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Review Article

STUDY ON ADVANCED APPLICATION OF MINT OIL

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ABSTRACT

Peppermint is most popular in traditional medicines such as herbal tea and essential oil. It is a cultivated natural hybrid of *Mentha aquatic L.* (watermint) and *Mentha spicata L.* (spear mint) in many parts of the world.

It is extracted by steam distillation and shows potential actions like antioxidant, antiallergic, antimicrobial, antiviral, antimycotic, an titoxigenic, antifungal, antiparasitical, anti-inflammatory, antiseptic, insecticidal and antitumor. The unique property of mint is analgesic (pain-killing). These properties contribute to its applications and hence it is widely used in pharmaceutical, food industries, agricultural field and is also effective on gastrointestinal tissue, respiratory system, central and peripheral nervous system. This study focuses on recent advances and application of mint oil.

Keywords: Peppermint, essential oils, antimicrobial activity, mint, production, analgesic, anti- inflammatory

1. INTRODUCTION

Herbs are a boon to traditional medicine practiced from ancient times. Plants are a potential source of traditional ayurvedic medicine, either in its natural form or processed have been used in curing many ailments. It provides a wide range of bioactive compounds present in different parts of plants that can be used for alternate therapy [1].There are different plants of medicinal value but our interest lies on peppermint or commonly known as mint Leaves.

1.1. Mint Leaves

Carl Linnaeus was renowned for first describing peppermint from plants and leaves in England during 1753 [2]. *Mentha* is derived from Greek word mintha [3], very commonly known as mint or peppermint. They are rarely yearly herbs aromatic and perennial [4]. It has almost 25 perennial species, belongs to the genus Mentha of the Lamiaceae family [5]. Mint leaf is as shown in fig. 1.

Fig. 1: Mint Leaves[1]

It is distributed wildly and can be seen in almost all environmental conditions especially wet and moist soil [6]. It can also sustain sun heat and grows well even at this condition [7]. Table1 shows its taxanomy.

In England, till 18th century the hybridization and cultivation of peppermint was not done. It was only cultivated during 1500 BC being considered as a hybrid of water mint and spearmint and thereafter it was used in cooking [8]. Before 2000 BC mint has been used for medicinal purposes, but until 1771 menthol was not isolated [9]. Rosmarinic acid, several flavonoids, primarily eriocitrin, luteolin and hesperidin are the phenolic constituents of peppermint leaves [10]. Menthol, menthone and cineol are the main volatile components present. Mint does not produce seeds being a perennial plant [11].

Table1. Peppermint Taxanomy [3]

Kingdom	Plantae
(unranked)	Angiosperms
(unranked)	Eudicots
(unranked)	Asterids
Order	Lamiales
Species	Menthe
Binomial name	*Mentha piperita*

1.2. Mint Oil

When the mint leaves are crushed, ground and steam distilled, the volatile distillate thus obtained is said to be mint oil [12]. It is a carminative naturally occurring. Numerous minerals and nutrients including manganese, iron, magnesium, calcium, folate, potassium, and copper are present in peppermint oil. It also contains omega-3 fatty acids, Vitamin A

and Vitamin C [13]. The chemical constituents of peppermint are rich in menthol, menthone and menthyl esters (menthyl acetate) [14]. Dried peppermint typically has 0.3-0.4% of volatile oil containing menthol (7-48%), menthone (20-46%), menthyl acetate (3-10%), menthofuran (1-17%) and 1, 8-cineol (3-6%). It also contains small limonene, pulegone, caryophyllene and pinenel[15] as shown in Fig 2.

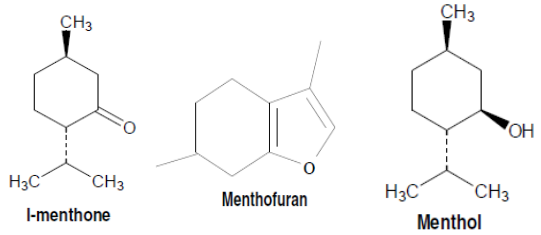

Fig. 1: Structures of components of mint oil [11]

Sustrikova and Salamon [16] in 2004, claimed oil is contained in little vesicles existing throughout the plant, and visible in the leaves. According to Jorge Gutierrez et al [17] essential oils are oily liquids that are fragrant and volatile. They are found in the stem, bark and leaves of the plant, formed by some specialized group of cells. The oil is commonly stored in bags like glands on the lower sides of the leaves.

Arun K. Tripathi et al [18] declared that terpenes, benzene derivatives, hydrocarbons and other miscellaneous compounds are the four main groups of volatile components present in essential oil. They are the complex secondary metabolites, having strong odour. The nature of oil is lipophilic.

According to Shrivastava Alankar [19] peppermint oil have its own characteristic odour and taste, it appears to be yellow, pale greenish-yellow in colour or may be colourless. The oil is soluble in 70% ethanol and slightly soluble in water**.**

Salient properties of mint oil are as shown in Table 2.

Table 2. Properties of Mint Oil [12]

S. N.	Properties	Values
1	Molecular weight	965.51672 g/mol
2	Density	0.896-0.908 g/cm^3 (25 deg)
3	Molecular Formula	$C_{62}H_{108}O_7$
4	Boiling point	82-93°C.
5	Solubility	Slightly soluble in water and alcohol
6	Specific Gravity	0.90 g/mL at 20°C.
7	Refractive Index	1.421

2. APPLICATIONS OF MINT OIL

Gokalp Iscan et al [20] suggested that apart from using the mint oil in food and herbal tea preparation, it can also be used for medicinal therapy that includes carminative, anti-inflammatory, antispasmodic, antiemetic, diaphoretic, analgesic and stimulant application. It can be further used in the treatment of nausea, anorexia, ulcer, bronchitis, sinus, toothache, itching and skin irritation, cold and flu, headache muscle pain, infections caused by bacteria and virus. Release stress, mental exhaustion and depression, and it helps in strengthening the immune system. It also acts as mosquito repellent.

In 2002 Patra et al [21], showed that *Mentha spicata* oil is used as a nitrification inhibitor for maximum yield of Japanese mint. The sensory test and effects of the fragrance of peppermint oil on human inhalation was potentially carried out by many researches and many of them declared harmless. Sara Burt [22] in 2004 carried out antibacterial activity of essential oils on some bacteria and exhibited that gram positive bacteria is more susceptible than gram negative bacteria. Grigoleit et al [23] stated in 2004, the choleretic and antifoaming effects of peppermint oil showed an added advantage to medicinal application.

Benjamin Kligler and Sapna Chaudhary [14] in 2007 exhibited the potential effect of mint oil in reducing spasm, irritable bowel syndrome (IBS) and non-ulcer dyspepsia. This was already mentioned by Pittler and Ernst [24] in 1998,in addition,it can be used as an excellent pain killer. Gutierrez et al [25] in 2008 observed that peppermint oil showed excellent antimicrobial properties; hence it acts against the bacteria that affect food and food-borne pathogens. Alok et al [26] in 2012 demonstrated the potential benefit of increased productivity and better soil condition by recycling of menthol mint via vermicomposting. Abdelrazzaq et al [27] in 2013 showed that antiradical values were significantly higher for leaf under soil cultivation than leaf under soiless cultivation.

In a comparative study, experimented by Mei et al [28] in 2013 between peppermint and chocolate mint, antimicrobial activity of peppermint was stronger and it also showed better properties than the other. Neha Sambe et al [29] in 2014 showed that the mint oil and its three lead compounds showed transitional properties and hence has a significant effect on the secretion of enzymes during infection by the fungal cell. According to Punitha et al in 2014 [30] inhibition zone diameters obtained in well diffusion assays showed the effectiveness of essential oils by forming methicillin-resistant against biofilms.It also showed nearly equal antimicrobial effects on both gram-positive and gram-negative bacteria.

3. CONCLUSION

Mint oils are one of the most popular and widely used essential oils because of its components such as menthol and isomenthonone [31] and the effective properties of these components contribute a lot to medicinal application, further development and advanced research is carried to enhance its properties and increase its applications making peppermint a valuable and precious plant.

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