# SULPHUR OLIVE OIL

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There are three general grades of olive oil produced and sold, namely edible, commercial and sulphur olive oil, commonly called olive oil foots. There is still another grade on the market which is called industrial, recovered and redeemed, but this oil is made either by bleaching the sulphur olive oil or in some cases by acidifying the soapstock obtained by refining low grade commercial oils.

In making edible oil, only fresh sound olives are used. These are pressed lightly, cold, without the use of water, steam, or heating, and only a small portion of the oil is removed. This oil may be taken off in one or two pressings, and the resulting products sold either separately as two kinds of edible oil, or mixed and sold as one lot. The acidity of the oil is generally under 1 per cent, the color and flavor excellent, and the oil limpid and clear.

In making commercial oil, no sorting of the olives is necessary. The residue from making edible oil, together with any olives not suitable for edible purposes, are pressed at high pressure, with the use of preheating and the addition of water or steam, until no further oil can be removed by pressure. The pulp is generally subjected to several treatments in making this grade of oil, and there are therefore several grades of commercial oil produced with acids running from 1 per cent to 10 per cent or more, and with varying colors.

After this treatment, the resulting pulp is dried and extracted with carbon bisulphide, which removes all the remaining oil from the mass. The solution of oil and solvent is steam distilled to removed the bisulphide, and the sulphur oil mixed with water is collected in tanks and allowed to settle. The water drops to the bottom of the tank, and the oil is removed by means of a pump and a swinging suction, pumping the oil into storage tanks or into barrels (second hand) for shipment. If by an error on the part of the operator, the suction should be dropped too low, a mixture of water and oil, or even clear water may be pumped. In this case, there may be several barrels which will contain oil mixed with free water, but there should not be more than four or five. Yet we have seen shipments which showed free water in 86 barrels out of three hundred, and some of the barrels were over half water. Such cases, however, fortunately are rare and most shipments are satisfactory in water content. Usually the moisture content of this material is under 3 per cent, this amount of water being entrained by the oil due to the manner of preparation; but this three per cent would not be visible as free water.

As will be seen this oil is a true olive oil, and not a "foots" or settling from the oil. It has the usual characteristics of olive oil. It is

rather thick, however, and the color varies from green deep green though an olive green to a brown. This color is due to the fact that the chlorophyll is extracted from the olives by the carbon bisulphide, and the amount of green chlorophyll present depends upon the condition of the olives, the length of time that the pulp has decomposed before being extracted, etc. In February the sulphur olive oil contains plenty of the green chlorophyll and is generally of a good green color, but later in the year the color is more brownish.

This variation in the color of the oil is shown very distinctly in the soap. A small piece of soap made by saponifying a sample of oil received in February or March will generally be a very distinct dark green in color, but later in the season, the color of the soap turns more brownish, showing all shades of olive greens, and even dark browns. Of course, the condition of the pulp before extraction has considerable to do with the color. If the pulp has been allowed to decompose considerably before it is extracted, the chlorophyll will lose its coloring qualities, and the soap will be much browner. Thus even in the first of the season, samples of new crop oil have been received which did not give a good green colored soap.

This soap test is made as follows:

A 10 gram sample of the oil is weighed into a three or four inch evaporating dish, and placed upon the steam bath. When hot, 8 cc of caustic soda, 20° Beaume, are added and the whole stirred thoroughly. After standing five or ten minutes, the soap is again stirred to thoroughly incorporate the lye and oil. It is then allowed to stand upon the bath until it is completely saponified, about an hour in all.

Also, differences in the age and condition of the pulp produce marked differences in the acidity of the oil, so that free fatty acid contents will vary from 12 per cent or 15 per cent to 50 per cent or more. Due to the fact that this oil is a by-product, and that it is necessary to produce the best edible and commercial oils possible, it is not feasible to regulate the conditions of the manufacture of the sulphur oil, and therefore it is difficult to know before delivery what class of material can be shipped.

Sampling of this oil in cold weather is attended with many difficulties. The pulp oil contains more stearine than olive oil, and therefore has a higher congealing point. In cold weather, this oil becomes quite thick in the barrels. If free water is present in the barrels, an open trier will not show it as the water will run off the sampling instrument. If a closed tube is used, the first plug of hard oil that enters the tube will block it, preventing the entrance of any more material, whether water or oil. Therefore a sampler must be very careful in sampling this material. In fact, if free water is present, the safest method is to dump the barrels containing free water into a tank, allowing the water to settle, and drawing it off and weighing it. Then the moisture content of the balance can be de-

termined by sampling and analyzing as usual. Thus if 100,000 lbs are placed into a tank, and 10,000 lbs. of free water is drawn off, and the balance shows a moisture content of 5 per cent, there will be a total water content of the 10,000 plus 5 per cent of 90,000 or 14,500, or 14.5 per cent of the total.

Where this oil is stored in storage tanks in countries which have rather cold winter weather, considerable variations in the shipments will result, if care is not exercised. Due to the successive coolings, stearine is deposited in the bottom of the tank. If the shipments are drawn from the top without mixing, the more liquid portions will be removed, and the stearine will be left in the tank. When this stearine is finally shipped, it will be more thick than the previous oil, and will have much higher titre, and lower iodine value due to the absence of the more liquid fatty acids.

As stated above, sulphur olive oil has the usual characteristics of olive oil, except that the unsaponifiable content is higher. In olive oil, this is usually under 1 per cent but in sulphur oil it runs up to 2 per cent or 2.50 per cent, and rarely is as low as 1.3 per cent.

In particular, the sulphur oil has a titre value of from 19 to 24, and an iodine value of 79 to 88 or 90. Shipments, however, have been received in which the titre varied from 36 to 39 and the iodine values from 60 to 63. These are clearly not normal, and would usually be classed as adulterated. Although they do not contain their normal proportions of liquid and solid acids, still in this case we did not feel that they were adulterated but that rather they contained excessive amounts of stearine. The only material which would lower the iodine values would be palm oil, the animal fats, and cocoanut or palm kernel oils. Of these, palm oil would change the color, and the amount necessary to produce the above change in the iodine value would not produce the corresponding change in the titre. Except for the change in color, the same can be said for the animal fats. On the other hand, cocoanut oil and palm kernel oil would not change the titre at all. Stearine, however, has a theoretical titre of 60 and iodine value of zero, and the amount necessary to produce the above change in iodine value would produce approximately the corresponding change in the titre. Further, these samples had the normal unsaponifiable content, and the normal acetyl values of sulphur olive oils. The acetyl values of these samples under investigations as well as those of samples of known purity were between 28 and 35.

NEW YORK PRODUCE EXCHANGE,
NEW YORK, March 18, 1924.

## FISH OIL RENDERING PLANT FOR CANADA

A fish reduction plant, with a capacity of 40,000 imperial gallons of fish oil per month, will be constructed on the north end of Vancouver Island within the next few months for a recently organized local firm and will be in operation next season.

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## FIRST USE OF SOAP

Just about the time that early man quit wearing skins and in their stead donned garments of wool or linen, he began to think, though not very seriously, of the problem of washing. For a long time, anthropologists tell us, these washings, of self and of clothing, were most infrequent, but washing had begun to be recognized as a necessary, if bothersome something which must be done, if only very occasionally.

At first, as is still the case in the most cannibalistic of the South Sea Islands, washing one's person with water was most distinctly not done. Instead, these personal ablutions were conducted much after the manner still practiced by the nomads of the Arabian desert where sand and sunlight are used in lieu of soap and water.

After this, however, as the dawn of time receded into the past, the use of water gradually came into common practice and washing oneself and one's clothing reached the stage where it became either a religious or social rite.

Incidentally, it was Caesar's soldiers who never washed above the waist, who brought back to Rome from the Gallic war a new substance—the same thing which we now call soap. These soldiers found the war-like German tribes living across the Rhine making and using it. They marveled and then, being Romans, adopted this new substance for their own. That is the way we got soap.—Exchange.