The Essential Oils of *Mentha rotundifolia* of European Origin

(Studies on the Essential Oil of *Mentha rotundifolia*, Part IV)

Sir :

Rotundifolone $C_{10}H_{14}O_2$, the principal component of *Mentha rotundifolia* oil in Japan, has been established to be 1-methyl-4-isopropylidene-1, 2-epoxy-cyclohexanone-3 (1, 2-epoxy-piperitenone) by our previous reports.¹⁾ Reitsema²⁾ isolated the same ketone from the oil of American *M. rotundifolia* and independently gave the same structure as ours via a different way. However, Rovesti,³⁾ Schimmel group⁴⁾ and Costa⁵⁾ did not find any α, β -unsaturated ketone in their European *rotundifolia* oils. On the other hand, pulegone was found in the oils of Argentina⁶⁾ and Morocco.⁷⁾ Our Japanese *M. rotundifolia*, though is not native in this country, was introduced as a sample from an unknown foreign country about twenty years ago. According to Murray,⁸⁾ the American strain is shown to be of European origin.

From the above-mentioned facts, *M. rotundifolia* will presumably be native in Europe and may at least be divided into two groups; one contains rotundifolone, and the other does not. In order to elucidate this problem, we have collected various strains of *M. rotundifolia* of European origin, which are shown in the following Table I:

Since the genus *Mentha* is taxonomically exceedingly complicated, the seeds of European origin mentioned above were imported and cultivated in Okayama, Japan. The somatic chromosome numbers of each strain were determined to be 24 by the method re-

TABLE I

1. France : Jardin Botanique de Toulouse, 1955.
2. Jugoslavia : Hortus Botanicus Univ. Ljubljana, 1955.
3. Bergie : Plantentuin der Rijksuniversiteit te Gent, 1955.
4. Italy : Istituto ed Ort Botanico della Univ. di Roma, 1955.
5. Polgne : Institut Scientifique National des Drougues végétales, Poznan, 1956.
6. Portugal : Estação Agronomica Nacional Sacavém, 1956.

ported previously.⁹⁾ The essential oils of these strains were found to have the following physico-chemical properties ;

TABLE II

Origin	$\lambda_{\max}$	Optical density (10 γ /cc)	d_4^{20}	n_D^{20}	$[\alpha]_D^{20}$
France	235m μ	0.240	0.934	1.4833	— 3.27°
Jugoslavia	260	0.481	1.024	1.5010	+148.33
Bergium	260	0.456	1.015	1.4962	+121.92
Italy	260	0.478	1.012	1.5000	+157.50
Poland	260	0.425	1.008	1.4875	+ 95.16
Portugal	260	0.400	0.993	1.4871	+ 72.73

As shown in the above table, the oils of five strains except the French strain were highly dextro-rotatory and showed strong absorption at 260 m μ . The presence of rotundifolone was also proved by semicarbazone and iso-rotundifolone (diosphenolene) formation¹⁾. These facts indicate that most of European *Mentha rotundifolia* are completely identical with those of Japan and America. But the French oil shows different aspects, which gave 2,4-dinitro-phenylhydrazone melting at 157° as a red-orange crystal. The detailed properties of this oil will be reported in the near future.

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