Uses, Phytochemistry, Pharmacology, and Toxicology of *Mentha spicata*
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9019422/>
3. Medicinal Uses, Phytochemistry, Pharmacology, and Toxicology of *Mentha spicata*
https://www.researchgate.net/publication/358285932_Medicinal_Uses_Phytochemistry_Pharmacology_and_Toxicology_of_Mentha_spicata
4. The traditional uses, phytochemistry and pharmacology of spearmint (*Mentha spicata* L.): A review
<https://www.sciencedirect.com/science/article/abs/pii/S0378874121004931>
5. Phytochemical Characterization of *Mentha spicata* L. Under Differential Dried-Conditions and Associated Nephrotoxicity Screening of Main Compound with Organ-on-a-Chip
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6190883/>
6. Geographical Distribution- Isa Telci, Nermin Incekara Sahbaz, Gungor Yilmaz, Mehmet E Tugay, Agronomical and chemical characterization of spearmint (*Mentha spicata* L.) originating in Turkey
https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=collection+of+spearmint+&btnG=#d=gs_qabs&t=1710433425713&u=%23p%3DeHbtwlqQAVMJ Economic Botany 58 (4), 721-728, 2004.
7. Collection- Jingzhe Li, Chamari S. Wijesooriya, Sadie J. Burkhaw, Linda K. B. Brown, Beatrice Y. Collet, John A. Greaves, and Emily A. Smith. Measuring Plant Metabolite Abundance in Spearmint (*Mentha spicata* L.) with Raman Spectra to Determine Optimal Harvest Time-
<https://pubs.acs.org/doi/10.1021/acsfoodscitech.1c00047> ACS Food Sci. Technol. 2021, 1, 6, 1023–1029
8. Cultivation- Antonios Chrysargyris, Eleni Koutsoumpeli, Panayiota Xylia, Anastasia Fytrou, Maria Konstantopoulou and Nikolaos Tzortzakis. Organic Cultivation and Deficit Irrigation Practices to Improve Chemical and Biological Activity of *Mentha spicata* Plants
<https://www.mdpi.com/2073-4395/11/3/599> Agronomy 2021, 11(3), 599.
9. Polycystic ovary syndrome: Causes, symptoms, pathophysiology, and remedies
<https://www.sciencedirect.com/science/article/abs/pii/S2451847623000040>
10. Benefits of Spearmint Tea and Essential Oil
https://www.healthline.com/nutrition/spearmint#TOC_TITLE_HDR_9
11. Bioactive properties of the aromatic molecules of spearmint (*Mentha spicata* L.) essential oil: a review
<https://pubs.rsc.org/en/content/articlelanding/2022/fo/d1fo04080d>
12. Benefits of spearmint oil -
<https://www.avinaturals.com/product/spearmint-oil/>
13. Spearmint - Uses, Side Effects, Precautions, Interactions
<https://www.webmd.com/vitamins/ai/ingredientmono-845/spearmint>
14. Uses for Mint Leaves
<https://www.almanac.com/12-uses-mint-leaves-health-home>
15. Ayurvedic Health Benefits of Mint Leaves
<https://birlaayurveda.co.in/ayurvedic-health-benefits-of-mint-leaves/#:~:text=It%20has%20been%20used%20>



- 20in,pitta%2C%20and%20heals%20respirato
ry%20problems
16. The Cultivation of Peppermint and Spearmint
<https://books.google.co.in/books?hl=en&lr=&id=VGQ5AQAAMAAJ&oi=fnd&pg=PA4&dq=related:LsVOBf59FJ0J:scholar.google.com/&ots=g-hPNN5p-v&sig=pLekIOedmS7rLkzWEUY-ZmhSMdo#v=onepage&q&f=false>
 17. CANDY
https://www.google.com/imgres?imgurl=https://www.bigbasket.com/media/uploads/p/xxl/40209247_2-center-fresh-chewy-mints-spearmint-flavour-candy.jpg&tbnid=tnGj1nl0hYzoXM&vet=1&imgrefurl=https://www.bigbasket.com/pd/40209247/center-fresh-chewy-mints-spearmint-flavour-candy-60-g-pouch/&docid=t0ITwOpSmC_X_M&w=900&h=900&hl=en-GB&source=sh/x/im/m1/4&kgs=6563547a6a03ed7e&shem=trie
 18. VLCC Wellscience Tea Tree Spearmint Anti Dandruff Shampoo
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 19. CAPSULE
<https://www.google.com/imgres?imgurl=https://images-cdn.ubuy.co.in/65172aa6b5750c11227f6438-mauwe-herbs-spearmint-capsules.jpg&tbnid=uTTbz9deFXCh1M&vet=1&imgrefurl=https://www.ubuy.co.in/product/1494P868-spearmint-100-vegan-capsules-1000mg-organic-spearmint-leaf-mentha-spicata&docid=m26H6Qyb3oLPnM&w=1500&h=1463&hl=en-GB&source=sh/x/im/m1/4&kgs=60dd365348805ceb&shem=trie>
 20. georganics Mouthwash Tablets - Cosmeterie Online Shop
<https://images.app.goo.gl/1TVkJ6JpJcYaVd1o6>
 21. Spearmint Tincture
<https://curateessentials.com/products/spearmint-tincture-2-oz>
 22. Spearmint Leaf – Cream
<https://www.amazon.com/Spearmint-Leaf-Cream-428628-Pack/dp/B076K9Z8QS>
 23. Essential oil -
https://www.google.com/imgres?imgurl=https://m.media-amazon.com/images/I/61k-DUae-CL._AC_UF1000,1000_QL80_.jpg&tbnid=zSKPuaEHxwslIM&vet=1&imgrefurl=https://www.amazon.in/MNT-Spearmint-Essential-Therapeutic-Aromatherapy/dp/B07F6CH5Y7&docid=J6c6byQFG4QjSM&w=951&h=1000&hl=en-GB&source=sh/x/im/m5/4&kgs=259c717e97227439&shem=trie
 24. Tea-
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 25. Toothpaste-
<https://images.app.goo.gl/o5u1DatEK84x1YeP6>
 26. Mouthwash -
<https://images.app.goo.gl/52HG9um3KmD6haiQ9>
 27. Soap bar-
<https://images.app.goo.gl/sCdnfHAzr3T8TrbL8>
 28. Benkhniq O., Fatiha B. A., Salhi S., Mohamed F., Douira A., Zidane L. Catalogue des plantes médicinales utilisées dans le traitement du diabète dans la région d'Al Haouz-Rhamna (Maroc) The Journal of Animal and Plant Sciences . 2014;23(1):3539–3568. [Google Scholar]
 29. Bouyahya A., Abrini J., Et-Touys A., Bakri Y., Dakka N. Indigenous knowledge of the use of medicinal plants in the North-West of Morocco and their biological activities.



- European Journal of Integrative Medicine . 2017;13:9–25. doi: 10.1016/j.eujim.2017.06.004. [CrossRef] [Google Scholar]
30. El-hilaly J., Hmammouchi M., Lyoussi B. Ethnobotanical studies and economic evaluation of medicinal plants in Taounate province (Northern Morocco) Journal of Ethnopharmacology . 2003;86(2-3):149–158. doi: 10.1016/s0378-8741(03)00012-6. [PubMed] [CrossRef] [Google Scholar]
31. Idm'hand E., Msanda F., Cherifi K. Ethnopharmacological review of medicinal plants used to manage diabetes in Morocco. Clin. Phytoscience. . 2020;6(1) [Google Scholar]
32. Fakchich J., Elachouri M. Ethnobotanical survey of medicinal plants used by people in Oriental Morocco to manage various ailments. Journal of Ethnopharmacology . 2014;154(1):76–87. [PubMed] [Google Scholar]
33. Labiad H., Et-Tahir A., Ghanmi M., et al. Ethnopharmacological survey of aromatic and medicinal plants of the pharmacopoeia of northern Morocco. Ethnobotany Research and Applications . 2020;19:1–16. doi: 10.32859/era.19.45.1-16. [CrossRef] [Google Scholar]
34. Orch H., Zidane L., Douira A. Ethnobotanical study of plants used in the treatment of respiratory diseases in a population bordering the forest of Izarène. Journal of Pharmacy & Pharmacognosy Research . 2020;8(5):392–409. [Google Scholar]
35. Salhi N., Bouyahya A., Fettach S., Zellou A., Cherrah Y. Ethnopharmacological study of medicinal plants used in the treatment of skin burns in Occidental Morocco (area of Rabat) South African Journal of Botany . 2019;121:128142.doi: 10.1016/j.sajb.2018.10.038. [CrossRef] [Google Scholar]
36. El Abbouyi P. A., Filali-Ansari N., Khyari P. S., Loukili H. Inventory of medicinal plants prescribed by traditional healers in El Jadida city and suburbs (Morocco) International Journal of Green Pharmacy . 2014;8(4):242251.doi: 10.4103/09738258.142681. [CrossRef] [Google Scholar]
37. El Hafian M., Benlandini N., Elyacoubi H., Zidane L., Rochdi A. Étude floristique et ethnobotanique des plantes médicinales utilisées au niveau de la préfecture d'Agadir-Ida-Outanane (Maroc) Journal of Applied Biosciences . 2014;81(1):71987213.doi: 10.4314/jab.v81i1.8. [CrossRef] [Google Scholar]
38. Chauhan R. S., Kaul M. K., Shahi A. K., Kumar A., Ram G., Tawa A. Chemical composition of essential oils in *Mentha spicata* L. accession [IIIM(J)26] from North-West Himalayan region, India. Industrial Crops and Products . 2009;29(2–3):654–656. doi: 10.1016/j.indcrop.2008.12.003. [CrossRef] [Google Scholar]
39. Jain P. K., Soni A., Jain P., Bhawsar J. Phytochemical analysis of *Mentha spicata* plant extract using UV-VIS, FTIR and GC/MS technique. Journal of Chemical and Pharmaceutical Research . 2016;8(2):1–6. [Google Scholar]
40. Tewari G. Essential oil composition of the aerial parts of *mentha spicata* L. World Journal of Pharmaceutical Research . 2017;6:853–859. doi: 10.20959/wjpr20176-8518. [CrossRef] [Google Scholar]
41. Aziz M. A., Adnan M., Khan A. H., Shahat A. A., Al-Said M. S., Ullah R. Traditional uses of medicinal plants practiced by the indigenous communities at Mohmand Agency, FATA, Pakistan. Journal of Ethnobiology and

- Ethnomedicine . 2018;14(1):1–16. [PMC free article] [PubMed] [Google Scholar]
42. Govindarajan M., Sivakumar R., Rajeswari M., Yogalakshmi K. Chemical composition and larvicidal activity of essential oil from *Mentha spicata* (Linn.) against three mosquito species. *Parasitology Research* . 2012;110(5):2023–2032. doi: 10.1007/s00436-011-2731-7. [PubMed] [CrossRef] [Google Scholar]
43. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7767097/>
44. Evaluation of possible toxic effects of spearmint (*Mentha spicata*) on the reproductive system, fertility, and number of offspring in adult male rats <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4224956/>
45. Combined impact of lemongrass and spearmint herbs on performance, serum metabolites, liver enzymes, and meat quality of broiler.

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