

MEMORANDUM.

Oil of lemon (*Oleum Limonis*) is thus defined by the British Pharmacopœia (Edition of 1898):—

Characters and Tests.—Pale yellow, with the fragrant odour of the lemon, and a warm bitterish aromatic taste. Specific gravity 0.857 to 0.860. It should rotate the plane of a ray of polarized light not less than 59° to the right in a tube 100 millimetres long; and if 100 volumes be fractionally distilled, the 10 volumes first collected should not produce a rotation differing by more than 2° from that produced by the original oil.

The Pharmacopœia of the United States (Seventh Decennial Revision, 1890) gives the following definition:—

A pale yellow, limpid liquid, having the fragrant odour of lemon, and an aromatic, somewhat bitterish taste.

Specific gravity: 0.857 to 0.860 at 15° C. (59° F.). Its optical rotation should not be less than 60° to the right in a 100 Mm. tube, and at a temperature of about 15° to 20° C. (59° to 68° F.).

Soluble in three times its volume of alcohol, the solution being neutral or slightly acid to litmus paper; also soluble, in all proportions, in absolute alcohol, carbon disulphide, or glacial acetic acid.

When kept for some time, the oil should not develop a terebinthinate odour or taste (absence of *oil of turpentine* or of *other oils consisting chiefly of pinene*).

The National Dispensatory (5th edition) defines the specific gravity as about 0.857 to 0.863 at 15° C., and fixes the initial boiling point at 160° C. Seven (7) volumes of alcohol is quoted as characteristic for complete solution.

Oil of lemon is largely (about 90 per cent) composed of terpenes, the chief of which is limonene ($C_{15}H_{24}$). W. A. Tilden found 76 per cent of citrene (=d-limonene), boiling at 176° C.; 6 per cent of cymene (1:4, methylisopropyl benzene) boiling at 175° C., and other hydrocarbons.

The value of oil of lemon, for flavouring purposes, is chiefly due to the presence of citral, an aldehyde which constitutes from 4 to 8 per cent of the oil. (Squire's Companion, p. 398). Citral boils at 224° to 228° C., and is concentrated in the higher fractions when the oil is distilled.

It is because of the large proportion of terpenes in oil of lemon, that flavouring extracts must be made with strong alcohol. When too little alcohol is employed, the oil remains undissolved. It is claimed, however, that a large proportion of the citral, which is the chief flavouring component, is dissolved by a weakly alcoholic liquid, and in this way a so-called "terpeneless lemon extract" is prepared. Since the chief item of expense in lemon flavouring extract, is the alcohol, there is a temptation to manufacturers to employ so-called "terpeneless lemon oil." In Bulletin No. 89 are recorded 27 samples of extract of lemon, made with alcohol varying from 92.36 per cent to as low as 20.99 per cent strength. The oil of lemon found in solution varied from 15.5 per cent to a mere trace. In Bulletin 114, are recorded 110 samples of extract of