ABSTRACTS

Oils and Fats

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

The use of the fractionating column for the separation of fatty acids. S. Lepkovsky, G. V. Feskov and H. M. Evans. *J. Am. Chem. Soc.* **58,** 978-81 (1936). The still devised by H. M. Evans (*Ind. & Eng. Chem. Anal. Ed.* **2,** 339) has been improved and applied to the fractionation of the fat acids of coconut oil and separation of erucic acid from rape oil. The fat acid compn. of coconut oil was found as: caproic 0.5, caprylic 9.0, capric 6.8, lauric 46.4, myristic 18.0, palmitic 9.0, stearic 1.0, oleic 7.8, and linoleic 1.6%. Rape yielded 40% erucic acid. The complete separation of palmitic acid from the C_{18} acids was possible by distn. of the Me esters.

Oil-forming process in plants and the prospects of its industrial use. S. L. Ivanov and P. T. Klokov. *Trans. VI Mendeleev Congr. Theoret. Applied Chem.* 1932 **2**, Pt. 1, 838-43 (1935).—The earlier observations of I. (*C. A.* **6,** 1012, 1170) on the synthesis of fat by means of plant lipase have been confirmed and addnl. information, e. g., effect of temp., is presented. In plants fluctuations of day and night temp. lead to the combining of glycerol with fat acids of different degrees of satn. to form mixed triglycerides. In the artificial synthesis of fat with plant lipase the characteristics of the product may be controlled by temp. control. The stages of glyceride formation from glycerol and fat acids are: 1st α-mono, 2nd α-α' di-, and finally tri-glyceride. In accordance with the previous mechanism (cf. *C. A.* **6,** 1170) and the above, a fat approximating cocoa butter and acids approximating coconut fat acids were prepd. synthetically. Forty-four references. (*C. A.* **30,** 4027.)

Consistency measurements according to Hj. Crusell. Ewald Pyhälä. *Öle Fette, Wachse* **1935,** No. 1, 13-14.—The app. for measuring consistency of fats is similar to a viscometer. The sample container is supplied with a piston and cover and is attached to an air-pressure source by means of which a const. pressure may be applied to the piston. The fat sample is extruded from the app. at a fixed standard of temp. and pressure for 15 min. and then weighed. The wt. of the fat is designated as the g. value of the consistency and is reported with the temp. and pressure used in the test. Data on a few fats show that there is no close relationship between the m. p. and the consistency of a fat. (*C. A.* **30,** 3669.)

Nickel-chromic oxide catalysts for the hydrogenation of an oil. J. C. W. Frazer and C. B. Jackson. *J. Am. Chem. Soc.* **58,** 950-2 (1936). Several catalysts were prepd. and tested by hydrogenating cottonseed oil. In each test there were used 300 g. of cottonseed oil, catalyst contg. .633 g. of Ni, temp. of 180° for 3.0 mins. and excess of H_2, in a special apparatus which contd. a high speed stirrer. Catalyst composed of Ni and CrO_3 was shown to be of high activity for hydrogenation of oil. The use of small quantities of the compds of S (BaS), Se (SeO_2) and Te (TeO_2) promote the activity of Ni-CrO_3 catalyst for the hydrogenation of an oil; large quantities of the above substances are extremely deleterious to the activity of the catalyst.

Influence of phosphorus and nitrogen on the hydrogenation of oils. E. Botkovskaya and L. Nikolaeva. *Masloboīno Zhirovoe Delo* **11**. 579-81 (1935). —Preliminary expts. with linseed, mustard, rapeseed, soybean (pressed and extd.), dolphin, seal and shark oils show that the presence of nitrogenous substances and phospholipides (up to 0.06% P_2O_5) does not affect the process of hydrogenation, while peroxides retard the hydrogenation of oils. P substances render the neutralization of oils difficult and cause excessive losses because of their emulsifying action. Ordinary methods of refining reduce the phospholipide content of oils. (*C. A.* **30,** 4029.)

The high-pressure hydrogenation of soybean oil. V. The preparation of light hydrocarbon oil. Yuichi Shinozaki, Sanroku Kagawa and Masanori Sato. *J. Soc. Chem. Ind., Japan* **39,** Suppl. binding 22 (1936); cf. *C. A.* **29,** 2766^9.—Without a catalyst it was difficult to obtain a product which had the characteristics of a light hydrocarbon oil. Higher initial pressures gave better results. The reaction time was about 60 min. and if prolonged too much the yield decreased. At and below 430° no satisfactory products were obtained. Results are reported with 5 catalysts (salts of Zn, Cu, Ni, Fe and Cr). The best results were obtained with the Ni salt; there was produced a transparent, colorless oil with a sp. gr. of less than 0.7, 1.1% unsatd. compds., trace of aromatic compds., 7.6% naphthenic hydrocarbons and 91.3% satd. compds. About 3% of catalyst was required. (*C. A.* **30,** 4029.)

Physical-chemical theories for vegetable oil extraction processes, their experimental reasoning and applications in practice. A. M. Goldowskij. *Fettchem. Umsch.* **43,** 52-5 (1936). A review.

The chemistry of bleaching earths. Adolph Voigt. *Angew. Chemie* **43,** 49-52 (1936). General discussion on current practice.

The viscosity of fatty oils. H. A. Boekenoogen. *Fettchem. Umschau* **62,** 177-80 (1935).—Since the introduction of the Hoeppler viscometer was a great step forward toward the rapid, accurate detn. of the viscosity of fatty oils, work done in this field should lead to the discovery of important relationships. B's. own work suggests various relationships between mol. structure and viscosity; e. g., increasing unsatn. and decreasing mol. wt. of the fat acid radicals of an oil were found in several cases to be assocd. with lower viscosity. More reliable work is needed. Schrader's discussion (cf. *C. A.* **28,** 5693^7) of the relation between the type and quality of linseed oil and its viscosity is criticized. Cf. following abstr. (*C. A.* **30,** 3670.)

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Determining the viscosity of fatty oils. W. Normann. *Fettchem. Umschau* **43**, 9-10 (1936).—The possible effect of impurities, e. g., mucilanginous substances or oxidation products, perhaps present in the oil samples used by other workers (cf. preceding abstr.) is discussed, and N.'s priority (cf. *C. A.* **15**, 1630) in this field is pointed out. (*C. A.* **30**, 3671.)

The iodometrically measurable acid formed during the determination of the iodine number of rosin-acid mixtures by the rapid method. W. Ruziczka. *Fettchem. Umschau* **42**, 161-4 (1935); cf. *C. A.* **29**, 5385^4.—Earlier work (cf. *C. A.* **21**, 1889) on the application of Margosches' rapid method (cf. *C. A.* **18**, 2436, 3484; **19**, 741) for detn. of I no. to mixts. of acids and rosins was extended. Six mixts. were used of (1) rosins of French and American origin and (2) the mixed acids from linseed oil, stearic and oleic acids. The I consumption was detd. by thiosulfate titration and the acid formation by the method generally used in estg. the free acid (HI) formed during the detn. of I no. by the rapid method and by Kolthoff's method (*C. A.* **21**, 876). The exptl. results obtained on studying the effect of varying the proportion of rosin in the 6 mixts. and calcns. made in attempting to deduce relationships are tabulated. Special attention was devoted to the relation between "plus acid" and the rosin content of the mixts. Although not a const., the previously recommended factor, 1.4, can be used to advantage in estg. the rosin content of rosin-acid mixts. If much work is to be done with mixts. composed of a definite type of rosin and acid in unknown proportions, it is advisable to det. the factor relating amt. of "plus acid" and rosin content as a function of rosin content. This can be done by exptl. work with mixts. contg. known proportions of rosin. (*C. A.* **30**, 3670.)

The effect of ingested cottonseed meal upon the distribution of the constituent fatty acids of goat milk. R. W. Riemenschneider and N. R. Ellis. *J. Biol. Chem.* **114**, 441-7 (1936). Samples of goat milk fat were examined to determine the changes in fat acid distribution produced by the inclusion of cottonseed meal in the ration. The butter fat constants indicate a decrease in butyric and unsatd. acids concerned in the Polenske values. This was confirmed by distn. of the fat acid methyl esters. An increase in capric, lauric, myristic and stearic at the expense chiefly of palmitic and oleic acids was observed as caused by the inclusion of cottonseed meal in the ration. No evidence of the presence of linoleic acid was observed.

Toxic effect of cod liver oil in the ration of the rabbit and the calf. W. A. Turner, E. B. Meigs, and H. T. Converse. *J. Biol. Chem.* **114**, *civ*, (1936). If cod liver oil, as 5 per cent of the grain component in a rabbit ration (about 0.7 gm. per kilo of body weight daily) is added to the ration, death will almost certainly occur between 90 and 150 days of age. Stiffness of limbs and emaciation precede death. Histological examination shows degeneration of the muscle tissue. Young calves, receiving a good grain mixture with skim milk (from cows not on pasture) and U. S. No. 3 timothy hay, do not survive. When cod liver oil is supplied as not more than 0.7 gm. per kilo of body weight daily, the calves survive and grow normally. Administration of 2.0 gm. or more of cod liver oil per kilo of body weight daily causes death.

The semimicro butyric acid number. I. F. Th. van Voorst. *Chem. Weekblad* **33**, 5-8 (1936).—The Gilmour (*C. A.* **19**, 2713)-Grossfeld's (*C. A.* **21**, 3397; **22**, 1863; **27**, 3351) method was used. The fat acids are sepd. in an acid K_2SO_4 soln., and the results compared with those of the Kirschner method. The agreement was satisfactory. For small amts. of fat acid the following modification is given: In a 50-cc. Erlenmeyer flask weigh 500 mg. fat, add 1 cc. glycerol (d. 1.23), 0.2 cc. KOH (750 g. per l.) and 2 grains of pumice stone, heat the mixt. gently until it is clear, pipet in 25 cc. satd. K_2SO_4 soln. while shaking at room temp., add 0.5 cc. H_2SO_4 (1:3), 1 cc. coconut-soap soln. and a little infusorial earth, filter, pipet 20 cc. into a 50-cc. flask, add 5 cc. H_2O and distil 16 cc. into a 50-cc. graduate. Into a 100-cc Erlenmeyer flask contg. 5 cc. H_2O and 2 drops 1% phenolphthalein soln. made pink with 0.01 *N* alkali the contents of the graduate are poured and titrated to pink. The results agree as shown from a no. of check analyses. (*C. A.* **30**, 3670.)

Component glycerides of cacao butter. T. P. Hilditch and W. J. Stainsby. *J. Soc. Chem. Ind.* **55**, 95-101T (1936).—Two similar samples of cacao butter were subjected to: (1) component acid analyses of the whole fats and a study of the fully satd. glycerides present in the fats after complete hydrogenation and after hydrogenation to intermediate stages of satn., (2) partial sepn. of the original fats by crystn. from acetone, each fraction sepd. being examd. by the same methods as those applied to the fats as a whole. The percentage compn. of the glycerides was: 52 oleopalmitostearins, 19 oleodistearins, 12 stearodioleins, 9 palmitodioleins, 6 oleodipalmitins and 2 palmitostearins. The molar proportions of oleopalmitostearins (55), oleostearins (30) and oleopalmitins (15) are in the order characteristic of even distribution of the total fat acids (oleic 40, stearic 34, palmitic 26) among the triglyceride mols., but while the amt. of oleodisterins is greater than that of stearodioleins, that of oleodipalmitins is less than that of palmitodioleins. Nearly half of the fat is made up of binary combinations in which stearic and oleic or palmitic and oleic acids are concerned, but similar combinations with palmitic and stearic acid occur in small quantities. The proportions of stearodioleins and palmitodioleins are almost those which would result if the unsatd. acids of the fat were divided in the relative proportions of the palmitic and stearic acids, and united separately with the latter to form mono- and di-oleoglycerides. The oleodipalmitins and oleodisterins occur in much smaller quantities than those corresponding with this calculation: of the total monoöleoglycerides ⅔ are oleopalmitostearins, the remaining ⅓ consisting of either oleodistearins or oleodipalmitins. (*C. A.* **30**, 4025.)

Tall-oil. C. Becker. *Chem.-Ztg.* **60**, 373-5 (1936). Review. Description, uses and history of developments are presented.

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PATENTS

Refining food fat. G. J. Westerink. Ger. 626,154, Cl. 53h, Gr. 1.01. Fats such as tallow and lard are refined by washing with soln. contg. salt and casein at 60-70°.

Separation of solid fat acids from liquid fat acids in mixtures. C. Stiepel. Ger. 625,577, Cl. 23d, Gr. 1. The fat acid mixtures are dissolved in alc. converted to Ca-soaps by boiling with $Ca(OH)_2$. After cooling the Ca-soaps of the solid acids ppt. and may be separated by filtering.

Manufacture of a solvent from glycerol. E. L. Holmes. U. S. 2,036,940. A manufacture of a solvent which consists in subjecting glycerol to the action of a dehydrogenating catalyst contg. Cu and heated to 240-260° and condensing to a liquid the vapors thus produced. The product principally contains acetol and is of value as a solvent for cellulose derivs.

Reduction product of hydrocarbon or alcohol character from fats. Deutsche Hydrierwerke A.-G. Ger. 629,244, Cl. 12o Gr. 1/01. Fats are hydrogenated at temps. above 250° but not over 350° in presence of Ni-catalyst and with pressures of 60 atms. of H_2, to produce fatty alcohols. The product is distd. giving a hydrocarbon and alcohol fraction; the residue may be used in soap making.

Clarifying fat acids. M. M. Nikiforov. Russ. 40,485, Dec. 31, 1934. Acid produced by splitting fats with Kontakt are washed with NaCl soln., and treated with steam and then with air at 80°. (*C. A.* **30**, 4030.)

Improving blown oils. J. Scheiber. Ger. 625,902. Cl. 12o Gr. 26/01. Blown oils are improved by heating the oil with unsatd. fat acid to 250-300°, followed by esterifying the remaining free fat acids with polyhydroxy alc.

Fats. Deutsche Hydrierwerke A.-G. Ger. 622,697, Dec. 4, 1935 (Cl. 23*a*. 3). Fats are refined by treatment with steam or inert gas at temps. above the m. p. of the fat till the sapon. is complete and the odor removed. Superheated steam may be used. NaOH may also be added. The process may be carried out *in vacuo*. (*C. A.* **30**, 3674.)

ABSTRACTS

Soaps

Edited by **M. L. SHEELY**

Detergent Value of Soap. Th. Ruemele *Allgem. Oel- u. Fett-Ztg.* **33**, 17-18 (1936). A brief review of the criteria used for evaluating soap. (*C. A.* **30**, 2786.)

Detergency of Soap Solutions. B. G. S. Acharya and T. S. Wheeler. *Proc. Indian Acad. Sci.* **2A**, 637-45 (1935). A method is described for measuring the adsorption of soap by cotton under standard conditions. The data on adsorption, pH and drop numbers of various soap solutions show that increased adsorption is associated with increased cleansing action. (*C. A.* **30**, 2786.)

The Chemistry of Wetting Agents. Josef Hetzer *Fett-chem. Umschau* **43**, 38-42 (1936). A scheme for classifying wetting agents according to their chemical structure is developed and applied to wetting agents of German manufacture. (*C. A.* **30**, 3540.)

Cleaners for Dairies Discussed. H. J. Barnum, P. S. Lucas and B. Harsuch. *Michigan Station Special Bul.* **262** (1935), p. 24. A study of cleaners in dairies was undertaken to determine the properties and efficiency for specific purposes. Cleaners studied were divided into the following classes: modified or neutral sodas, soda ash, special alkalies, trisodium phosphate, and colloidal. Aside from the trisodium phosphate, the cleaners were similar in composition.

While all of the cleaners were sufficiently soluble as ordinarily used, soda ash was the most soluble, followed by modified sodas, special alkalies, trisodium phosphate, and colloidal. Some of the cleaners were highly buffered and resistant to reduction in cleansing ability. In most cases tap water retarded this action more than distilled water. The modified sodas were most stable in buffer action, followed by soda ash and colloidal, special alkalies, and trisodium phosphate. In causticity the special alkalies were highest, trisodium phosphate 2nd, soda ash and colloidal about equal, and modified sodas lowest. For removing butterfat from a utensil by emulsification the special alkalies were most efficient, but could not be used for hand-washing because of their action. Soda ash and colloidal were 2nd in efficiency in this respect, followed by modified sodas and trisodium phosphate. Soda ash was the most efficient water softener, followed in order by colloidal, modified sodas, special alkalies, and trisodium phosphate.

Cleaners containing abrasives are commonly called "detergents." Aluminum and copper were very severely scratched by the volcanic ash content of such cleaners, while tinned copper and tinned steel were severely scratched, nickel moderately scratched, and Ascoloy and chrome nickel steel were unaffected. Special alkalies were very severe in their corrosive action on metals, trisodium phosphate was 2nd in severity, soda ash 3rd, and colloidal and modified sodas were