

**Commissioner of Industries
Hyderabad
Andhra Pradesh**

Menthol

1. Nature of the Product and Its Applications:

From time immemorial man had depended on nature to cater to all his needs. With the progress of civilisation, man started deriving not only food, but also food additives to enhance quality and taste of food. Medicines for various ailments and also perfumery items for pleasure. Camphor was used as a food additive. Records from antiquity describe the use of soothing syrups and herbal extracts to control excessive coughing. Camphorated Opium tincture as an effective anti-septic agent was reported in second century A.D. The use of volatile oils, some times called the Essential Oils as expectorants has been traced to 2000 years, to piny who used turpentine internally to relieve coughing. Though the essential oils have been used for a long time on an extensive scale, few objective studies have been carried out on their effectiveness. Limited evidence suggests that they act by direct stimulation of the bronchial secretory cells.

Compounds in this category are administered by a number of different routes including oral by aerosol, topical, as a cream and some times as lozenges. The three well known oils namely (1) Menthol (2) Camphor (3) Thyrnol are often used in the over-the counter cough and cold preparations. Menthol commercially the most important terpene alcohol is obtained by the crystallisation of Peppermint Oil (Extracted from the leaves of "Mentha Arvenisis") has many medicinal uses besides being the source for menthol and also the dementholised oil finds extensive usage as a flavouring agent.

2. Market Potential:

Menthol is used in liquors, confectionery, perfumery, cigarettes, cough drops and inhalers. It is also an ingredient in many pharmaceutical formulations. In India menthol is also used extensively in pawn. Peppermint oil in its wholesome form as well as dementholised mint oil find extensive usage in medical preparation and also as a flavouring agent in candies. Sauces, desserts, Salads, Jellies, Vinegar, Tea and particularly in Tooth paste, Mouth wash, chewing gums, inhalants and tobacco processing. Because of the diversified many end-uses it is difficult to estimate the demand for Menthol or Peppermint Oil with an accuracy. There are about six units producing menthol in organised sector and about 350 small scale units according to the All-India Menthol Industry (Small Scale) Association. While the installed capacity of the units in organised sector is about 500 TPA, the total installed capacity in small scale sector is about 300 TPA. Menthol is also exported. Exports and domestic market consumption is growing rapidly.

3. Installed Capacity:

The recommended installed capacity for the unit to manufacture menthol is 100 Kg/ day i.e 30 M. Tonnes per annum based on 3 shifts and 300 working days per annum and also peppermint oil is 30 Kg/day i.e. 9.0 M. Tonnes per annum based on 3 shift and 300 working days per annum.

4. Raw Materials:

The raw materials required for the manufacture of Menthol are "Mentha Arvenises plant leaves, Caustic Soda and Boric Acid. Cultivation of the plant "Mentha Arvenises" near the proposed unit is required for smooth and efficient operation of the plant.

5. Manufacturing Process & Technology:

The leaves of the "Mentha Arvenisis" are subjected to steam distillation, the distillation products are condensed and separated into peppermint oil and water. The crude mint oil then obtained is refined by vacuum filtration and then chilled to about 5-10 degree C to obtain Menthol Crystals. The crystals, thus formed are centrifuged and obtain about 45% yield of menthol. The spent oil is treated with sodium hydroxide and Boric Acid while crystalline borate esters which are formed are separated and decomposed by steam. The Menthol thus released is recovered by crystallisation under reduced temperatures and centrifuging. The mother liquor is distilled to obtain dementholised peppermint oil. The overall yield of menthol is about 50% and an equal amount of dementhonised oil is obtained as co-product.

6. Plant and Machinery:

6.1 Major Equipments:

The process plant and equipment required consists of reactors, steam distillation unit, vacuum distillation, crystallisation unit, crystallisers, centrifuges, storage tanks, pumps etc. and service equipment like boiler, colling tower, refrigeration unit, electricals etc.

6.2 Suppliers of Equipments:

A. Fabricated Equipments:

- i) M/s Metal Engineers
IDA, Balanagar, Hyderabad
- ii) M/s Gujarat Machinery Manufacturers Ltd.,
Anand, Gujarat

B. Boiler:

- i) M/s Thermax India Ltd.,
Chinchwadi, Pune

C. Cooling Towers:

- i) M/s Paharpur Cooling Towers
Calcutta

D. Brine Chilling Plant:

- i) M/s Kirloskar Pneumatic Ltd.,
Chinchwadi, Pune

7. Location :

Availability of the raw materials and nearness to market are the main consideration for the location of the unit. The other factors are infrastructure facilities and availability of cheap and skilled labour.

8. Infrastructure :

Manpower : 33 Nos.
Power : 70 HP
Fuel (Coal) : 0.50 T/day

9. Project Cost and Means of Finance:

Cost of the Project:

	Particulars	Rs. Lakhs
a)	Land & Land development (1.5 Acres)	3.00
b)	Building & Civil construction (3000 Sq. ft)	11.90
c)	Plant and Machinery	60.50
d)	Miscellaneous Fixed assets	8.00
e)	Preliminary & Pre-operative Expenses	4.10
Total fixed capital		87.50
Working Capital Margin		6.54
Total Project Cost		94.04

Total working capital required in 1 year: Rs. 22.33 Lakhs

Means of Finance: (Rs. Lakhs)
- Promoter's Contribution: 37.16
- Term Loan: 56.88

10. Annual Operating Expenses

Assumed Operation @ 80% of Installed Capacity in 3rd year:

	Particulars	Rs. Lakhs
a)	Raw Material	84.83
b)	Packaging Material & Consumables	5.37
c)	Utilities	8.34
d)	Salaries & Wages - Prodn.	8.69
e)	Factory Overheads	1.22
f)	Admn. & Management Expenses	7.85
g)	Financial Expenses:	6.90
	Interest on Term Loan	3.90
h)	Depreciation	3.37
i)	Selling Expenses	1.79
132.26		

Net Sales realisation : Rs. 160.92 Lakhs

Pre-tax Profit: Rs. 28.66 Lakhs
a) Break Even Point @80% Cap. Utilisation : 40.99%
b) Rate of return on Investment before taxes : 29.23%