

## ON THE CULTURE OF MENTHA LONGIFOLIA (L.) HUDS.

S.M.A. KAZMI\* and A.H. SIDDIQUI

North Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Peshawar

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*Mentha longifolia* (L.) Huds. is the commonest species of wild mint in West Pakistan. In order to assess the possibilities of its commercial exploitation, experiments on its cultivation were undertaken and an economical method was developed. It has been observed that crops raised with this method contain the required percentage of mint oil and menthol prescribed by B.P. and can be exploited for the purpose. Methods, observations and results of analysis have been given in this paper.

### Introduction

Peppermint oil finds large scale use in the pharmaceutical, cosmetic, confectionary and tobacco industries.<sup>1</sup> About 2.25 million lb of the peppermint oil is produced annually, throughout the world.<sup>4</sup> Its chief constituent is menthol, which is isolated from the oil and sold separately.

The source of the commercial oil and menthol are various species of genus *Mentha* of the family Labiatae i.e. *M. piperita* L., *M. arvensis* L., *M. pulegium* L. etc. which are grown in different countries for the purpose.<sup>2</sup>

The plants of genus *Mentha* are perennial herbs with square stems rising from the underground rhizomes. Leaves are opposite in arrangement and are scented.

Three species of *Mentha* viz. *M. piperita*, *M. arvensis* and *M. longifolia* are found in West Pakistan. Work on the cultivation and estimation of the oil of the first two species has already been undertaken (Chopra *et al.*).<sup>2</sup> Because *M. longifolia* (L.) Huds. is quite abundant in West Pakistan and can, to some extent, be exploited by the essential oil industry, experiments on its culture were taken up at the Experimental Farms of these Laboratories.

### Cultivation

**Soil.**—The soil of the Experimental Farm is loamy, having a pH of 8.5, soluble exchangeable salts 0.66 and organic matter 1.92 mequiv/g. The land was worked well by deep ploughing and clearing of roots or bushes. The larger plots were divided into small plots of 8 ft × 12 ft which are connected with channels to facilitate the uniform irrigation.

**Manuring.**—It has been observed that *M. longifolia* (L.) Huds. responds favourably to organic

manure. Two tons/acre of farmyard manure or composite was found to be ideal. It has been observed that subsequent dressing of 600 lb of mixture of inorganic fertilizers, ammonium sulphate and potassium sulphate in equal proportions produce a very good crop.

**Raising of Crop.**—The young juicy suckers cut into 3 or 4 in pieces were planted in rows 2–3 ft apart, the cuttings were placed end to end at a depth of about 2 in in the early spring (February). The field was irrigated liberally. The new buds sprout within a period of 5–9 days. The plants flowered in July, when the crop was harvested and the field was again thoroughly weeded and irrigated. The plant again grew well and flowered in October. The rooted sucker does well when planted during July–August and liberally irrigated. These plants blossomed in the last week of October or beginning of November and were ready for the first harvest. The growth of these plants was, however, found to be very poor in the winter months. The plants again blossomed in the next spring. In winter, they remained dwarf and sometime the leaves turned black and dry as a result of the frost.

**Irrigation.**—The wild mint requires liberal irrigation on drained soils. Due to its profuse vegetative growth, the plant can absorb good deal of water for transpiration. The plantations under experiment were as such liberally irrigated, once a month, in early spring and late summer and twice a month in June–August, and liberally, except once a while, in winter. It has been observed that the plant survives even after it has been submerged in the monsoon water for a couple of days. Liberal irrigation after planting and harvesting is beneficial for the propagation and healthy growth.

**Harvesting.**—Harvesting was done when the plants were in full bloom. According to the existing conditions, one or two flushes of the crop may be harvested in July–August and October–November when the plant is in blossom. It is

\*Now at Arnold Arboretum of Harvard University, Cambridge, Mass., U.S.A.



TABLE I.

	<i>M. longifolia</i>	Japanese natural oil	Brazilian natural oil	B.P. standard
Oil percentage	.. 0.9438 leaves fresh	1.07-1.8% whole dry herb	—	Not less than 0.5%
Refractive index	.. 1.495 31°C	1.460-1.463 at 20°C	1.4577-1.4695 at 20°C	1.460 to 1.470 at 20°C
Sp. gr.	.. 0.985 at 30°C	0.895-0.972 at 15°C	0.877-0.898 at 25°C.	0.897-0.910 at 20°C
Optical rotation	.. 1.22 at 30°C	—	—	—
Menthol %	.. 50.5%	69.91%	65.2-88.9%	Not less than 45%
Acid value	.. 1.217	2.0	—	—
Solubility	.. 1-2 vol of 70% alcohol opalasant with more up to 10 vol	2-3 vol of 70% alcohol	—	4.0 vol of 70% alcohol

advisable to cut the crop with sickles in the morning in a bright sunny day after the dew has evaporated. The cut plants are tied into small bundles and hung in the open air or under sheds and dried. The time required for drying varies in summer and autumn. The best state of dryness is considered at a stage when the fresh plant is reduced in weight to 1/3 or 1/4 but is not completely crisp. Bundles of the herb material must not be allowed to ferment.

**Yield.**—The suckers planted in early spring were harvested in July when the first flush of the crop yielded 200-300 maunds/acre which contained 45% stems, 50% of leaves and 5% flowers. The herb contains 75% moisture. The cut stems grown again flowered in late October or early November when the second flush was harvested. The yield of the green herb was found to be about 100 maunds/acre. It contained nearly 75-80% moisture and 30% of stem.

**Distillation.**—The oil was obtained by distilling the fresh leaves of the herb and the yield was nearly 0.943%. For distillation, the cleverger apparatus was charged with fresh leaves. The stems from the herb were removed before distillation. Menthol separated in the crystalline form on cooling the oil to a low temperature. By repeated chilling and filtration, the menthol present in the oil was separated. The properties of the oil and its menthol percentage obtained from the summer

crop of *M. longifolia* L. are given in Table I. It compared favourably with the Japanese and Brazilian natural oils.

### Conclusion

*Mentha longifolia* L. can be cultivated on commercial scale at Peshawar. The oil and the menthol percentage of the crop are up to the standard prescribed by B.P. and that the plant can be used for the extraction of oil on a small scale.

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