ABSTRACTS

Oils and Fats

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

Oxidation of unsaturated fatty oils with atmospheric oxygen. Johs. M. Aas. *Fettchem. Umsch.* **43**, 52-5 (1936). Seal oil, wheat germ oil, cod liver oil and oleic acid were studied with a special apparatus for detg. correlations between O uptake, gain in wt. and loss in iodine no. Wheat germ oil and oleic acid take up 3 atoms of O per double bond. Rape oil and cod liver take up 2-2.2, O atoms per double bond.

Ketone formation in purified fats. VIII. The effective range of light rays. 3. H. Schmalfuss, H. Werner, A. Gehrke and R. Minkowski. *Margarine-Ind.* **27**, 93-5 (1934); cf. *C. A.* **29**, 4959^1.—Soybean oil was rapidly ketonized by light of wave length less than 410 mμ, much more rapidly than the Me ester of lauric acid on which only light of wave length under 330 mμ was essentially effective. The decrease in effectiveness in the region of longer wave lengths is more gradual with soybean oil than with the lauric acid ester. Hard and soft x-rays as well as short electromagnetic waves have no ketonizing effect upon soybean oil. **IX.** *Ibid.* 167.—Visible light of 450-650 mμ causes neither ketone nor aldehyde formation in soybean oil. A faint yellow filter protects the oil from damage by visible light. (*C. A.* **30**, 4345.)

The action of soil microörganisms on fats. L. M. Horovitz-Vlasova and M. J. Livschitz. *Zentr. Bakt. Parasitenk.*, II Abt., **92**, 424-35 (1935).—The oxidation of fats and oils by microörganisms gives peroxides, oxy acids and aldehydes; it is analogous to the action of light and O. (*C. A.* **30**, 4345.)

Oxidation of the Japanese sardine oil (ivasa). G. G. Kirillov. *Bull. Pacific Sci. Inst. Fisheries* (U. S. S. R.) **7**, 129-34 (in English 134) (1934); cf. Belopol'skiĭ and Maksimov, *C. A.* **26**, 4492.—The oil was freed from the solid fraction by alternate filtration and gradual cooling to a min. of 5°. The oil, I no. 188, was oxidized with O in the presence of 3% of Fe resinate as a catalyst at 120-30° and 180-200°. Samples were taken at intervals of 4, 8, 12, 24 and 48 hrs. The oxidation at 180-200° after 18 hrs. was stopped because of the solidification of the oil. After 18 hrs. of oxidation the oil was practically insol. in all org. solvents. The oil spread on a metal surface and heated to 150-200° gives a glass-like, insol. pliable film that cannot be scratched by the finger nail. The detns. of the coeffs. of sapon., *n*, I nos. and Ac nos. show that the oxidation at higher temps. results in a greater rate of the decrease of the unsatn. of the oil and greater formation of acid products. The reduction of the I nos. is the result of the parallel processes of oxidation and polymerization, though at 120-30° the polymerization is less pronounced than at higher temps. The oxidation at the lower temp. is considered more suitable for industrial production. (*C. A.* **30**, 4706.)

Dependence of the characteristics of oils on their acid content. Alfred Eisenstein. *Öle, Fette, Wachse, Seife, Kosmetik* **1936**, No. 7, 1-4.—E. calls attention to the variation in characteristics of oils due to the presence of free fat acids; i. e., a palm oil (58% free fat acid) gave a sapon. no. of 203.7; since 1000 mg. of this oil corresponds to 1027.2 mg. of neutral oil, the sapon. no. calcd. to neutral oil basis is 198.3 Math. formulas, with examples, for converting the characteristics of acid oils to the neutral oil basis are presented. Characteristics of various palm oils show lesser variations if reported on the basis of neutral oil. (*C. A.* **30**, 4345.)

Determination of acidity in insulating oil. Use of the glass electrode in n-butanol. R. N. Evans and J. E. Davenport. *Ind. & Eng. Chem. Anal. Ed.* **8**, 287-91 (1936). The paper outlines a potentiometric method for the titration of acids in oil in which the glass electrode in n-butanol is employed. The need for a small amt. of water in the solvent is pointed out. The effect of easily hydrolyzable substances on the shape of the titration curve and on the estimation of acidity of oils is discussed.

Nomograph for iodine value of tung oil. C. S. Wan and K. Ho. *Ind. & Eng. Chem. Anal. Ed.* **8**, 282-3 (1936); *cf. Ibid.* **7**, 96-101. The authors have worked out a nomograph, from which one can read off the correction and consequently obtain I value of tung oil at proposed standard conditions without going through comprehensive calcns. Tables and data are presented.

The colorimetric determination of cholesterol in liver oils. K. Hotta and M. Kawaji. *Nagoya J. Med. Sci.* **9**, 23-4 (1935).—In the colorimetric estn. of cholesterol in liver oils, the oil must first be completely sapond. This is effected by heating 5 cc. of the oil with 20 ml. 0.9% NaCl soln. on a water bath for 30 min., and shaking frequently; this product is autoclaved at 150° for 30 min. with 20 ml. 25% KOH; the autoclave treatment is repeated if necessary. Cholesterol in this product is detd. by Miyamori's modification of Embden's colorimetric method. Analysis of 12 liver oils by this procedure indicated a cholesterol content of 3.4-5.4 mg. per ml. oil. (*C. A.* **30**, 4705.)

Catalytic actions of nickel formate and nickel carbonate precipitated on a carrier. I. Petryaev. *Masloboĭno Zhirovoe Delo* **12**, 92-3 (1936).—The catalyst (*I*) was prepd. from $NiCO_3$ by pptn. on kieselguhr and reduction in the Vil'bushevich retort, and the catalyst (*II*) from $Ni\ (COOH)_2$ by reduction in sunflower oil at 240°. The 2 catalysts were used in the hydrogenation of crude and refined sunflower, hemp, linseed and mustard oils. The presence of albuminous, mucilaginous and pectic substances affect considerably the action of *I*, but have no marked effect on the action of *II*. The presence of soap causes rapid poisoning of *I* but does not affect *II*. The latter results are confirmed by factory experience in the hydrogenation of various refined oils retaining some alkalies (tested to phenolphthalein) after washing. (*C. A.* **30**, 4707.)

A study of the composition of Astrakhan whitefish oil. N. V. Williams and A. S. Onishchenko. *Schriften zentral. Forschungsinst. Lebensmittelchem.* (U. S. S. R.) **4**, 145-9 (1935).—Sep. analyses were made of the oil from different parts of the Astrakhan

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whitefish. Body oil, the principal fraction, had consts. and compn. as follows: d $^{20}/_{4}$ 0.9232; n ^{20}/d 1.4756 (butyrorefractometer 75.3); f. p. 2.1°; unsaponifiable 0.60%; acid no. (mg. KOH) 14.53; sapon. no. 194.33; Ac no. 11.28; Reichert-Meissl no. 1.46; I no. 146.21; thiocyanate no. 94.58; satd. acids (Bertram) 22.45%; acid neutralization no. (Bertram) 244.4; av. mol. wt. satd. acids 230; m. p. of satd. acids 53-54°; f. p. of satd. acids 50.5-51°; percentage of acids; stearic + palmitic 22.13, oleic 43.8, linoleic 3.91, linolenic 12.45, clupanodonic 6.71, undetd. 3.0; unsaponifiable matter 0.6%; glycerol (by difference) 7.4%. (*C. A.* **30**, 4706.)

California sardine and other oil. R. C. Rollins. *Paint Varnish Production Mgr.* **14**, 12, 14 (May, 1936). —The California sardine is a definite species somewhat larger than other sardines. The exact chem. compn. of California-sardine oil is not known, but probably contains palmitic, jecoric and clupanadonic acids. The chem. consts. of the refined oil approximate: acid no. 0.5, I no. 190-95, sapon. no. 180-90, sp. gr. 0.923. Heat-treated sardine oil is deodorized, losing the fish odor and acquiring a sweet odor more like bodied linseed oil. Sardine oil dries rapidly without driers, while driers speed up the initial dry and assist in eliminating after-tack. (*C. A.* **30**, 4346.)

What is a textile olein? Kehren. *Z. ges. Textil-Ind.* **39**, 245-6 (1936). Textile oleins are fatty acid mixts. which must be thin fluid and clear at 10°; their color should not be darker than yellowish brown and the odor should be neither disagreeable nor abnormal. Limit values for their consts. are: turbidity point below 10°; residual ash less than 0.1% and free from Fe if possible; ether-sol. total fat content not below 98%; acid no. 185-200; sapon. no. 190-205; neutral fat including lactones not above 5%; unsaponifiable constituents not over 4%; I no. 70-90; Mackey test—time of testing 1.5 hrs. during which the temp. of the oil-soaked cotton should not greatly exceed 100°. (*C. A.* **30**, 4329.)

The comparative rate of absorption of different fats. H. Steenbock, M. H. Irwin and J. Weber. *J. Nutrition,* **12**, 103-111 (1936); cf. next abs.

The percentage of fat absorbed from the alimentary canal of rats was determined at 2, 4, 6, 8 and 12 hours after feeding definite quantities of fat. It was found that: (1) partially hydrogenated vegetable oils were absorbed as rapidly as lard or corn oil, and (2) that butter oil, halibut liver oil, and cod liver oil were absorbed uniformly at a more rapid rate than lard, corn oil or the partially hydrogenated fats. Eleven other samples of fat tested after a 4-hour absorption period could be arranged in the following descending order of their percentage absorption: linseed oil, olive oil, whale oil, soya bean oil, peanut oil, rancid lard, cottonseed oil, cocobutter, coconut oil, palm oil, and oleo stock. Although the difference between any of these fats and the one immediately preceding or following in the list may not be significant, certainly there were very real differences in the absorption rates of those widely separated. Besides differences in the character of the fats themselves, it appears that the quantity of unsaponifiable matter in a crude fat may influence the rate of absorption of the total.—(Abstracted by W. E. Anderson.)

A technic for determining the rate of absorption of fats. M. H. Irwin, H. Steenbock and V. M. Templin. *J. Nutrition,* 12, 85-101 (1936).—The method involves the feeding of a definite quantity of fat and subsequent analysis of the intestinal residues. Concomitant use of the chylomicron method and the haemolipokrit method for determining blood fat did not give comparable results. The former was found to have little or no quantitative value. The haemolipokrit method gave concordant results on duplicate samples of serum but was not found satisfactory for studying the rate of absorption of fats because different fats appeared in the blood at rates quite different from those with which they disappeared from the alimentary tract. No definite or striking correlations between the grams of fat absorbed and the variables—body weight, body surface, or length of intestines—were found.—(Abstracted by W. E. Anderson).

The resorption of hardened whale fat with a low melting point in the human digestive system. K. Hansen, H. T. Offerdahl and B. Erikson. *Norsk. Mag. Laegevidenskap,* **94**, 1305-17 (1933).—Whale fat does not cause any irritation of the digestive canal and it is fully equivalent to natural butter as a source of caloric energy. (*C. A.* **30**, 3863.)

The prevention of nutritional encephalomalacia in chicks by vegetable oils and their fractions. Marianne Goettsch and A. M. Pappenheimer. *J. Biol. Chem.* **114**, 673-87 (1936).—A protective factor against nutritional encephalomalacia (pathological changes in central nervous system in chicks on synthetic diets) of chicks is present in certain edible oils such as corn oil, cottonseed oil, hydrogenated cottonseed oil, peanut oil and soybean oil. The factor, as present in these oils, is thermostable, and resistant to aeration and to ultraviolet irradiation. It can be partially extd. by 95% alc. It is present in the nonsapon. fraction of oils if proper solvents are used for extn.

Metabolism of ethyl esters of fatty acids. H. J. Deuel, Jr., L. Hallman, J. S. Butts and S. Murray. *Proc. Soc. Expt. Biol. & Med.* **34**, 669-70 (1936).—Et esters of several fatty acids up to stearic were fed to rats in doses of 15 gm. (calculated isomolocularly as acetone) per sq. meter of body surface per day. The excretion of acetone bodies from caproate and butyrate is approx. quantitative; whereas, the acetone bodies after administration of Et esters of fatty acids with 8 or more C atoms is greater which indicates more aceto-acetate residue originates from the oxidation of one molecule of fatty acid having 8 or more C atoms. Low values with Et palmitate and stearate were traceable to lack of absorption. When Et esters of fatty acids having odd carbon atoms were fed, only insignificant amts. of acetone bodies were excreted in the urine. Me esters were found to be somewhat toxic.

PATENTS

Extracting fish oils. Bruno Albert Rewald. Brit. 441,545, Jan. 16, 1936. Oils contg. vitamins A and D are extd. from fish tissue, e. g., livers, by treatment with a liquid fat solvent, e. g., C_6H_6, Me_2CO, benzine, trichloro-acetone, $C_6H_4Cl_2$, and also a monohydric aliphatic alc. that liberates the vitamins contained in the unsaponifiable material. The treatment with alc., e. g., MeOH, EtOH, may be prior to or during the extn. of fat. (*C. A.* **30**, 4708.)

Waxy substances. I. G. Farbenind. A.-G. Fr. 792,589, Jan. 6, 1936. Amides or nitriles of fatty acids of relatively high mol. wt. are condensed with aldehydes or compds. yielding aldehydes, in the presence of substances having an acid reaction. Thus, palmitic amide is dissolved in AcOH, paraformaldehyde is added and concd. H_2SO_4. The mixt. is heated and on cooling a wax seps. which melts at 146-50°. Several examples are given. (*C. A.* **30**, 4347.)

Polymerized oils. Imperial Chemical Industries, Ltd., Eric W. Fawcett and Eric E. Walker. Brit. 442,000, Jan. 31, 1936. Addn. to 422,941. In the production of drying oils by polymerization, and removal of unpolymerized and unpolymerizable matter by evaporative or mol. distn. in a high vacuum as described in 422,941, fish oils with an I no. above 120 are treated. Menhaden, Japanese sardine, herring and Canadian pilchard are specified. (*C. A.* **30**, 4708.)

Drying-oil composition. Robert D. Bonney and Walter S. Egge (to Congoleum-Nairn, Inc.) U. S. 2,040,461, May 12. Material contg. a drying or semi-drying oil such as linseed or perilla oil is subjected to oxidizing treatment limited substantially to the formation of uncoagulated products of oxidation and is treated with a fatty acid contg. 14 to 22 C atoms such as linseed oil fatty acids and unoxidized oil constituents and non-hardening oil constituents are removed by a selective solvent such as gasoline. (*C. A.* **30**, 4702.)

ABSTRACTS

Soaps

Edited by M. L. SHEELY

Dry-cleaning Soaps. C. A. Tyler, *Soap* 12, (5), 13-3, 61 (1936). Basically, these products consist of a soap mixture in which the fat acid has been only partially saponified and dispersed in a volatile organic solvent. The actual soap content may range from 10 to 50% with 10 to 20% excess free fat acid, the balance being water and a mixture of organic solvents. A recent tendency is toward the use of vegetable fat acids because of less odor in the dry-cleaning system. K and NH_3 soaps are those most used. A common dry-cleaner's soap of the paste type has the following approximate composition; Ca soap 25, K soap 20, aqueous NH_3 2 (26° Be.), oleic acid 15, water 8, petroleum naphtha 30%. A study and rating of 46 commercial dry-cleaning soaps was made by the National Association Institute of Dyeing and Cleaning. The soaps were divided into 3 classes: pastes, soluble or liquid soaps and detergent soaps. Ten, all pastes, were given excellent ratings. The efficiency of the detergent soaps was rated low, and that of the soluble soaps in between the detergent soaps and the pastes. (*C. A.* **30**, 4346.)

Liquid Soap Clarification. Paul I. Smith, *American Perfumer and Essential Oil Review,* **33**, (1), 79 (1936). Pure caustic potash should be used if economically possible, at least the grade preferred should contain the minimum quantity of sodium salts. The use of distilled water is generally recommended.

To overcome the separation of free fatty acid, the presence of methyl, ethyl or propyl alcohol of glycerin tends to prevent hydrolysis. The addition of sulfated fatty alcohols, particularly lauryl sulfate, is advocated by some workers but it should be remembered that the presence of these organic compounds in the soap leads to considerable changes in the nature of the soap or shampoo.

Methyl cyclo-hexanol is sometimes added to commercial grades of liquid soaps where the camphor-like odor is not objectionable. The precipitation of insoluble lime soap is thereby prevented to a great extent.

The Determination of Free Alkali in (Medicinal) Soft Soap. Robert M. Lingle, *J. Am. Pharm. Assoc.* 25, 286-8 (1936). Numerous references are cited to show that the present U. S. P. allows more free alkali in soft soap than is desirable in a medicinal soap. The literature is examined to study the various methods described for determining free alkalinity in soft soap. Objections were found to all of the available methods, though the U. S. P. method is more rapid, more convenient and gives results that are sufficiently accurate for the nature of the product. Experiments are being conducted to ascertain whether some of the free alkali is gradually neutralized by the fat acids in the soap. (*C. A.* **30**, 4244.)

Investigation of the Lime-Soap Dispersion Capacity of Textile Detergens. H. Kuckertz, *Angew. Chem.* **49**, 273-6 (1936). The experiments of Lindner with oleic soap were checked, and it was found that reproducible results could be obtained if the experiments were carried out within narrow, constant conditions, and that comparative values are obtainable only if the additions of dispersion agents are based upon a constant soap concentration. As comparison solution for the occurring turbidity, the solution of least turbidity in each test series was used. Results obtained in this manner showed good agreement in the interval of 40-68% light absorption. The tests showed that some fatty alcohol sulfonates possess only little dispersion action with lime soaps. The dispersion agents examined were Gardinol KD (fatty alcohol sulfonate), Igepon T. Plr. (fatty acid condensation product), Lamepon A (fatty lysalbic acid condensation product), and Peregal O (fat-containing product, without salt-forming groups.) Practically the same relative results could be obtained when the detergent concentration was determined in very hard water as the concentration which just prevented the precipitation of the lime soap. (*C. A.* **30**, 4234.)

Some Recent Developments in Waterproofing. C. H. S. Tupholme, *Am. Dyestuff Reptr.* **25**, 167-9, 196 (1936). Wool and other fibers are rendered highly water-repellent by treatment with water-soluble soaps after a thorough cleaning. The soap treatment is followed by a cold-water rinse. A solution of 1.0-4 g./l.