Mentha (Mint) Oil Futures

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Introduction

India is world's largest producer and exporter of mint oil. Mint oil and its constituents and derivatives are used in food, pharmaceutical and perfumery and flavouring industry. Its main constituent, menthol, is used in the manufacture of lozenges, toothpastes, pain balms, cold balms, Dabur Pudin Hara, etc. The basic raw material for mint oil is leaves of a plant *Mentha arvensis*. Mentha is widely cultivated in India and its leaves are used in making a sauces/chatni in most households.

Mint oil is obtained by steam distillation of *Mentha arvensis* leaves. The oil is used for treating certain stomach disorders like indigestion, gas problem, acidity, etc. It is the main ingredient of ayurvedic medicines like Daburs 'Pudin Hara'.

The oil is a natural source of menthol, which is the main ingredient of cough drops and ointments like Vicks Vaporub, etc. Mint oil and menthol are also used in certain sugar candies like 'Polo', the mint with a hole.

In India mint oil is widely used in the extraction of menthol crystals by slow cooling through refrigeration, crystallization, centrifugation and drying. Menthol crystallization, domestic industry in pharmaceuticals as well as flavourings and also exported. Menthol is one of the most actively traded commodities in the chemical market in India.

INDIA'S EXPORTS OF MINT OILS
(Quantity, M.T.; Value Rs. Crores)

Year	Quantity	Value
1992-93	1,510	26.06
1993-94	1,410	30.16
1994-95	1,583	43.57
1995-96	1,352	47.5
1996-97	2,371	134.5
1997-98	3,016	95.94
1998-99	2,825	70.54
1999-2k	2,734	96.73
2000-01	2,725	93.75
2001-02	2,945	96.97
(Source : *DGCI*)		

Cultivation

Mentha arvensis is cultivated in India in the semi- temperate regions in the foothills of Himalayas in Punjab, Himachal Pradesh, Uttar Pradesh and Bihar. In 1997 the area under mentha in U.P. went up to 40,000 hectares from 20,000 hectares in 1996 because some of the sugarcane farmers took up its cultivation in view of non-payment of arrears by the sugar mills and closure of several mill. Even in 1998, the area under mentha is reported to have gone up. The all-India area under mentha in the country is estimated at about 70,000 hectares.

Production

India at present produces about 15,000 tonnes of mint oil and exports 10,000 tonnes and earns foreign exchange worth Rs. 4500 crores annually. In the year 2004-05, total menthe oil

production rose to 15770 MT. Mentha Arvensis Oil has the lion share with 14000 MT distantly followed by Mentha Peperata Oil 1500 MT, Mentha Sparmint Oil 250 MT and Mentha Citrata Oil 20 MT. From mint oil menthol is also produced in the country. The area under mentha arvensis in the country is about 70,000 hectares. About 10lakh people in the country are engaged in the cultivation, marketing and processing of mentha arvensis, mint oil and menthol.

Research & Development

The central Institute of Medical and Aromatic Plant has developed two varieties of mentha arvensis, 'Himalaya' and 'Kosi', which are early maturing, high yielding, disease and pest resistant with a higher content of menthol than conventional variety. The Himalaya variety was released for cultivation in 1997 and kosi in 1998. The Himalaya variety is resistant to rust, blight and leafspot diseases, which lower the yield of, mint leaves drastically. These varieties can be used to harvest three crops in a year. The institute also imparts training to farmers in the cultivation of mentha arvensis.

The institute has also developed a package of practices to be followed in the cultivation of mentha leaves for obtaining better yields (250 kg in terms of mint oil per hectare) and fight the menace of pests and diseases. It has found the cropping systems of rice-wheat-mint, rice-potato-mint, rice-garlic-mint and rice-potato-onion-mint moat suitable for adoption by the farmers. A farmer can earn about Rs. 75,000 per hectare by cultivating this crop. The crop can be cultivated only in semi-temperate regions. The Teraj regions comprising parts of Uttar Pradesh and Himalchal Pradesh are most ideal. The region around the foothills of Himalayas in Haryana, Bihar and Punjab are also suitable for taking cultivation of mentha.

Exports

At present the major producers of mint oil in the world are India, China, Brazil and the US. India exports different types of mint oils to a number of countries including Argentina, Brazil, France, Germany, Japan, UK, USA, etc. these varieties include the Japanese mint oil (derived from Mentha Arvensis), peppermint oil (Mentha Piperita), dementholised Japanese mint oil, spear mint oil (Mentha Spicata), water mint oil (Mentha Aquatic), horsemint oil (Mentha Sylvestries), Bergamont oil (Mentha Citrate) and still others.

Mentha Oil export has steadily increased from India in the recent years. In the year 2004-05 India impressively exported 9160 MT. Although domestic demand for this product has increased on the wake of higher activity by domestic cosmetic and perfume industry. Present domestic demand for menthe in domestic market is estimated to be 4000 MT to 4500 MT.

Description and Distribution

Mint or 'Pudina' is known to one and all, as used in 'chutney' and as an old popular household remedy for relieving cold and cough. It belongs to the genus Mentha, which consists of about 40 species of aromatic perennial herbs, distributed mostly in the northern hemisphere (Europe, America, Japan, China, Brazil and Formosa). In India, about eight species of Mentha are reported to occur or grow. However, the world demand for peppermint oil and menthol is met from the following three species which have also been approved / recognized by the purpose of quality standards and international marketing:

1. Mentha arvensis Linn. Var. Piperascens malinvaud.
2. Mentha piperita Linn var. piperita.
3. Mentha spicata Linn.

For our purpose, therefore, we shall confine our discussion to these three species only and in the alphabetical order. These species yield peppermint oil, which find's several industrial uses mainly because of its menthol content. The mentha species growing naturally in India have been observed to yield peppermint oil of desirable quality but still its demand is ever growing and its imports have been ranging between Rs.86 and 152 lakhs annually. The country's annual requirement of peppermint oil is about 10mt, which can be met by growing the crop, over 10,000 acres. In addition, menthol worth Rs.1.5 to 2 lakhs is also being imported annually from UK, the USA, Japan and China despite the fact that the cultivation of M. piperita in India was taken up as early as in 1881. The different species were raised in Nilgiris and Mysore and the indigenous Mentha in Kashmir, but the oil then obtained was not of the B.P standard. In 1952, rooted suckers of Japanese mint (M. arvensis Var piperascens) obtained from Japan and planted to their growth and yield of oil. Now, Japanese mint is cultivated on a large scale in Jammu and Kashmir (about 2,000 hectares) and in Punjab, Harayana, Tarai and Haldwani areas in U.P., covering more than 1,000 hectares. The other centers of production are chakrohi (J & K) Kuppam (A.P) and Jullundur (Punjab). Japanese mint is a downy perennial herb with running rootstocks and rigid branching stem, 60-90cm high, cultivated at an altitude of 270-1,500 m. This species is more robust than M.arvensis. It does breed true from seed. Due to its wide adaptability, it can be cultivated all over India. Temperate to tropical climates suit it well. Sunny weather with moderate rainfall is conductive to its luxuriant growth and high menthol content.

In arvensis, the introduced strain of Japanese mint is now well adapted under different agro-climate conditions of the country. Jammu mint, which is a tetraploid of Japanese mint gives as high as 5% oil (dry wt.) as compared to an average of 2.53% (0.5 TO 0.8% on fresh weight basis) in the normal diploid. The world's demand for Japanese mint oil or Japanese peppermint oil, as commodity known, and natural menthol is met mainly from Japan and to a lesser extent from China and Brazil.

Mint Oil Exports: Today, in India, Japanese-mint is cultivated in an area of about 20,000 hectares (1991-92), producing 2,000mt of essential oil. After meeting the country's demand, the oil exported is to the tune of 24.18 mt. worth Rs lakh.

Recently, the export of mint oil from India during 1992-93 and 1993-94 was to the tune of 1,263 and 1,155 mt. earning us foreign exchange of about Rs. 22.70 and Rs. 21.65 crores respectively and during 1996-97 was 2120 tons worth Rs.104 crores Foreign (exchange earned).

Mind Oil Yield: The oil yield of Japanese-mint I India is about 100kg/hectare, whereas, in China, it is 235kg/hectares because of its diversified usage and source of earning foreign exchange, there is need to raise the productivity of mint crop by adopting scientific cultivation methods.

Harvesting: The mint crop gives maximum oil content when it has just reached the flowering stage, after which the oil content begins to decline, but in cases where there is delayed flowering, as at Delhi, yellowing of the lower leaves is an indication for cutting in time. 2-3 cutting are done during the season. Freshly cut herb is left in the field for 2-4 hours during the sunny weather. This partially dried herb is further dried in small bundles by hanging over wires in shade till it is reduced to 1/3 or ¼ of its original weight, taking care that the leaves do not get crisp. The crop should not be heaped for drying in the sun as it is reported to result in reduction of oil by about 20-25%.

Manufacture of Volatile Oil & Menthol: Distillation of dried leaves is cheaper than that of fresh leaves. By steam distillation and filtration, a golden yellow volatile oil is obtained. Leaves and flowering tops give the highest yield. About 50% of menthol can be separated out

in crystalline form on cooling the oil. The remaining (dementholised) oil is used as peppermint oil. Manufacture of menthol from dementholised oil has been taken up on commercial scale by three or four firms in Bombay, West Bengal and Gujarat. There are several small distilleries in U.P also for the distillation of oil.

Storage of Oil: The peppermint oil is stored in coloured bottles, air-tight aluminium or galvanized containers in cool dry place. Presence of moisture in the oil may rancidify the oil. Since it is acidic in nature, it should not be stored in tin containers.

Composition of Oil: The natural oil yields on an average 40-50% menthol and 50-60% dementholised oil, which can be used both in confectionery and medicine in place of imported peppermint oil. Japanese mint oil is not distinguished from the peppermint oil in the Indian trade. The dementholised oil has been found to contain menthyl acetate (24.4%), free menthol (44.8%), menthone (24.6%) and hydrocarbons (6.2%). Among the hydrocarbons, alpha-pinene, a-1-limonene, carophyllene and cademene are present.

The quality of Japanese mint oil grown in Jammu and U.P compares favourably with that of oil obtained in Japan and Brazil. Its physico-chemical properties are-Sp. Gr. At 25^{o}C; 8969-9903; Ref, index at 25^{o}C; 1.4494 to 1.4573: Opt. Rot: 41 2; congealing Point: 15.0; Acid value: 1.5-2.8; Ester value: 14.12 to 29.47%; total menthol: 81.3 to 94.4% and solubility in 1.5 to 2.0 volumes of 70% alcohol.

Uses As Food Flavourant: Mint or 'Pudina' is very popular for use in the common 'Pudina' / Dhania' chutney. Mint is also used for flavouring meat, fish, sauces, soups, stews, vinegar, teas, tobacco and cordials. The fresh leaf tops of all mints are used in beverages, fruit cups, apple sauces, ice-cream, jellies, salads, sauces for fish and meats; also to flavour vegetables, chutneys, etc. Roast lamb and mint jelly have become in-seperable companions. Japanese mint oil is used as a substitute for true peppermint oil (from M. Piperita), which resembles it in physico-chemical properties. It possesses a somewhat bitter flavour and is considered inferior to M. piperita oil in aroma and quality. Arvensis oil with low menthol content is finding some use in cheap perfumery.

Japanese mint oil finds uses similar to that of peppermint oil. However, the latter is preferred for flavoring purpose. It is used for the production of natural menthol. Dementholised oil is employed for flavouring in mouthwashes, toothpaste and pharmaceutical preparations.

In Medicine: The main use of mint is the extraction of volatile oil which contains menthol and is used in medicine for stomach disorders, in cough drops, inhalation, mouthwashes, toothpastes, etc. and also for flavoring in cigarettes. The harsh flavour of arvensis is masked to some extent by skilful blending of the two oils. Of course, arvensis is not used where delicacy of aroma and flavour is the prime objective.

The oil and the dried plant are antiseptic, carminative, refrigerant, stimulant and diuretic. The dried plant does not have a good taste as it is, but it is expectorant, emmenagogue, tonic to the kidney, useful in the diseases of the liver and spleen, asthma, etc. it also possesses antispasmodic properties, is used in Jaundice, and frequently given to stop vomiting.

In China, the leaves and stems are made into an infusion and used as carminative, sudorific and antispasmodic. In Annam, the plant is considered as an excellent diaphoretic. An infusion is given in fever, indigestion, etc.

Synthetic menthol is also now being manufactured in a number of countries, but its flavour is not equal to that of the natural one.

Price Volatility

Fortnightly Price Volatility in Mentha Oil at Delhi from 2002-04

Volatility	<2	2-5	5-8	>8
No. of times	29	11	4	4
% of times	60.4	22.9	8.3	8.3

Max fortnightly volatility recorded – 27.8%

Annexure

Fortnightly Prices of Mint Oil at Delhi in Rs./Kg

	Mint Oil (Rs./Kg)
11/1/02	328
11/15/02	322
12/2/02	324
12/16/02	328
1/1/03	352.5
1/15/03	351.5
2/1/03	342.5
2/15/03	330.5
3/2/03	323.5
3/16/03	318.5
4/2/03	317.5
4/16/03	313.5
5/2/03	316.5
5/15/03	311
6/1/03	302
6/16/03	280.5
7/1/03	280
7/15/03	278
8/2/03	277.5
8/16/03	278.5
9/1/03	276
9/15/03	277.5
10/1/03	283
10/15/03	281.5
11/1/03	276
11/15/03	276
12/2/03	278
12/16/03	276
1/2/04	307.5
1/16/04	316.5
2/2/04	312.5
2/16/04	314.5
3/1/04	307.5
3/15/04	306.5
4/1/04	297.5
4/14/04	301.5
5/1/04	302.5

5/15/04	308.5
6/1/04	290
6/15/04	291
7/1/04	283
7/15/04	312
8/2/04	313
8/16/04	320
9/1/04	352
9/15/04	450
10/1/04	480
10/15/04	460
11/1/04	450