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## MENTHA – A REVIEW

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**ABSTRACT:** *Mentha* (also known as mint, isa genus of plants in the family Labiatae /Lamiaceae). The genus *Mentha* L. is distributed all over the world and can be found in many environments. Mint is a popular and well-known herb growing all over the world and includes many varieties and hybrids. *Mentha* species, one of the world's oldest and most popular herbs, are widely used in cooking, cosmetics, and alternative or complementary therapy, mainly to treat rheumatic pains, aching head, and digestive disorders. Aerial parts of the plant are refrigerant, stomachic, carminative, stimulant, and diuretic. They possess antispasmodic and emmenagogue properties and are also given to stop vomiting and to treat jaundice. The oil is a valuable anti-neuralgic<sup>66</sup>. The peppermint has been used in the pastin herbal medicine dating back to the ancient Egyptian, Greek, and Roman times Murray<sup>1</sup>.

**INTRODUCTION:** The peppermint, *Mentha* × *piperita* L., is a plant that represents the oldest and conventional medicinal herbs used in both Eastern and Western civilization until modern time. The peppermint has been used in herbal medicine in the past, dating back to ancient Egyptian, Greek, and Roman times<sup>1</sup>. All the basic requirements of individuals have been talented by plants from ancient time<sup>2</sup> pointed out the prominent role of plants in human life. Modern nation, despite its far-reaching progression, still depends mainly and primarily on plant products. Thus, the extent of plant science and its imperative cost is vast and varied.

*Mentha arvensis* (English name field mint, corn mint. Hindi, Being., Mar., Gui. and Tel. - Podina, Pudina KAN. - Chetni rnaragu). Japanese mint is a vital variety in Japan, Taiwan, Brazil, Australia, and the USA. *Mentha arvensis* (Labiatae / Lamiaceae) is a multipurpose medicinal, aromatic plant.

Mint is a popular and well-known herb growing all over the world and includes many varieties and hybrids. Mint is implicit in coming originally from the East and introduced to Europe by way of North Africa and has become naturalized in the Americas. Mints are cherished in the United States for their essential oils, which had a worth of about \$ 74 million in 1906<sup>3</sup>. Practice of *M. longifolia* in the treatment of throat irritation, mouth, and sore throat is extensive<sup>4</sup>. Studies have shown that plants of the genus *Mentha* possess unusual antimicrobial behaviour<sup>5</sup>, mainly due to the presence of oxygenated monoterpenes in their chemical composition<sup>6, 7, 8, 9</sup>.

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The essential oil of *M. longifolia* has revealed enjoyable antimicrobial activity against *Escherichia coli*, *Salmonella typhimurium*<sup>10</sup>. The most significant hazard with mint growing is the option of rust developing on the foliage. Because of mints sterility, enrichment of their tolerance or resistance to pests is not possible using the conservative breeding method. Peppermint (*Mentha piperita* L.) is one of the most widely consumed single ingredient herbal teas. Peppermint tea, brewed from the plant leaves, and the essential oil of peppermint are used in conventional medicines.

Peppermint tea is used to treat coughs, bronchitis, and inflammation of oral mucosa and throat. Proof-based research regarding the bioactivity of this herb is reviewed. Peppermint oil with green tea polyphenols might be valuable as anti-allergic<sup>11</sup>. Previous studies have shown antiviral<sup>12, 13</sup>, antibacterial, antifungal<sup>14, 15, 16</sup>. The genotype-reliant regeneration may be due to differences in genetic control of organogenesis by the different mint genotypes<sup>17</sup>.

*Mentha arvensis* yields oil; its trade name is Japanese mint oil. The oil is usually distilled from partially dried herbs, leaves and flowering tops gives the highest yield on steam distillation. Mint oil is used as an exchange for peppermint oil, which resembles its Physico-chemical properties. Oil of *Mentha piperita* L. (peppermint oil), a widely used essential oil, was evaluated for larvicidal activity against different mosquito species<sup>18</sup>. In addition to menthol, which is the main component, the oil contains methyl acetate, menthone, and minor amounts of pipertone,  $\alpha$ -pinene, furfural, 1-limonene, camphene, caryophyllene, d-3 octanol,  $\alpha$ - $\beta$  hexenic acid, and other free and esterified fatty acids.

The oil distilled from plants grown in Jammu contains 70-80% menthol; dementholized oil has the consequent composition; menthol, 44.8; methyl acetate, 24.4; menthone, 24.6; and hydrocarbons, 6.2%,  $\alpha$ -pinene, 1-limonene, caryophyllene, cadinene, and unidentified sesquiterpene has been identified. Peppermint (*M. piperita*) oil is one of the most admired and widely used essential oils, primarily because of its main components' menthol and menthone<sup>19</sup>.

The impact of several parameters like menthone predecessor or cyclodextrins feeding alone or both together, fungal elicitor, Agro bacterium gel mediated calli on the stimulation of menthol production in the suspension culture of *Mentha piperita*<sup>20</sup>. Mint oil is used for flavoring purposes, foods, beverages. The phenolic constituents of the leaves include rosmarinic acid and several flavonoids, primarily eriocitrin, luteolin, and hesperidin. The major volatile components of the essential oil are menthol and menthone<sup>21</sup>. Dementholized oil is in use for mouthwash, toothpaste, etc. In India, menthol production is nonpromising because of the constrained crop growing.

Thus, there is a need to increase the cultivation of this herb to guarantee round the year availability. Tissue culture provides an easy and economical way for international trade of disease-free material<sup>22, 23</sup>. However, disparity generated by the use of tissue culture regeneration techniques has resulted in the enhancement of diverse commercial crops 24.U.V. B is recommended to enhance oil content in *Mentha piperita*<sup>25</sup>. UV-B radiation affects the oil chemical composition and morphology, total protein, and total phenol content of peppermint (*Mentha piperita*).

The essential oil content was slightly increased by UV-B radiation. The menthol content was significantly decreased because of more significant than before the synthesis of menthone, menthofuran, and methyl acetate. Plant morphology has a significant inhibition of stem elongation, accompanied by changes in leaf area. Protein content and total phenols were increased when plants were irradiated with UV-B, whereas no significant effects were observed for chlorophyll content<sup>26</sup>.

Menthol is a natural product obtained from plants that have importance in different branches of industry, mainly due to the feeling of freshness it provides in contact with skin and mucous. Menthol (70% - 90%) is the primary compound of the menthol mint essential oil, followed by methyl acetate (7% - 12%), which is an indicator of maturation<sup>27</sup>. An alternative for improving mint may require the use of tissue culture regeneration and the production of somaclonal variants<sup>28</sup>.

To date, orange mint and peppermint embryos<sup>29</sup> Japanese mint have been proliferated *in-vitro* rooted and acclimatized *in-vitro*. The needy genotype regeneration may be due to differences in genetic control of organogenesis by the different mint genotypes<sup>17</sup>.

Among the three explants studied, leaf explants followed by shoot tip explants proved best for callus induction. As reported earlier in *Mentha arvensis*<sup>30, 31</sup> and *Mentha spicata*<sup>32</sup>, Japanese mint has been proliferated *in-vitro* rooted and acclimatized *in-vitro*<sup>33</sup>. The genotype-dependent regeneration may be due to differences in genetic control of organogenesis by the different mint genotypes<sup>17</sup>.

Best results were obtained when explants were cultured for two weeks onto Murashige and Skoog medium fortified with 300 mM mannitol, 2.0  $\mu$ M 6benzyl adenine, and 2.0 $\mu$ M indole-3-butyric acids, and then transferred on a medium without mannitol and containing 0.5  $\mu$ M  $\alpha$ -naphthaleneacetic acid, 9.0  $\mu$ M 6 benzyl adenine and 0.5  $\mu$ M thidiazuron<sup>34</sup>. The doctrine of 35 stated that both auxin and cytokinin are necessary for callus induction and regeneration, which also holds good for *Mentha arvensis* as organogenic callus from shoot tip and nodal explants observed on NAA or IAA singly or in combination with BAP/Kn.

Several other workers also confirm it<sup>30, 36</sup> in *Mentha arvensis*. Similarly, in *Mentha piperata*<sup>29</sup> and *Mentha spicata*<sup>33</sup>. Menthone is the predominant monoterpene produced in the essential oil of maturing peppermint (*Mentha x piperita*) leaves during the filling of epidermal oil glands.

This early biosynthetic procedure is followed by a second, later oil maturation program (approximately coincident with flower initiation) in which the C3-carbonyl of menthone is reduced to yield (-) -(3R)-menthol and (+)-(3S)-neomenthol by two distinct NADPH-dependent ketoreductases<sup>37</sup>.

The major extracted phenolic compounds from *Mentha aquatica* L. are luteolin-7-O-glucoside, eriocitrin, and rosmarinic acid, whereas hesperidin in luteolin-7-O-glucoside, eriocitrin, and rosmarinic acid are the major phenolic compounds in *Mentha piperita* L.<sup>38</sup>.

Herbalists believe peppermint is an astringent, antiseptic, antipruritic, antiemetic, carminative, vermifuge, diaphoretic, analgesic<sup>39</sup>. The plant extract possesses radio protective<sup>40, 41</sup>, antioxidant<sup>42</sup>, anticarcinogenic<sup>43, 44, 45</sup>, antitumorogenic<sup>46</sup>, antinociceptive<sup>46</sup>, ant androgenic<sup>47</sup>, antiallergic<sup>48</sup>, antispasmodic<sup>46</sup>, anticatarrhal<sup>49</sup>, properties among others<sup>50</sup>.

Peppermint oil vapour is used as an inhalant for respiratory congestion. The essential oil can be used in complex patients within filtrative pulmonary tuberculosis<sup>51</sup>. Traditionally the species are used to treat various digestive complaints such as colic in infants, flatulence, diarrhoea, indigestion, nausea, and vomiting, morning sickness, and anorexia and to reduce gas and cramping. Peppermint is used to treat irritable bowel syndrome<sup>49</sup>.

Crohn's disease, ulcerative colitis, gallbladder, and biliary tract disorders and liver complaints<sup>52, 53</sup>, menstrual cramps<sup>54</sup>; headaches, migraines, and chickenpox<sup>50, 52</sup>. Plant extract can also trim down the arsenic-induced toxicity<sup>55</sup>; glucose, cholesterol, LDL-c, and triglycerides levels (in diabetic rat<sup>56</sup>; uric acid level, cholesterol/HDL and LDL/HDL ratios; iron absorption<sup>57</sup>, malodour and volatile sulphur compounds in intensive care unit patients<sup>58</sup>.

Menthol production from chitosan - elicited suspension culture of *Mentha piperita* and inferred that chitosan elicitation might trigger the conversion of pulegone to menthol<sup>59</sup>. Clinically it is confirmed that peppermint is valuable against nausea and vomiting tendency usually in the first few months of pregnancy<sup>60</sup>. In a place, the bio-controlled study of gynecological surgery patients showed a statistically significant consequence of peppermint in reducing postoperative nausea<sup>61</sup>.

The volatile oil of peppermint is valuable in revitalizing the mind, improving mood, relaxing tension-filled and anxiety-ridden nervous system<sup>39</sup>; psychological change in attentional behaviour<sup>62</sup>; promoting general arousal of attention<sup>65</sup> and enhancing memory<sup>64</sup>.

Essential oils extracted from the seeds of anise (*Pimpinella anisum*), dried fruits of eucalyptus (*Eucalyptus camaldulensis*), dried foliage of mint

(*Mentha piperita*) and basil (*Ocimum basilicum*), and fresh foliage of laurel (*Laurus nobilis*) were tested for their repellency against the adult females of *Culex pipiens*. All essential oils showed repellency in varying degrees, eucalyptus, basil, and anise being the most active<sup>65</sup>.

**CONCLUSION:** The importance of plants is increasing day by day, thus opening up a massive market for plant-based drugs at the international level. Thus, medicinal and aromatic plants face genetic erosion because of habitat destruction and over-exploitation, thus needing to be conserved.

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