

OTTAWA, January 16, 1906.

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SIR,—I beg to hand you a report upon one hundred and ten (110) samples of Commercial Extract of Lemon. These sample represent the article as sold in eleven of the twelve inspectoral districts of Canada. No collections were made in the district of Calgary.

Extract of Lemon is very largely used for flavouring pastry, &c. Its name implies the possession of the characteristic flavour of lemons. This is known to be due to an essential oil (Oil of Lemons) which is present in the lemon peel. Oil of lemons is easily soluble in strong alcohol; and the British Pharmacopœia prescribes alcohol of 90 per cent strength as the proper solvent for lemon oil. According to the directions of the Pharmacopœia of 1898, one part by weight of fresh lemon peel is to be extracted by four parts, by volume, of alcohol of 90 per cent. The product is known as tincture of lemon.

The *Spiritus Limonis* (Spirit of Lemon) of the United States Pharmacopœia, is made from oil of lemons, grated lemon peel and 95 per cent alcohol, and must contain 5 per cent of lemon oil.

The percentage of oil of lemon required to be present in the B. P. tincture is not defined. It may however be stated as not less than such an amount as can be extracted from one part (by weight) of fresh lemon peel, when macerated with four parts (volume) of 90 per cent alcohol.

It is quite true that no legal or authoritative definition of extract of lemon exists; and we are not warranted in holding that commercial extract of lemon must be identical in character with pharmacopœial tincture of lemon. At the same time, it seems impossible that there should be any essential difference between the two, if extract of lemon is to possess, in any high degree, the properties of a flavouring extract. The pharmacopœial tincture is employed chiefly, or solely, for flavouring purposes. As already stated, it owes its value to the contained oil of lemon.

Oil of lemon consists chiefly of terpenes, which are only soluble in strong alcohol. It is therefore impossible to prepare a genuine extract of lemon without the use of strong alcohol. While these terpenes constitute about 90 per cent of oil of lemon, there is present, also, from 4 to 8 per cent of an aldehyde, known as citral; and this aldehyde contributes largely, if not chiefly, to the total flavour. Other substances are present in comparatively small amount; but the total flavor of the extract (or tincture) is made up of the combined flavours of these bodies. Citral may be obtained from other sources than lemon peel; e. g., from lemon grass, (*Audropogon Schoenanthus*). A solution of citral in dilute alcohol possesses a flavour closely resembling that of extract of lemon, but is not to be identified with this latter. There can be no doubt that much of the extract of lemon, sold in America is nothing else than a solution of citral in dilute alcohol; often coloured by turmeric or by coal tar yellows, in order to give it the appearance of a genuine lemon product. The chief inducement to the manufacturer is his ability to use weak alcohol, instead of 90 per cent alcohol which is necessary to dissolve true oil of lemon. In this connection I may quote the following from the report of the Connecticut Laboratory for 1901.

'The materials for a quart of good extract cost about 75 cents; 60 cents for the alcohol, and 15 cents for the oil and peel, or about 2½ cents per ounce. Since an ounce bottle of lemon extract usually sells at retail for ten cents, there is a margin of about 7½ cents to cover cost of manufacture, cost of package and labels, and profits, even when the best materials are used.'