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A REVIEW ON: THE MEDICINAL BENEFITS OF PEPPERMINT (MENTHA PIPERITA L.)

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ABSTRACT

Aromatic herbs are in high demand in the biotechnology, cosmetics, pharmaceutical, and food industries, which has raised their market prices. Due to its remarkable health benefits, peppermint (Mentha piperita L.), a well-known medicinal herb, is well recognized by the pharmaceutical and food processing industries. The effectiveness of peppermint in preventing human diseases should be the focus of additional research on this plant. There are not many clinical trials for peppermint tea, and there are few investigations on peppermint leaf in humans. Although caution has been advised when using peppermint oil therapy in patients with GI reflux, a hiatal hernia, or kidney stones, adverse effects to peppermint tea have not been observed.

Menthone and menthyl esters, particularly menthyl acetate, are also present in the oil. The volatile oil found in dried peppermint normally contains menthol, menthone, menthyl acetate, menthofuran, and 1,8-cineol. Additionally, peppermint oil contains trace levels of numerous other substances, such as limonene, pulegone, caryophyllene, and pinene. According to the German Commission E monographs, peppermint oil and leaves have been taken internally to treat irritable bowel syndrome, catarrh of the respiratory system, and inflammation of the oral mucosa, as well as to function as an antispasmodic for the upper gastrointestinal tract and bile ducts. The antiviral, antibacterial, anti-inflammatory, antifungal, anti-asthmatic, allopathic, spasmolytic, anti-headache, anti-septic, and radioactive characteristics of peppermint are reviewed in detail in the current work. Consequently, there is a huge demand for more studies on peppermint.

Keyword: Peppermint, Peppermint Oil, Medicinal Herbs, Drying Of Mints.

I. INTRODUCTION

Members of the Labiatae (Lamiaceae Family) are referred to as mint leaves (Mentha spicata L.). It is a sizable family of annual or perennial herbs that is widely cultivated throughout the world to benefit from its unique herbal properties. They produce quadrangular green or purple stalks and are herbaceous rhizome plants [4]. Because of the presence of two groups of secondary metabolites, including monoterpenoids found in essential oils and several structural kinds of phenolic compounds, mint species are widely used in both traditional and modern medicine. It is well recognized that essential oils have antibacterial, antispasmodic, carminative, and antiviral properties [5]. Medicinal plants are used by people all over the world and have tremendous potential benefits for human societies. Even though many of their health benefits have not yet been fully explored, their medicinal actions can be taken into consideration when treating current or potential ailments [6.] Peppermint leaves, leaf extracts, and water are all used in preparations; however, the plant is grown primarily for its essential oil, which is derived by distilling just-ground leaves. In addition to menthol and menthone, PO also contains pulegone, menthofuran, and limonene. The chemical composition of PO can change depending on the stage of plant development, the location, and the processing circumstances [7]. The ratio of the various components was significantly impacted by the drying technique as well. After experimenting with drying mint common (Mentha villosaHuds) at temperatures ranging from 50 to 70°C, Radünz (2004) concluded that the air temperature of 50°C is recommended to obtain the highest essential oil content and higher concentration of the main active ingredients [8].

Mint (Mentha spicata), amaranth (Amaranthus gangeticus), curry leaves (Murraya koenigii), and gogu (Hibiscus cannabinum) were the green leafy vegetables used. After establishing the necessary conditions for blanching, such as blanching time, temperature, and blanching treatment solution, all four green leafy vegetables were blanched before drying [9].

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II. BOTANICAL DESCRIPTION

Botanical name: Mentha piperita L.

Family: Lamiaceae

Properties: aromatic, carminative, anti-emetic, stimulating nervine.

Parts used: aerial portion (mainly leaves, flowers).

Stem:

Usually square erect or ascending, slightly branched, and upper portion always quadrangular (Figure 1).

Rhizomes:

They are wide spreading and fresh with fibrous roots in the herb.

Flower:

It is 6-8 mm long, purplish, occurs in thick, terminal, spicoid racemes of verticillasters. Each flower shows tubular calyx with 5 sharp, hairy teeth along with purplish, irregular, 4 cleft corolla, 4 short stamens, 4-celled ovary, and projecting style ending with bifid stigma in the herb (Figure 2).

Leaves:

They are opposite, petiolate having 4-9 cm long and 1.5- 4 cm broad, pointed, and dark green on the upper surface of the herb (Figure 3).

Fruit:

Fruit contains four ellipsoidal nutlets in the herb, which is pale purplish or pinkish in colour [39].

Figure 1: Mentha piperita leaves

Figure 2: Mentha piperita

Figure 3: Mentha piperita

III. CHEMICAL CONSTITUENTS

The main ingredient in peppermint essential oil, menthol, is primarily responsible for the antispasmodic properties of the drug. Limonene (1.0-5.0%), cineole (3.5-14.0%), menthone (14.0-32.0%), menthofuran (1.0-9.0%), isomenthone (1.5- 10.0%), menthyl acetate (2.8-10.0%), isopulegol (0.2%), menthol (55.0%), pulegone

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(4.0%), and carvone (maximum 1.0) are some of the ingredients of peppermint oil.[2]. After chewing, peppermint leaves provide a refreshing flavor and a persistent, sweetish aroma. The peppermint is a potent and beneficial source of a wide range of minerals, including Na, Mg, K, Ca, Cr, Fe, Co, Cu, Zn, and Se [1]

IV. PHARMACOLOGICAL ACTION

Anti-viral effects:

In 96-well plastic plates, hep-2 cell cultures were created and cultured for two days at 37 °C with CO2 (5%) incubator. When the cell culture reached confluence, the media was then taken out of the cells. In 96-well plates of Hep-2 cell monolayers, a virus suspension (0.1 mL) containing 50% tissue culture-infective dose (TCID50) and maintenance media (0.1 mL) with an appropriate concentration of the test sample were added. The highest concentration used was the maximal non-cytotoxic concentration [3]. Since many viruses have remained resistant to prevention or treatment longer than other microbes, infectious viral illnesses continue to be a significant global problem [16].

Anti-bacterial Properties:

Due to the widespread use of medicinal plants in modern medicine, plant secondary metabolites are becoming more and more sought after as antimicrobial agents [10,11].].

PO and extracts showed a good antimicrobial activity against:

1) Escherichia coli, 2) Salmonella pullorum, 3) Comamonas terrigena, 4) Streptococcus faecalis, 5) Acinatobacter sp, 6) Streptococcus thermophiles, 7) Lactobacillus bulgaricus, 8) Staphylococcus pyogenes, 9) Staphylococcus aureus, 10) Streptococcus pyogenes, 11) Serratia marcescens, 12) Mycobacterium avium, Salmonella typhi, 13) Salmonella paratyphi A/B, 14) Proteus vulgaris, 15) Enterobacter aerogenes, 16) Yersinia enterocolitica and 17) Shigella dysenteriae [12,13-15].

Anti-fungal Activity:

According to in-vitro research, PO and extracts are effective fungicides against dermatophytic fungus, Candida albicans, and Aspergillus albus [17]. According to research figures, peppermint effectively combats the fungi Candida albicans, Aspergillus albus, and dermatophytes [18].

Allelopathic Effects:

Allelopathy is one type of stress that has an impact on the quantity, quality, and growth of crops in agro-ecosystems [19,20]. Allelopathy is a crucial component of the agricultural ecological system and affects every plant's maturity, worth, and potential for development [21,22,23].

Antispasmodic effects

By lowering calcium influx in the large intestine and jejunum [26], PO relaxes gastrointestinal smooth muscle [25]. Atrial and papillary muscles from rats and guinea pigs exhibit inhibition of calcium channel function in response to PO and menthol [27,28]

Anti-inflammatory properties:

Peppermint's anti-inflammatory qualities Numerous terrible diseases, such as tumours, septic shock, atherosclerosis, diabetes, and abdominal obesity (fatness), are thought to be caused in large part by inflammation [28]. According to numerous investigations, peppermint chemicals play important roles in reducing angiogenesis and inflammation [29–31].

These plants' extracts have anti-inflammatory effects on rat and mouse cotton pellet granuloma tests and xylene-induced ear oedema [37].

Allelopathic Effects:

Inhaling the vapor of peppermint oil is used to treat respiratory congestion. Coughs, bronchitis, and throat and oral mucosal inflammation are all treated with peppermint tea. Using essential oilstuberculosis58In complex individuals with infiltrative pulmonary oil vapour, peppermint is inhaled to relieve respiratory congestion. Coughs, bronchitis, and throat and oral mucosal inflammation are all treated with peppermint tea. Complex people with infiltrative pulmonary tuberculosis may benefit from using essential oil.

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Allelopathy is one type of stress that has an impact on the quantity, quality, and growth of crops in agro-ecosystems[32–33]. According to a report, tomato seedling growth can be inhibited by peppermint water extract (10% v/v concentration)[34]. The agricultural ecological system's primary component, allelopathy, affects the maturity, value, and Coughs, bronchitis, and throat and oral mucosal inflammation are all treated with peppermint tea. Complex people with infiltrative pulmonary tuberculosis may benefit from using essential oil.

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Anti-carcinogenic:

Effects In the treated animal, Mentha Piperita leaf extract significantly inhibited G1 cell cycle arrest, mitochondrial-mediated apoptosis, and perturbed the oxidative balance in a dose- and time-dependent manner. [35].

Radio protective activity:

In mice bone marrow, the leaf extract of these plants demonstrated radioprotective qualities against radiation-induced chromosomal damage [36].

Anti-diabetic effects:

According to studies, administering peppermint juice to animals has been shown to lower their blood sugar, cholesterol, low-density lipoprotein cholesterol (LDL-c), and triglyceride levels [38].

Drying of peppermint and other medicinal leaves:

Fresh and dried peppermint leaves can be used in a variety of ways. The dried leaves are widely used in both traditional remedies and other cuisines (Hedrick, 1972) [42]. While drying peppermint leaves prolongs shelf life and avoids deterioration, it also has the potential to change their flavour and vivid aroma [43]. The components most vulnerable to drying are volatile fragrance molecules. Several variables, including drying conditions (temperature, air velocity), moisture content, plant variety and age, environment, soil, and harvesting technique, affect changes in the concentrations of the volatile compounds of mint during drying [44-45-46-47]. Evaluated six drying treatments (sun, shade, oven 50 °C, oven 70 °C, microwave, and freeze-drying) for essential oil yield, composition and color characteristics of Thymys daenensis subsp. daenensis. Celak leaves.

V. MEDICINAL BENEFITS

The entire plant is medicinal in and of itself. Tea made from dried peppermint leaves is beneficial for treating oral mucosal and throat inflammation, as well as cough and bronchitis. The herb has historically been used to treat issues like indigestion, anorexia, flatulence, diarrhoea, nausea, vomiting, and morning sickness. Additionally, the medication has spasmolytic properties, which lessens gas and cramping in the abdomen. Menthol oil is used to make toothpaste, and it also helps women who experience menstruation cramps. Today,

disorders like Crohn's disease, irritable bowel syndrome, gall bladder disease, and biliary tract ailments are treated with species like M. Piperita [48-49]. In addition to its use as a flavouring or fragrance additive in food, toothpaste, mouthwash, and other items, peppermint may also be used medicinally. Due to its fresh, pleasant flavour and aroma, peppermint is a widely used flavour. Peppermint tea may provide additional advantages for battling bad breath in addition to helping to freshen one's breath. Tea can also be made with dried or fresh peppermint (Mentha piperita) leaves. There are several contemporary goods that contain peppermint, including toothpaste, candies, and teas. In addition to being popular due to its flavour, peppermint tea may also have a variety of possible health advantages [50].

VI. CONCLUSION

Because of its extensive and varied pharmacological potential, it can be said that M. Piperita is a well-known herb around the world. This plant has excellent potential for treating human ailments and has a promising future in international trade. Even though the peppermint plant plays a significant economic and positive function in human society, studies must consider its slight toxicity and side effects. The molecular mechanism of PO in human health will need to be determined by future in vivo human investigations. PO is currently the most widely marketed essential oil in the entire globe, and it is regarded as a valuable target for both food and medicinal research in many affluent and developing nations. Due to its medical properties, this herb is now quite popular in the Indian region as well. As a result, it has been grown for the exportation of volatile oil. Herbs have drawn the interest of scientists in the biotechnology, cosmetic, pharmaceutical, and food sectors since antiquity. They are now employed for a variety of industrial processes, including medicine, flavouring, beverage production, dyeing, and fragrance production.

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