soap on the surface containing the unsaponified fat and a salt solution below containing the glycerine. There may be a third intermediate layer, containing a proportion of all the constituents. If the salt is added in sufficient quantity soap curds will be formed. This action takes place not only with strong solutions of soap, but with comparatively weak ones also. Caustic soda has the same effect as common salt, and is even more effective; it also forms curds. Carbonate of soda and sulphate of soda also will salt out soap, but they are not so effective, and they behave in a somewhat different manner, forming two liquid layers, the upper soap layer setting to a gelatinous mass on cooling. Sulphate of soda is the least effective.

### Effect of Salt

The effect of the salt is, however, not merely that of separating the soap in the form of a paste or as curds. There are in the kettle, besides neutral soaps, the products of dissociation—free alkali and an acid soap or free acids—which are caused to recombine by the addition of the salt; that this is the case may be demonstrated by estimation of the free alkali before and after such addition.

The writer has been able to touch upon only a few points in the present article. As time goes on, other problems will be dealt with, and, no doubt, there will be opportunities for treating upon these subjects in a fuller manner. *Oil and Color Trades Journal.*

# The Detection of Extracted Olive Oils

## Organic Silver Salts Exhibit Marked Reactivity to Sulphur

By M. F. LAURO

THE various tests for extracted oils are based on reactions with traces of the solvents left in the oils after extraction. On Olive Oil Foots or Industrial Olive Oil, extracted from olive pulp by means of carbon bisulphide, sufficient solvent is always present to be easily ascertainable, by almost any of the methods used for the detection of sulphur or sulphur compounds. When, however, such oils are bleached, refined and blended with pressed oils, the percentage of solvent present is considerably reduced, generally to a point where it becomes quite a problem for the chemist to determine its presence.

### Metallic Silver Method

The so-called "Coin" test is the one most often used in the United States for the detection of carbon bisulphide in olive oil. The suspected oil is heated, with a bright new dime or piece of silver foil suspended half-way in the oil, in a test-tube immersed in an outer oil bath to prevent scorching. The heat is gradually carried up to 210°C. taking from fifteen to twenty minutes, then held at that temperature for another fifteen minutes. The silver is examined to see if blackened. A black stain on the silver indicates the presence of sulphur or its compounds. At times the metal is stained a coppery hue, rather than black, in

which case the oil may be further heated to 240°C. and the color noted. Some olive oils may discolor silver but unless the tarnish is black on the coin, even though slight in extent, the test is not considered conclusive.

### Acetic Anhydride Reaction

In Italy, a test frequently used is that of Pachini or Bracci, where a few cc. of oil are warmed with acetic anhydride, filtered through a paper wet with the anhydride, and a drop or two of concentrated sulphuric acid allowed to come in contact with the filtrate. A rose-red coloration changing to violet, or to green when diluted with water, indicates an extracted oil.

### Organic Silver Method

In place of metallic silver, which is not sensitive enough and which requires a temperature near the scorching point of olive oil, the writer employs an organic salt of silver, such as the oleate, salicylate or preferably benzoate, in finely powdered form.

The test is conducted as follows: About five cc of the oil to be examined is heated in a test tube to 150°C., and a pinch of silver benzoate is dropped in from a spatula and shaken into the oil. If any sulphur-bearing solvent be present, the oil immediately begins to darken and will discolor proportionately to the percentage of sulphur present. If a mere trace is present the benzoate may be added to the oil in the beginning and then heated, due care being taken to avoid scorching of the oil.

This test has been found sensitive to 0.2% of olive oil foots in a pressed oil, as determined by comparing the color formed with a blank of the original oil without addition of "foots," but heated with benzoate, in the same manner. Neither the "coin" nor "Pachini" test reveals the presence of this amount.

### Physical Changes

Concurrently, the writer makes use of the color change and the odor of olive oil on heating as confirmatory tests. A good edible oil will have a characteristic odor, somewhat like garlic, and in most cases the color changes on heating from golden yellow to a distinct light green. In heating extracted oils, not only does the color darken with silver benzoate to reddish black and black, so that it is opaque, but the odor is decidedly unpleasant and "choky." With commercial pressed oils, the color may darken slightly, which sometimes happens, but the oil is not opaque.

Oil extracted with ethylene trichloride now appears often on the market. The Beilstein copper-wire test easily shows the presence of this halogen by the green coloration imparted to a flame when an ignited copper wire wet with the oil is thrust therein. Such oils lighten, rather than darken in the benzoate test.

Since many compounds that affect silver salts, such as aldehydes, are present in inferior, rancid and high acid olive oils, there is at times a slight reduction of silver with such oils, but the color change is slight under the conditions of the test and easily differentiated from that with oils containing carbon bisulphide.

If 0.02 gram of silver benzoate and 5 cc. of oil are used, the test may be made quantitative by comparing the color produced against that shown by standards containing known amounts of olive oil foots or of carbon bisulphide made up and run at the same time.