Edible Oils Processed in Canada*

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ALTHOUGH in general trade and commerce Canada is more closely tied to the United States than to any other country—even Great Britain—in the edible oil industry Canada has done no business with the United States for many years.

Tariffs and processing taxes have constituted a barrier between the two countries as solid and as effective as a wall of stone. The wall, of course, surrounds the United States, causing higher prices for oils in this country than those in other producing countries. Thus Canada is forced to look to world wide sources for her crude edible oils.

This situation makes it possible and necessary for Canada to make use of a wide variety of fats and oils in her edible oil industry, but the fact that the crude oils come from so many different sources gives rise to many problems in processing which are not encountered in United States plants using fewer oils, derived from more uniform sources.

Canada's edible oil industry is similar in organization and in technical development to the industry in the United States, and in general the same types of products are made.

Edible oils are used for:

1. Shortenings
2. Salad and Cooking Oils
3. Cocoa Butter Substitutes
4. Miscellaneous Food and Drug Products

No oleomargarine is made in Canada as its manufacture and sale are prohibited by law.

Canadian Crude Oils

The production of crude vegetable oils in Canada is limited to relatively small quantities of corn oil made from corn grown in Canada, South Africa, and South America, and soy bean oil made from beans grown in Canada. Linseed oil also is made for the paint industry.

Some sunflower seed are produced in the prairie provines, but no commercial extraction of the oil from these seed has been undertaken. It appears that the production of sunflower seed oil would not be economically sound at this time.

A new copra crushing plant is now under construction in Vancouver, B. C., for the production of coconut oil for use in Canada. The copra will come from the South Seas in the vicinity of New Zealand and Australia.

It is believed that this will prove to be a successful venture for both Canada and the interests in the South Pacific.

In addition to these vegetable oils which can be refined for use in edible products, Canada produces substantial quantities of marine animal oils which might also be classed as edible after proper hydrogenation and further processing.

These are:

Pilchard Oil
Herring Oil
Salmon Oil
Whale Oil

Newfoundland, a crown colony, which lies close to Canada on the east, produces seal oil which might be used for edible purposes in Canada with proper processing.

These marine oils have not been used for edible purposes to an appreciable extent in Canada up to this time, but as the war continues the necessity might arise for the utilization of all available edible oils and fats.

Canada produces butter, lard, edible tallow, and oleo oil in quantities sufficient for domestic use with some surpluses for export.

Imported Oils

Prior to the beginning of the war in Sept., 1939, when Canada entered at the side of Britain, the following crude oils were imported in commercial quantities:

Crude Palm Oil from the Malay States.
Crude Cotton Seed Oil from England, crushed from African and Brazilian seed.
Crude Peanut Oil from England, crushed from seed produced in Africa and the Near East.
Crude Peanut Oil from Manchuria.
Crude Coconut Oil from the Malay States, Java, the Philippines, or Ceylon.
Crude Coconut Oil, crushed in Germany or England.
Crude Palm Kernel Oil, crushed in England from kernels produced in the Malay States.
Crude Sesame Oil.
Crude Kapok Seed Oils, and other vegetable oils were also imported in small quantities at infrequent intervals.

As the war progressed, England was forced to stop the export of crude vegetable oils to Canada and war conditions upset shipments from the far east.

During the past year Canada has been able to obtain some partially refined or caustic-washed cottonseed oil from South America to take the place of supplies formerly obtained from England.

The imported crude vegetable oils are received in Canada in tank steamers, in small oil tanks installed in passenger liners, and in drums borne by freighters. The ships discharge at Halifax, Montreal, Vancouver, and Toronto, in Canada; and at New York, Seattle, and Portland, in the United States.

Processing

The edible oil processing industry in Canada consists of about ten refineries and four hydrogenation plants located in Montreal, Toronto, Hamilton, Winnipeg, Edmonton, and Vancouver. Several shortening chilling, and packaging plants also are operated, using refined oils processed in the larger refineries.

The imported crude oils are usually bought on specifications covering maximum free fatty acid content and, to some extent, maximum color readings.

The rules of the National Cottonseed Products Association are seldom used as the basis of purchase of these oils.

In general, the laboratory and plant methods used in Canadian plants are similar to those used in United States plants.

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Several Canadian refineries are equipped with centrifugals for caustic refining, but a majority of the plants use kettles.

Bleaching kettles and filter presses are of the usual type, but due to the variety of oils handled, some with very dark colors, the bleaching agents used include a relatively large proportion of activated earths, and special mixtures of fullers earths and bleaching carbons.

High temperature and high vacuum batch deodorizers are used with vacuum cooling tanks. As far as I am able to determine, no continuous deodorizer installations have been made in Canada.

Several enclosed type chilling machines are in use, but most shortening plants use direct expansion ammonia or brine chilled rolls for chilling shortenings.

High pressure homogenizing and automatic or semi-automatic measuring and packaging equipment is generally used in Canadian plants.

Salad oil is produced by chilling in several types of vertical or horizontal tanks, and by filtration through plate and frame presses.

In the hydrogenation plants, hydrogen gas is produced by both the electrolytic and the steam iron methods.

Finished Products

The chief product made from edible oils in Canada is shortening.

The greater portion of this product is the compound type made from hydrogenated vegetable oil stearine mixed with vegetable oils. This is the shortening generally used in the households throughout the country.

Hydrogenated shortenings are made for use in biscuit and cake bakeries, and special shortenings containing emulsifying agents are also made.

Palm oil has been the cheapest edible vegetable oil obtainable in world markets for several years, and Canadian refiners have developed shortening formulae including rather large percentages of this oil blended with peanut, cottonseed, and coconut oils.

The problem presented by palm oil is that of color. This has been met with more or less success by using high temperatures, special bleaching agents, and other special processes developed by individual refiners.

Palm oil also presents a problem in the texture of shortening containing it. Too much palm oil makes a shortening too brittle, but the correct amount adds to the water-absorbing and mixing qualities of the finished product.

The cottonseed oil (from African and South American seed) used in Canada is usually inferior in quality compared to cottonseed oil from the United States, and special refining methods have been developed for processing this oil.

The peanut oil varies in quality but the average oil is satisfactory.

The coconut oil imported from the Malay States and adjoining areas is usually excellent in quality as it is made from sun-dried copra. This oil is used to some extent in shortenings, but relatively large quantities are used in special plastic substitutes for cocoa butter in coatings and fillings for sweet biscuits.

Palm kernel oil is used in Canada for the production of plastic fats by hydrogenation.

Cottonseed, corn, and soybean oils are used as salad and cooking oils with success. The salad oil business in Canada has increased greatly during the last ten years.

Sesame, kapok, and sunflower seed oils are used when they are available.

I have tried to outline the situation on edible oils in Canada during peace times and the early period of the present war in which that country is an active belligerent. What the future holds is a matter of conjecture.

With supplies of crude oils cut off from many parts of the far-flung British empire, and with increasing restrictions on exports and imports in many neutral countries, changes in raw materials for the Canadian edible oil industry will almost certain take place.

The problem of obtaining edible fats and oils will no doubt be solved by finding new sources of supply, and by utilizing more of the oils and fats produced in Canada.

Abstracts

Oils and Fats

Edited by
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STABILIZATION OF FATS, OILS AND SOAPS. H. I. Henk. *Fette u. Seifen 48,* 90-1 (1941). A review.

HYDROLYSIS AND OXIDATION OF SPOILING FATS. E. Glimm and A. Ellert. *Fette u. Seifen 48,* 60-2 (1941). Data on butter fat, lard and triolein are presented and include change in acid, sapon. and Lea values. Peroxides were unstable above 60°. The dependence of peroxide formation on light rays was affirmed.

DEACIDIFYING BY ADSORPTION. H. A. Boekenoogen. *Fette u. Seifen 48,* 59-60 (1941). Al_2O_3 will remove most or all the phosphatides, sterols and chlorophyll and it removes part of the carotinoid and quinoid compds.

OFFICIAL GRAIN STANDARDS OF THE UNITED STATES FOR SOYBEANS. U. S. D. A. Agr. Marketing Ser. *Fed. Register. 6,* 2675-6 (1941).

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INDEX OF REFRACTION OF UNSAPONIFIABLE. L. Kifler and R. Opfer-Schaum. *Fette u. Seifen 48,* 49-51 (1941). The optical refraction on 10 oils was investigated. It was more variable than that of the original oil. This was particularly important with olive oil which can be distinguished from other oils with this criterion. Data using a 1.4840 glass at 0° were olive 56-63, peanut 78-94, sesame 114-137, almond 106-107, linseed 94-96, grape seed 91-92, cottonseed 84, soybean 98-99 and sunflower oil 95-96.

APPLICATION OF MOLECULAR DISTILLATION IN THE FAT FIELD. II. THE DISTILLATION OF GLYCERIDES. H. P.