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REVIEW ARTICLE

Production and trade of menthol mint in India: Problems and prospects

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ABSTRACT

Menthol mint, corn mint, Japanese mint or Mentha arvensis belongs to the family Lamiaceae, which is known as the mint family. The genus name 'Mentha' is derived from the Greek word minthos meaning herb mint and 'arvensis' means ploughed field (Takeda, 1971). The cultivation of Mentha arvensis was initially started around 1870 in Japan, so it is also called as Japanese mint, that is believed to be the native place of this plant. The cultivation was gradually spread to other countries like Brazil, China, France, Italy and U.S.A. This paper traces the evolution of menthol mint introduction, cultivation & trade in India.

INTRODUCTION

In India, the story of mint cultivation is very dramatic & successful. From an importing country of mint oil up-till early 1970s, India became the largest producer and exporter of mint oil in the world today. Literature suggests that Japanese mint was introduced in India by Dr. LD Kapoor in 1952 through the courtesy of a Japanese botanist, who had sent him only six suckers that were planted at Drug Research Laboratory, Jammu (Shah, 2009). Before, 1968, there was no production of menthol mint in India. All the demands for menthol mint oil in India were met through import. To introduce this crop, at a commercial scale, the credit goes to Col. Mr. R.N. Chopra & Dr. I.N. Chopra of Regional Research Laboratory, Jammu in 1968 and Mr. S.C. Bante, Managing Director, Hindustan Richardson Ltd. The commercial cultivation of menthol mint took an organized shape in *Tarai* area of Uttar-Pradesh (now in Uttarakhand). This company even established a distillation unit in Bilaspur, so that farmers could grow menthol mint confidently and use their facilities for distillation. Under this trust-building venture, the farmers started growing menthol mint and supplied their harvest to Hindustan Richardson Ltd. that also provided the technical knowledge of growing mentha herb to the farmers. The farmers of this area were happy by adopting menthol mint crop and started realizing better economics. As a result of which, the area of mentha crops substantially expanded to western districts of Uttar Pradesh mainly in Rampur, Moradabad, Badaun, Bareilly, etc. With the best efforts of farmers of Uttar Pradesh and R&D interventions of CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow, menthol mint became a popular crop amongst the farmers by mid 1980s. As CSIR-CIMAP is situated in Lucknow, farmers of Barabanki, Lucknow and Sitapur and also of Bihar, Punjab & Haryana started menthol

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Table 1: Types of mints grown in India and other countries and varieties developed by CSIR-CIMAP, Lucknow

Common Name	Botanical name	Producing Country	Variety In India
Japani Pudina Corn Mint Menthol mint Japanese mint	*Mentha arvensis*	India China Brazil	• MS-1 • HYBRID-77 (KALKA) • GOMTI • HIMALYA • KOSI • SAKSCHHAM • KUSHAL • SAMBHAV • DAMROO • SHARYU • CIM-KRANTI • CIM-UNNATI
Peppermint	*Mentha piperita*	USA India France, Former USSR, Brazil	• INDUS • PATRA • MADHURAS • PRANJAL • TUSHAR • KUKRAIL
Spearmint	*Mentha spicata*	India China	• MSS-5 • NEERA • NEER KALKA • ARKA
Bergamot	*Mentha citrata*	USA Brazil Thailand	• KIRAN
Pudina Garden Mint	*Mentha viridis*	India Pakistan Nepal Sri Lanka	• GANGA • SUPRIYA
Scotch spearmint Gingermint, Redmint	*Mentha cardiaca*	USA Canada Scotland	• MUKTA • MCAS-2 • PRATIK

mint cultivation at a commercial scale. The continuous R&D efforts of CSIR-Central Institute of Medicinal and Aromatic Plants towards the varietal development, *M. arvensis* cultivars and their extension in central and western UP, 80% of menthol oil production in India was from Uttar Pradesh. The present share of UP is 75% followed by, 5% of Uttarakhand, 5% of Punjab/Haryana and 15% of Bihar/Madhya Pradesh Now, few farmers of South India have also trying to cultivate the mint in their field.

In the first half of the 20th century, production of menthol mint was dominated by Japan, meeting around 70 % of global requirements. The rest of the demand was met by China. Brazil was also having an annual production scale of 5000 tons in the mid 1962-63. China re-entered the global market as the major supplier during the 1980 to 1994. Though India entered the global market only in the mid 1980's, its production has reached 37000-40000 tons in 2020 (Fig.1). India had taken over as dominant supplier to the International market in mid-2000's, and has maintained its position as a global leader in production and export of its oil and allied products. Presently, India is the World leader in production of Mint oil and its products, with an approx. capacity of 40000, Tons and its contributing share now stand at 80-85% of world production. The demand for natural mint and mint products is expected to continue in future.

The major uses of menthol mint oil, menthol crystals, De-mentholated Oil (DMO) and other fractions of its oils are mainly used in various flavour, pharmaceutical and fragrance industries. The mint based products are used in cough & stomach disorders, rheumatism, toothpaste, tooth powder, mouth wash, pain-balm, headaches ointment, chewing tobacco, menthol cigarette, panmasala, confectionaries and cosmetics (for cooling effects).

Varietal improvement of mints in India by CSIR-CIMAP

In the initial phase of plantation, the planting material was brought in either from Japan, China, Brazil or USA, which resulted in limited plantation of the crop in India as the farmers could not reach the international market for the purchase of the suckers. Due to limited availability of the roots in the country, CSIR labs such as CIMAP-Lucknow and RRL (Now, Indian Institute of Integrative Medicine) Jammu did thorough research and development work on mints and have introduced many Indian varieties for the large scale cultivation by the Indian farmers and further value addition of their essential oils by indigenous industries (Table 1). After successful adoption of mints by the farmers, industries and traders started exporting these oils and their value-added products to the various countries. Presently, India is the largest producer and exporter since last 30 years.

Table 2: Some of the value-added products prepared from essential oil of different mints

Raw Material	Value –Added Products	Processing Involved
Menthaarvensis herbage ↓ *Mentha arvensis* Oil/ DMO	• Menthol Powder • Menthol Crystals • De-mentholated Peppermint oil (DMO)	Chilling unit/Centrifugal
	• Mentha Arvensis Oil	Steam/Hydro Distillation
↓ *Mentha arvensis* Terpenes	• Peppermint (DMO) rect. • Menthone • ISO-Menthone • Menthyl Acetate • Liquid-Menthol • Neo-Menthol • ISO-Menthol • Mint-Terpenes	Fractionating Column
	• L-limonene • CIS-III-Hexanol • Hexenyl Acetate • Alpha-Pinene • Beta-pinene • 3-Octanol • Octnyl Acetate	Reaction & Fractionating Column
Peppermint/ (*Mentha piperita)*	• Peppermint Oil/Mentha Piperita Oil ↓ • Menthofuran • Peppermint Piperita Oil	Fractionating Column
Spearmint/ (*Mentha spicata)*	• L-Carvone • Spearmint Terpenes	
Mentha citrata/ (Bergamot/Horsemint)	• Use same as it is	

Crop cycle of the menthol mint

The north Indian plains having tropical to sub-tropical climate is ideally suitable for cultivation of menthol mint. Sunny weather with moderate rain is conducive to its luxuriant growth. A deep soil, rich in humus which can retain moisture, is suitable for mint cultivation. Generally, Mentha suckers (cuttings) are sown in the month of December to February and the crop is harvested during May/ June. After introduction of cv. Kosi, maximum farmers are able to take two harvests successfully. Now, Jalaun district of UP and Chhattarpur area of M.P. have started sowing in the month of October and harvesting during December/January. Presently, acreage of land under the cultivation of mentha crop is about 3.00 lakh hectare in UP, Bihar, Punjab, Uttrakhand, MP, etc. It is estimated that about 6 crore mandays are directly or indirectly generated by menthol mint cultivation and marketing in the country. The average mentha oil recovered from one hectare is around 150-175 Kg. The farmers are constantly getting enriched in their knowledge of mint farming. As a result, the farmers are producing good quality planting material and essential oils with enhanced farm income without losing tradition crops.

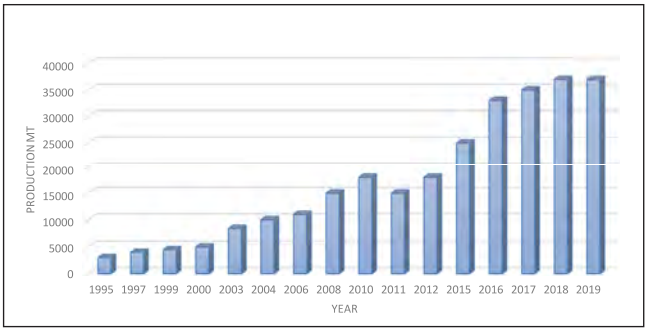

Figure 1: Production of mint from the year 1995 to 2019

Major menthol mint producing countries

India is a major producer of the menthol mint oil and its allied products and exporting to more than 100 countries. Apart from India, China, USA and other countries are producing few quantities for their own consumption. As per data estimates, India produced 74 % oil of the total world production however, China produced only 10 % oil in 2019. China is also major importer of menthol mint oil, crystals and De Mentholated Oil (DMO) from India.

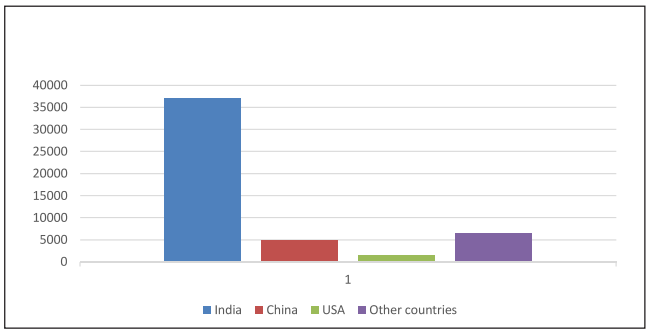

Figure 2: Country-wise estimated production of menthol mint (MT/ Year)

Challenges faced by the mint industry in India

- Earlier, U.P. mandi fees @ 1.5 % was imposed on all the mint and its allied products including *Mentha piperita* & *Mentha spicata in* Uttar Pradesh. But there is no mandi fee applicable in UP and any other province/states in India.
- For the evaluation of natural product, C-14 tests are primary quality parameters. This is not available in India and there are heavy testing charges (appx. Rs. 40,000/-) is done from overseas laboratories. This testing facility should be available in India on reasonable cost.
- Adulteration in Mentha Oil has become a huge problem before the Industry, either the mixing of DL-Menthol or other unwanted items, which are creating the difficulties in selling and value addition.
- There is a great challenge to the natural menthol after introduction of synthetic menthol in the market. It was estimated that about 6,00,000 farmers are associated directly or indirectly in this trade and earning good remuneration within a short period of time through cultivation and primary processing of menthol mint in between their crop rotation. The market price of natural menthol is going down due to cheaper availability of synthetic menthol to the user industry. Looking at this situation, CSIR-CIMAP has developed new variety named CIM-UNNATI which yield more oil than existing variety and also popularized Early Mint Technology to reduce input cost. These two methodologies are quite helpful to compete the synthetic menthol in the market.

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