SPECIFICATIONS OF THE AMERICAN OIL CHEMISTS' SOCIETY FOR PRESSED OLIVE OIL AND OLIVE OIL FOOTS

Preamble:—As a result of the work of the Olive Oil Committee, headed by Mr. M. F. Lauro, dating from August, 1933, to May of this year, the following specifications are recommended by the Society for pressed olive oil and olive oil foots.

Specific Gravity at 25/25° C...0.909 to 0.915
Iodine Value (Wijs) ......80 to 88
Saponification Value ....188 to 196
Titer of the fatty acids ....17° to 26° C.
Crismer Turbidity Test ......68.5° to 71.5° C.
Unsaponifiable Matter (FAC).Maximum 1.4%

For Californian oils, the iodine value shall be 79 minimum.

For African (Tunisian, Algerian, Moroccan) and for Dalmatian oils, the iodine value shall be 92 as a maximum.

For all oils of edible grade, the free fatty acid content shall not be greater than 1.5% as oleic, and shall be clear, free from visible water and suspended matter, and possess the characteristic olive flavor.

In addition to the above tests, the Committee recommends such necessary and reliable tests as would establish freedom from foreign oils, as the Halphen for cottonseed oil, the Villavecchia for sesame oil and the Bellier for peanut oil, and prove the oil to be pressed and not solvent extracted. The oil shall contain no artificial or added coloring matter.

Olive Oil Foots

Iodine Value (Wijs) ......77 to 90
Saponification Value ....186 to 196
Titer of the fatty acids ....16° to 26° C.
Unsaponifiable matter (FAC).Maximum 2.3%
Ash ....Maximum 0.20% to consist chiefly of iron oxide and only traces of lime, etc.
Moisture and Impurities (ethyl ether insoluble).Maximum 3.00%

ABSTRACTS

Oils and Fats

Edited by
W. F. BOLLENS and M. M. PISKUR

Studies on the rancidification of butter fat. N. N. Godbole and Sadgopal. *Z. Untersuch. Lebensm.* **72,** 35-45 (1936). Indian buffalo butter fat (ghee) was tested for stability against rancidification. Influence of light, air, moisture content, metals and rancid ghee on the stability and the characteristics are tabulated.

Aldehyde formation in purified fats. II. Heat and aldehyde formation. H. Schmalfuss, H. Werner and A. Gehrke. *Margarine-Ind.* **28,** 43-4 (1935); *Chem. Zentr.* **1935, II,** 1987.—The effect of heat on aldehyde formation in soybean oil, completely hydrogenated soybean oil (m. 62°), Me laurate, lauric acid and glycerol (all aldehyde-free) was investigated. The samples, sealed in glass tubes, were kept, some at room temps., some at 150°. While all the materials investigated showed rapid ketone formation, no *epihydrinaldehyde* (in combined form) was formed except after heating for 27 hrs. Glycerol, soybean oil and solid soybean fat showed no aldehyde formation; however, lauric acid and its Me ester reddened Schiff's reagent (according to Holde, *Kohlenwasserstoffe und Fette,* pp. 657) the more strongly the more they were heated. Glycerol showed aldehyde formation when exposed to the Hg lamp but not when heated at 150°. Epihydrinaldehyde formed in Me laurate when exposed to the Hg light but not when merely heated. *(Chem. Abs.)*

Babassu oil. Margaret J. Hausman. *Soap,* **12,** No. 9, 28-31. Monograph.

Report of Committee on Analysis of Commercial Fats and Oils, American Chemical Society. W. H. Irwin, R. W. Bailey, T. C. Law, C. P. Long, H. J. Morrison, M. L. Sheely, L. M. Tolman, H. P. Trevithick and J. J. Vollertsen. *Ind. Eng. Chem., Anal. Ed.* **8,** 233-7 (1936).—During the year the following subjects were studied and recommendations made for the adoption of several methods: (1) modified Wiley m.-p. method for fats and fat acids, (2) thiocyanogen method as modified and used in the Procter & Gamble labs., (3) modified Twitchell method for the sepn. of liquid and solid fat acids, and (4) detection of foreign fats contg. tristearin in unhydrogenated pork fats. Details of the methods are given. *(Chem. Abs.)*

The iodine number as a universal biological constant. The gravimetric determination of the iodine number by the absorption of bromine vapor. Hermann Wollschitt. *Arch. exptl. path. Pharmakol.* **179,** 260-5 (1935).—A weighed sample of the oil or fat is spread as a thin layer in the bottom of a glass container, or is spread on filter paper. Care is taken to remove the solvent completely before weighing. It is then exposed to Br vapor for 15 min. to 3 hrs., heated

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at 100° for 30 min. to drive off free Br, and again weighed on a microbalance. The difference is the amt. of Br taken up, and a simple calcn. gives the I no. of the material. The method is consistent and reliable. Data are given for a large no. of fats and oils. *(Chem. Abs.)*

Application of the thiocyanogen value in the determination of oleic and linoleic acids in natural oils which are free from linolenic acid, according to Kaufmann. S. K. Sharma. *J. Indian Chem. Soc.* **13**, 151-4 (1936).—There is confusion in the scientific literature on the application of Kaufmann's method for calcg. the percentages of unsatd. acids or their glycerides in natural oils on the basis of thiocyanogen value. The equations used are not strictly accurate because every fat contains glycerol which is not taken into account and because some oils contain appreciable quantities of unsaponifiable matter which are ignored. *(Chem. Abs.)*

Practical tests on partial hardening of strongly unsaturated oils. I. Linseed oil. F. Wittka. *Allgem. Oel- u. Fett-Ztg.* **33**, 305-9 (1936).—The aim of the investigation was to produce a low I no. liquid nondrying oil from a highly unsatd. drying oil. Drying oils when hardened to an I no. of 90 have yielded only soft fats instead of a liquid product, due either to formation of iso-oleic acid or to part of the oil fat acids becoming hydrogenated past the oleic acid stage. A highly active Nikieselguhr catalyst was prepd. Several hydrogenation tests on peanut oil made at temps. from 40°-100° (10° intervals) indicated that the activity of the catalyst increases considerably between hydrogenation temps. 70° and 80° when judged from the standpoint of solidification temps. of products. Linseed oil samples were hydrogenated at 50, 60, 70, 90 and 100° C., resp., using 1% catalyst which contained 30% Ni. The usual increase in solidification point and decrease in I no. occurred with increase in hydrogenating temp., but, striking results were noted in the oils hydrogenated at 70° when compared to the use of 90°. Hydrogenation at 70° for 60 min. gave a product liquid at 0° with an I no. of 97.8, while that hydrogenated 50 min. at 90° solidified at 30° and had an I no. of 99.1. W. concluded that this sharp increase in solidification point above 70° is due to formation of iso-oleic acid. The hydrogenation at 70° was repeated to obtain sufficient oil for further tests. A 48 hr. test with the oil contg. 2% siccative proved that the oil was nondrying. Analysis of the oil gave: I no. 97, (SCN) no. 74.2 and hexabromide no. 0. Fat acid compn.: satd. solid acids about 16, unsatd. solid acids 12, oleic acid 42 and linoleic acid 30%. Conclusion: Linseed oil has been partially hardened to yield a nondrying oil. *(Chem. Abs.)*

Refractometric method of determining oils in seeds and oil cakes by digestion. P. Z. Zaĭchenko and V. P. Rzhekhin. *Vsesoyuz. Nauch.-Issledovatel. Inst. Zhirov, Analysemethoden in der Oel- u. Fettind.* **1936**, 31-60 (in German 60-1).—Digest 1 g. of ground seeds with 35 cc. H_2SO_4 (d. 1.58) and 2 cc. of iso-AmOH in a water bath at 65° for 10-45 min., and then centrifuge for 10-15 min. After shaking with 2 cc. of petr. ether, b. 40-60°, *n* 1.3798, examine the ext. in the Abbé refractometer at 20°. Detns. of sunflower, cotton, hemp and flaxseeds can be made in 0.5-1 hr. with an accuracy of 0.3-0.5%. With the use of an American refractometer of the Abbé type the accuracy is increased to 0.05%. Procedures and comparative tables for various forms of the seed products are shown. *(Chem. Abs.)*

The presence of hydrocarbons in the products removed in the refining of peanut oil. Henri Marcelet. *Compt. rend.* **202**, 1809-11 (1936).—The unsaponifiable fraction of peanut oil yielded phytosterol and a colored, noncrystallizable oily liquid. The latter after distn. at 4-5 mm. pressure, sapon. and extn. with petroleum ether yielded 1.8 g. of an amber-colored hydrocarbon per ton of oil. Redistn. (3 mm.) yielded 3 malodorous fractions and an odorless, nonvolatile residue. The small amt. of the 1st fraction and residue prevented their further study. The 2nd and 3rd fractions had the compn. $C_{15}H_{30}$ and $C_{19}H_{38}$, for which the names *hypogeene* and *arachidene*, resp., are suggested to indicate their resemblance to hypogeic and arachidic acids. These substances contribute to the flavor of peanut oil. *(Chem. Abs.)*

The determination of butter fat contents in food fats and foods in general. Th. von Fellenberg. *Mitt. Lebensmittelunters. Hyg.* **27**, 133-57 (1936); *Chem. Zentr.* **1936** [II], 1457. The method depends on difference in amt. of alkali necessary to titrate the free fat acid distd. from the samples under definite conditions.

Determination of neutral equivalents of higher fatty acids. R. B. Sandin, M. Kulka, D. W. Woolley. *Ind. and Eng. Chem.* **8**, 355-356.—The method for determining the neutral equivalent of a fatty acid of high molecular weight, described in this paper, involves titrating the acid in absolute alc. soln., with sodium ethylate as the base, using thymolphthalein as the indicator. The color change is from yellow to green and is very readily detected. To make the end point even more readily determined, the titration is performed in a Nessler tube. Finally, the primary acid standard, which has been found to be very satisfactory, is a highly purified grade of stearic acid.

Investigations on fishy flavor. W. L. Davies and E. Gill. *J. Soc. Chem. Ind.* **55**, 141-6T (1936).—It has been shown that with increasing fishiness there is a corresponding increase in the total N and organically combined N of fish oils and ether exts. of fish products, together with a deepening of the brown color. On long standing with casein, betaine, lecithin or other N sources or by heating with $ONMe_3$ (I) at 105° for a

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short time, various oils, notably linseed oils, can enter into org. combination with N and develop an unmistakably fishy odor. Glycerol (II), cholesterol and the unsaponifiable matter of vegetable and animal fats do not acquire an odor when heated with I at 107° though the fat acid fraction of linseed oil reduces I and acquires a fishy flavor. Fishy oils and their exts. and steam distillates, after treatment with various reagents give pos. reactions for HCHO in phloroglucinol and Schryver tests and also for peroxide and NMe_3 by phloroglucinol (purple). Fishiness appears to be assocd. with traces of peroxides, HCHO and tertiary N either in the form of the volatile base or I or both. *(Chem. Abs.)*

Contribution to the knowledge of glycerides of fat and oil. XIV. Glycerides of hardened castor oil. A. Bomer and Fr. Brehm. *Z. Untersuch. Lebensm.* **72**, 1-34 (1936).—Castor oil was hardened to m. p. 62-66.5° and I no. 3.0. The fat acids became predominantly stearic with oxystearic and 10% other acids. Both stearic and oxystearic acid result on hydrogenation of ricinoleic acid. A double bond is reduced more easily than an (OH) group. The product from hardening glyceride of ricinoleic acid contained 10% nonhardened glycerides, 5% tri-oxystearin (m. p. 89.4), 10% stearo-di-oxystearin and 75% di-stearo-oxystearin.

Fish oil. L. T. Work, C. Swain, A. Wasmuth and J. Mattiello. *Ind. and Eng. Chem.* **28**, 1022-4 (1936).—A commercial batch of 250 gallons of Menhaden fish oil was heat-processed at 296° C. (565° F.), and the following properties were measured on samples taken at frequent intervals: viscosity, specific gravity, acid number, iodine number, octabromide number, saponification number, glyceride number, surface tension, and cloud point. The variation of each of these properties with respect to viscosity is presented in graphical form. Fish oil behaves similarly to linseed oil under the conditions of heat processing employed except that the saponification and glyceride numbers decrease with an increase in viscosity. Up to a viscosity of 53 poises and an acid number of 9.9 no livering is encountered when bodied fish oil is ground with zinc oxide or peacock blue.

PATENTS

Oil with grain material to stabilize against oxidation. S. Musher (to Musher Foundation, Inc.). U. S. 2,049,017, July 28, 1936.—A method for transfusion of flavor and anti-oxidant qualities from a cereal into a fatty glyceride which comprises contacting a fatty glyceride with a cereal at approximately 140° F. for about 15 min. and subsequently filtering off the cereal fibers.

Stabilizing shortening. D. P. Grettie. Brit. 446,792. May 6, 1936.—A modification of the method of stabilizing lard according to pat. 395,971, which consists in adding to the lard, in place of hydrogenated sesame seed oil, a quantity of distillate comprising a heavier-than-water liquid secured by the deodorization of hydrogenated sesame seed oil.

Fat stabilization. D. P. Grettie. U. S. 2,052,289. Aug. 25, 1936.—The method of stabilizing lard which comprises adding thereto and thoroughly incorporating therewith from 1-10% of crude soya bean oil.

Bleaching fats, oils and waxes, etc. Ger. 632,516. Cl. 23a Gr. 3, July 9, 1936.—Fats, oils and waxes are bleached with a freshly prepd. mixt. of H_2O_2 and acetic acid anhydride.

Manufacture of edible fats and oils. Ges. fur Verwertung Fauth'sche Patente G. m. b. H. British 446,997.—Whale blubber is heated to 70° C. and quickly pressed; the resulting oil is immediately refined.

Refining oil. W. Fuchs. Ger. 630,790. Cl. 23a Gr. 3.—Oil is deacidified with NaOH, emulsified with $Ba(OH)_2$ soln. and treated in an electro-osmosis app. for 6 hrs. using 64 volts. Ba is removed with H_2SO_4 and the oil freed from H_2O by centrifuging.

Refining oils and fats. Harburger Olwerke. Brinchman and Mergell. Ger. 631,224. Cl. 23a Gr. 3.—The oil is treated with phosphoric acid and cellulose.

Improving oils and fats and other glycerides of fat acids. Willy Ekhard. Fr. 797,099, Apr. 20, 1936.—The oils and fats are improved as regards odor, taste, keeping qualities and consistency by mixing them with a fermentable substratum which is brought into active fermentation by microörganisms, such as yeasts, lactic ferments and ferments producing propionic and butyric acids, and sepg. the oils, etc., when fermentation has ceased. A small amt. of a catalyst such as Ni, Sn, ZnO, salts of Mn, $SnCl_2$ or Na_2SO_3 may also be added. *(Chem. Abs.)*

Margarine and oil for use therein. H. W. Vahlteich, C. H. Haurand and R. H. Neal (Best Foods, Inc.). U. S. 2,047,530.—A margarine oil comprising a hydrogenated cotton seed oil having glycerides corresponding to 18-25% satd. fat acids, less than 5% linoleic acid and remainder oleic acid, said oil having a melting point of about 90 to 95° F. and a setting point of about 72-79° F.

Preventing foaming of emulsions. H. E. Buc (to Standard Oil Development Co.). U. S. 2,052,164, Aug. 25, 1936.—An oil-in-water emulsion containing in addn. to oil, water and an emulsifying agent, a substance selected from the class consisting of high molecular wt. satd. fatty acids in amt. ranging from 0.2 to 2% of the amt. of emulsifying agent present.

Lubricating oils. A. W. Ralston, W. O. Pool and J. Harwood (to Armour & Co.). U. S. 2,053,045, Sept. 1, 1936.—A lubricating oil comprising a mineral lubricating oil and a small amt. (0.25-1%) of an aliphatic nitride having at least 6 C atoms to increase the oiliness of said mineral oil.

Penetrating oil. A. W. Ralston, W. O. Pool and J. Harwood. U. S. 2,053,046, Sept. 1, 1936.—Mixt. of mineral lubricant and aliphatic nitrile.

Improving blown fatty oil. J. Scheiber. Ger. 625,902. Cl. 12o 26.01, Feb. 17, 1936.—Example: 900 pts. of linseed oil are blown 6 hrs. at 150° or until there is an 80 Ac no.; 420 pts. of linseed oil fat acids are added and the mixt. is heated to 200° for 2 to 3 hrs. The temp. is progressively raised to 300°, cooled, 46 pts. glycerin are added and heat is applied until the acid no. falls below 5. Protective coatings made with this product are highly water resistant.

Wool grease naphthenate compositions suitable for use as driers in paints, varnishes and lacquers. Friedrich Meidert (to I. G. Farbenind, A.-G.). U. S. 2,049,396, July 28.—Wool grease or wool grease acids are saponified with an aq. soln. contg. an excess of caustic alkali, the excess alkali is neutralized with naphthenic, linoleic or resin acid or the acids obtainable by the oxidation of paraffin or petrolatum, a sol. salt of a siccative metal such as $MnSO_4$ is added, and the ppt. thus formed is washed with water, water remaining in the ppt. is evapd. and the ppt. is heated to the fusion point. *(Chem. Abs.)*

ABSTRACTS

Soaps

***Edited by* M. L. SHEELY**

The Nature and Structure of Solid Soaps and the Importance of These Factors in Soap Making. B. Tyutyunnikov and N. Kas'yanova. *Allgem. Oel u. Fett-Ztg.* **33,** 204-16 (1936).—Literature on the subject is reviewed. Tyutyunnikov and Kas'yanova present 32 photomicrographs of soaps. All the soaps displayed a crystal structure. Further study should lead to a criterion for investigating common soap manufacturing methods so as to create such improvements that will yield desirable physical qualities in soaps. *(Chem. Abs.)*

Bleaching Oils, Fats and Soaps. *Seifens. Zeit.* **63,** 291-3 (1936).—The method of bleaching dark-colored fats, tallows, etc., by treatment first with dilute sulphuric acid and then with hydrogen peroxide of 30% strength, is described. It may be used also with oils, but the author is of opinion that bleaching the soaps is preferable to prior bleaching of the oils and fats. These latter may be subjected to a little preliminary bleaching or refining with dilute sulphuric acid, then saponified, and the resulting soap—either in the soap pan or crutcher—bleached with hydrogen peroxide, of which various proprietary brands are named, together with suitable apparatus, including a steam jet stirrer. *(Oil and Colour Trades Journal* **90,** 1976, 616.)

Preventing Rancidity. *Drug and Cosmetic Industry* **39,** 2, 241 (August, 1936).—Antioxidants are useful materials to add to fats and oils to prolong the induction period and retard the development of rancidity. Among these are hydroquinone, alpha and beta naphthol and guaiacol as well as tannings. Hydroxydiphenyls and dinaphthyls have a protective action when they are present in concentrations as low as 0.001 to 0.1%. The protective action is also exhibited by compounds in which the aryl groups are not directly connected but are separated by a methyl, amino or oxygen group. Transition products of phenol with formaldehyde or amines are also useful as antioxidants. Several of the unsaturated polybasic acids, such as maleic, fumaric, aconitic, citraconic and itaconic acids have been found useful. Of the amino derivatives used for stabilization, the aromatic amines for aminophenols such as para-aminophenol are effective in concentrations of 0.01-0.5%. *(Allg. Oel und Fett-Ztg.)*

Synthetic Fatty Acids from Mineral Oils. *Oil and Colour Trades Journal* **90,** 1975, 554 (1936).—In Russia Petrov, Daniloswitsch and Rabinowitsch used mineral oil distillates for the production of synthetic fatty acids. Oxidation is preceded by sulphonation with oleum or gaseous SO_3. With the simultaneously purification of the crude oil with 18% sulphuric acid containing 20% anhydride, the sulphonation products obtained are known as Kontakt Petrov and find extensive application in the fat-splitting industries. The purified oil after separation of the sulphonation products is neutralized with 4% caustic soda and consists chiefly of hydrocarbons of the methane and naphthene series. It is oxidized at atmospheric pressure by passing through an air current at 90 to 115° C. for 48 hours. A catalyst is used. After 48 hours 15 to 20% fatty acids are produced. The total acid yield and the predominance of one or other kind of acid depends on the time of reaction.

The crude acid mixture contains carboxylic acids, oxy acids, lactones, anhydrides, alcohols, aldehydes, ketones and resins. Carboxylic acids are used in soaps and the oxy acids in the lacquer industry, in plastics and for dark soap for special purposes. Mixed with hydrogenated fats up to 50% they are used in making soap. The fatty acids sulphonate well and become solid. The calcium salts of the fatty acids rub out well with pigment and dry quickly. The fatty acids are being used in varnishes or interior work.

The Thermal Conductivity of Glycerol-Water Mixtures. S. Erk and A. Keller. *Physik. Z.* **37,** 353-8 (1936).—Determinations cover the range 6° to 72° and 18 to 88% glycerol by weight. *(Chem. Abs.)*

Glycerin Research in Russia. *Perfumery and Essential Oil Record* 27, [8], 327 (1936).—Considerable attention is now being given to research in connection with oils, fats and fatty acids, in Russia, including fat-