fication between approximately 0-25°, separating the soap from the unsaponified residue and treating the unsaponified residue with methanol to remove that portion of the residue soluble therein and produce a concentrate high in vitamin ester content.

BUTTER PRODUCT AND PROCESS FOR PRODUCING THE SAME. L. O. Buxton (National Oil Products Co.). *U. S. 2,404,034-7.* These processes for producing a butter concentrate contain the steps of dissolving butter oil in a greater volume of isopropanol, heptane, acetone, Et acetate, or other compatible organic solvent, cooling the mass to below 10° to cause layer formation, and separating the solvent layer, having dissolved therein a major portion of the vitamins, flavor-imparting and antioxidant constituents originally present in the butter oil.

VACUUM DISTILLATION APPARATUS. K. C. D. Hickman and E. S. Perry (Distillation Products, Inc.). *U. S. 2,403,978.* This invention relates to improved vacuum distillation apparatus particularly of the type wherein the vaporizing and condensing surfaces are stationary and separated by substantially unobstructed space.

COMPOSITION. M. P. Kleinholz (Sinclair Refining Co.). *U. S. 2,403,928.* The improved mineral oil composition comprises a petroleum lubricating oil fraction with which there has been compounded a proportion, effective to retard rusting of a semilactide of the α-hydroxy fat acid.

ANTICORROSIVE. H. G. Smith and T. L. Cantrell (Gulf Oil Corp.). *U. S. 2,403,762.* The new compositions of matter are oil-soluble addition salts of primary fatty amines containing 8-18 C atoms and acid phosphate diesters of 2,4,6-trialkylated phenols containing at least 1 branched chain alkyl group, said primary fatty amine salts being substantially neutral compounds soluble in mineral oils and miscible with hydrocarbons.

Abstracts

Drying Oils

Edited by
HOWARD M. TEETER

OITICICA OIL. *Chemurgic Dig. 5,* 248-9 (1946). An historical and technical review.

ISOMERIZED OILS. H. R. Touchin. *Paint Manuf. 25,* 237-9 (1946). A review of progress in isomerized oils. 17 references.

THE USE OF LOW-TEMPERATURE CRYSTALLIZATION IN THE DETERMINATION OF THE COMPONENT ACIDS OF LIQUID FATS. III. FATS WHICH CONTAIN ELEOSTEARIC AS WELL AS LINOLEIC AND OLEIC ACIDS. T. P. Hilditch and J. P. Riley (Univ. of Liverpool, Eng.). *J. Soc. Chem. Ind. 65,* 74-81 (1946). The general principles of analysis were previously described by Hilditch, *et al.* (see abstracts of previous papers in this series). Each fraction of acids was analysed spectrophotometrically before and after isomerization with alkali to determine the proportion of α-eleostearic acid and linoleic (and if present, linolenic) acids. The characteristics of American tung, Chinese tung, essang (*Ricinodendron africanum*), neou (*Parinarium macrophyllum*), and krobanko (*Telfairia occidentalis*) oils, respectively, were: sapon. equiv., 286.7, 288.7, 291.2, 299.3, 277.7; iodine number (Wijs), 163.0, 162.6, 150.8, 108.2, 109.0, n_{40}, 1.5133, 1.5120, 1.5010, 1.4848, 1.4772; and the compositions of their respective fat acids were: palmitic, 5.5, 4, 9.5, 12, and 15%; stearic, —, —,1, 2, and 9%; oleic 4, 9, 9.5, 40, and 27%; linoleic, 8.5, 10, 26, 15, and 29%; α-eleostearic, 82, 77, 54, 31, and 20%. Two points of interest emerged: (1) None of the four eleostearic-containing fats contained the non-conjugated triene linolenic acid. This suggests the possibility that the two triene acids do not occur together in the same vegetable fat. (2) The diminution in eleostearic acid content is most clearly paralleled by increase in the saturated acids. In regard to the possible economic value of the last three oils, they are freely produced in Nigeria. Neou and essang nuts have the disadvantage of high shell content, although the kernels are rich in fat and readily extractable once they are decorticated. Krobanko oil appears to have little technical outlet. (*Chem. Abs. 40,* 4535.)

HEAT POLYMERIZATION OF CASTOR OIL. S. Mukherjee and B. K. Mukherjee (Univ. Coll. Sci. Technol. Calcutta). *J. Ind. Chem. Soc. 22,* 305-8 (1945). Castor oil polymerizes at temperatures as low as 50°. The molecular weight increases 2 or 3 times its original value when the oil is heated 4 hours at 100°. The oil is partly dehydrated and the diene value increases. The viscosity, specific gravity and refractive index increase proportionally with the increase in molecular weight. The changes in acetyl, iodine and diene values are not regular and indicate that polymerization does not take place by simple doubling of the molecule but that the glycerides are first decomposed into fatty acids and lower glycerides and the fatty acids then undergo polymerization. (*Chem. Abs. 40,* 4537.)

THERMAL POLYMERIZATION OF DRYING OILS. H. E. Adams and P. O. Powers (Armstrong Cork Co.). *J. Applied Phys. 17,* 325-37 (1946). A statistical analysis of the thermal polymerization of drying oils was made. Comparison of the predictions from this analysis with experimental data disclosed discrepancies which would be explained by the existence of an intrapolymer. A sample of linseed oil was polymerized in 50% xylene solution at 300°, and its properties were compared with those of a sample of pure linseed oil bodied for the same time at 300°. The iodine values of both samples were identical, but the viscosity and molecular weight of the sample bodied in solution were lower than for the oil not bodied in solution. Since in dilute solution intramolecular reactions are favored at the expense of intermolecular reactions, the results are consistent with formation of the postulated intrapolymer.

VISCOSITY OF LINSEED STAND OIL AT HIGH SHEARING STRESS. D. Tollenaar and H. Bolthof. *Ind. Eng. Chem. 38,* 851-3 (1946). Bodied, or stand oils, prepared by heating linseed oil, possess anomalous viscosity as demonstrated by the fact that the viscosity of the oil varies with the shearing stress or rate of shear. Shearing stresses necessary to produce this effect are encountered in printing presses. The picking phenomenon observed when printing a paper with a viscous unpigmented stand oil may be the same as the picking effect at the same printing rate with a low viscosity mineral oil due to this anomalous viscosity behavior.

COPOLYMERS OF DIMETHYLSTYRENE VINYL FATTY ESTERS WITH BUTADIENE. P. O. Powers (Armstrong Cork Co.). *Ind. Eng. Chem. 38,* 837-9 (1946). Emulsion polymerization of vinyl fatty esters with butadiene produced soft tacky polymers which attained a tensile strength as high as 2,000 pounds per square inch and elongations up to 690% when compounded and cured in test molds. Tricopolymers of vinyl fatty esters, with butadiene and dimethylstyrene or styrene, gave polymers of up to 5,230 pounds per square inch tensile strength and 580% elongation when the amount of vinyl fatty esters in the polymer was not over 10%. The vinyl esters imparted considerable tear resistance to the synthetic rubbers made from their polymers even when present only to the extent of 10% in the polymer. Vinyl esters of fatty acids were made by reacting fatty acids with acetylene under pressure in the presence of a catalyst. The fatty acids of linseed, soybean, coconut, cottonseed, and perilla oil, and oleic and stearic acids were used, and the resulting esters investigated individually in the polymerization reaction.

THE INTERACTION OF PHENOLIC RESINS AND DRYING OILS. H. S. Lilley. *Paint. Tech. 11,* 179-80 (1946). The data obtained by Dold [*Farben Zeitung, 44,* 1034 (1939)] are reconsidered. It is suggested that Dold's conclusions against the existence of "oil-reactivity" are invalid.

IDENTIFICATION OF THE LINOLEIC AND LINOLENIC ACIDS OF BEEF TALLOW. H. B. Knight, E. F. Jordan, Jr., and D. Swern (Eastern Regional Res. Lab.). *J. Biol. Chem. 164,* 477-482 (1946). By low-temperature crystallization of the fatty acids of beef tallow, concentrates of the polyunsaturated fat acids were obtained. From 20,000 g. of tallow, 277 g. of material having an iodine value of 130.5 (I) and 240 g. of material having an iodine value of 145.3 (II) were isolated. Bromination of 95 g. of I yielded 24.1 g. (calcd. 26.7 g.) of 9, 10, 12, 13-tetrabromostearic acid (III), m.p. 112-112.7° and 1.8 g. (calcd. 3.3 g.) of 9, 10, 12, 13, 15, 16-hexabromostearic acid (IV), m.p. 180°. Bromination of 95 g. of II gave 13.2 g. (calcd. 23.8 g.) of III, m.p. 108.5-113° and 5.1 g. (calcd. 6.3 g.) of IV, m.p. 170-171.5°. Spectrophotometric analysis of I gave non-conjugated acids: diene, 26.3, triene, 5.0, tetraene, 0.23%; and conjugated acids; diene, 4.4, triene, 0.10, and tetraene 0.004%. II contained non-conjugated acids: diene 23.5, triene, 9.5, and tetraene 1.8%; and conjugated acids: diene, 5.8, triene, 0.20, and tetraene, 0.008%. Discrepancies between iodine values determined and those calculated from the spectroscopic data suggest the possible presence of minor proportions of polyunsaturated fat acids with double bonds too widely spaced to be conjugable with alkali under the conditions used. It is concluded that the non-conjugated octadecadienoic and octadecatrienoic acids of beef tallow consist mainly of *cis, cis*-9, 12-linoleic acid and *cis, cis, cis*-9, 12, 15-linolenic acids, respectively.

SELECTIVE HYDROGENATION OF POLYETHENOID FATTY COMPOUNDS. A POSSIBLE MECHANISM. T. P. Hilditch (Univ. of Liverpool, Eng.). *Nature 157,* 586 (1946). To explain the phenomena associated with selective hydrogenation, the hypothesis is advanced that what has been termed "selective hydrogenation" is in fact restricted to compounds wherein a single $-CH_2-$ group separates two ethenoid groups and that the mechanism is almost certainly connected with the ready detachment of a hydrogen atom from the central $-CH_2-$ group. The hypothesis accounts fully for the following observed facts: (1) The almost completely selective hydrogenation of the 9,12-octadecadienoic grouping and the production of 9,15- as well as 9,12- and 12,15-octadecadienoic compounds from 9,12,15-octadecatrienoates. (2) Since the 9,12,15-octadecatrienoates contain two $-CH_2-$ centers, simultaneous action at both centers is possible with the formation of monoethenoid groups. (3) Some polyethenoid compounds, e.g., marine animal oils or 9,15-octadecadienoic compounds, which have no central $-CH_2-$ group do not exhibit selective hydrogenation. (4) The lessened selective action in mixtures of acids (as opposed to esters) is explained by interference of the polar COOH group with the chemisorption equilibrium involving the $-CH_2-$ group.

PATENTS

DRYING AND SEMIDRYING OILS. W. Charlton, A. Hill, H. Plimmer, and Imperial Chemical Industries, Ltd. *Brit. 565,431.* The drying properties of certain semidrying or drying oils or the corresponding acids, or mono- or diglycerides are improved by heating them at a moderately elevated temperature, such as 90-150° in the presence of maleic anhydride, maleic acid or a monoester of maleic acid with a monohydric alcohol while a current of air or other oxygen-containing gas is passed through the heated mixture. The mixture should contain not less than 0.5 mol. and not more than 1 mol. of the maleic acid compound per mol. of fatty acid in whatever form it is present. The heating is continued until the viscosity of the product just passes a minimum. (*Chem. Abs. 40,* 4534.)

DRYING AND SEMIDRYING OILS AND THEIR DERIVATIVES. H. Plimmer, E. B. Robinson, and Imperial Chemical Industries, Ltd. *Brit. 565,432.* Same as *565,431* except that the mixture also contains a small proportion of one or more of the oils, acids or esters in an oxidized form. (*Chem. Abs. 40,* 4534.)

WRINKLING OIL COMPOSITION. W. A. Waldie. *Brit. 565,563.* A wrinkle varnish composition is prepared by heat-bodying a mixture of oiticica oil and a non-wrinkling drying oil such as linseed oil. and adding to this mixture an oil soluble resin. such as a rosin-modified phenol-aldehyde resin or a heat-treated natural resin. and an oil soluble drier such as a cobalt drier. The heat-bodying of the mixture is carried out at 450-460° F. for a time sufficient to give a viscosity which produces a slight string on a stirring rod. (*Chem. Abs. 40,* 4534.)

MODIFIED ALKYD TYPE RESINS. H. L. Gerhart and L. M. Adams. *U. S. 2,404,836.* The new resin product consists of the copolymer of (A) a compound of the class consisting of cyclopentadiene and dicyclopentadiene and (B) an alkyd resin consisting of the unsaturated glyceride oil acid modified polyester of a polyhydric alcohol and a dicarboxylic acid, the product being soluble in petroleum naptha.

Abstracts

Soaps

Edited by
LENORE PETCHAFT

RECOVERY OF GLYCERIN FROM SOAP LYE. P. C. Guha and Ajoy Gupta. *J. Indian Inst. Sci. 23A,* 317-23 (1941). Since no glycerol is recovered in soap making in India, the authors encouraged its recovery to supply local markets. They designed a plant with a 10-lb. per hr. capacity, which is suitable for the small soap manufacturers of India. (*Chem. Abs. 40,* 4540.)

THE PHASES OF SOAPS AND THEIR EQUILIBRIA. Felix Lachampt (Soc. "Monsavon"). *Ind. corps gras 1,* 100-7 (1945). A review on phases present in soap-water and soap-water-salt systems. Some applications of the phase diagrams in soap making are pointed out. 12 equilibrium charts.

CONSTITUTION AND EFFECTIVENESS OF WETTING AGENTS. Ernst Gotte (Research Laboratory Rodleben der Henkelgruppe, Dessau). *Die Chemie 57,* 67-70 (1944). A complete classification of soaps (wetting agents) is presented. Within a homologous series the wetting action is dependent on the state of solution and reached an optimum value at a definite ratio of the hydrophobic to hydrophilic component in the molecule. The state of solution can be strongly influenced by electrolytes. The introduction of a second hydrophilic group into the molecule lowers the effectiveness greatly or makes the agent ineffective. The wetting power is greatly improved if the hydrocarbon chain in the hydrophobic part is branched and if the hydrophilic group is in a more or less central position. 19 references. (*Chem. Abs. 40,* 4541.)

THE STRUCTURE OF SOAP SOLUTIONS. D. Dervichian and F. Lachampt. *Bull. soc. chim. 12,* 189-206 (1945). A review of the investigations of McBain, Hartley, Stauff, and others. D. described (cf. *C. A. 39,* 5152^5) a micelle structure which accounts for all the properties of soap solutions. The properties discussed are electrical conductivity, the mechanism of the transformation from molecular to colloidal solutions, the dimensions of soap micelles based on x-ray data, gel formation, and coagulation. The anomalous viscosity of K palmitate solution at high dilution and at room temperature as compared to K oleate solution under identical conditions is explained by the fact that the former is below, the latter above, the Krafft point. 22 references (*Chem. Abs. 40,* 4540.)

PHOSPHATES IN LIQUID SOAP. Dudley Bachrach. *Soap 22,* No. 8, 49 (1946). Although lathering power of liquid soaps is not increased by addition of phosphates, a clearer solution is obtained. In practical use, it has been found that the best mixtures of phosphates comprise two parts by weight of trisodium phosphate (TSP)—half of it is water of crystallization—and one-half part of trisodium pyrophosphate (TSPP). To many firms who purchase a potash soap base and dissolve it to make their liquid soaps, this use of phosphates may also have some value. Most soap bases contain some small amount of unsaponified oil or fatty acid which makes the diluted solution cloudy. The addition of a small amount of TSP to the water used in the dissolving or diluting process will help in clarifying the finished solution as the unsaponified fatty acids will be combined. It will also tend to add a water softening character by the formation of TSPP in the solution.

STRUCTURE AND PROPERTIES OF COLLOIDAL ELECTROLYTE SOLUTIONS. A. W. Ralston (Armour & Co., Chicago). *Ann. N. Y. Acad. Sci. 46,* 349-50 (1946). Micelle theory is reviewed with particular reference to R's work on amine salts. Lamellar micelles should not be regarded simply as neutral particles but as particles with feeble ionic properties. With mutual attraction of long chains and polar nature of terminal groups surface-active properties become appreciable. Orientation toward the solution phase produces a system with maximum surface. The particles contain many mols., polar groups orienting toward the aqueous phase and giving ionic effects. Along with lamellar micelles there are formed a small number of ionic micelles in equilibriums with larger particles. These micelles are assumed to be spherical except for distortion from motion. Packing of molecules in this sphere is determined by such factors as cross-sectional areas of hydrocarbon chains and the area occupied by head groups. These factors along with ionic repulsion determine the size of ionic micelle. The apparent range of sizes of ionic micelles is explained by presence of chains of different lengths. (*Chem. Abs. 40,* 4583.)

PATENTS

SOAP. Lawrence H. Flett (Allied Chemical & Dye Corp.). *Can. 433,360.* For use in hard water, sea water, or acid aqueous solutions a composition comprises a water soluble soap and a mixture of monoalkyl derivatives of Na phenolsulfonate in which the alkyl groups are formed from a mixture of alkyl chlorides derived from chlorination of a petroleum distillate at least 80% of which boils at 210-275° and over a maximum range of 55°, the proportions being 24-54 parts of alkyl derivatives per 100 parts by weight of soap. (*Chem. Abs. 40,* 3916.)

DETERGING, WETTING, AND EMULSIFYING COMPOSITIONS. Harry H. Kroll (Alrose Chemical Company). *U. S. 2,404,297.* A process for preparing a surface active detergent comprises heating a mixture of a neutral fatty acid amide of the alkylol amines, a water-soluble alkali soap, and a water-soluble alkylol amine, for substantially 15-45 minutes in the range substantially 125-160°.

MANUFACTURE OF SOAP. Martin Hill Ittner (Colgate-Palmolive-Peet Company). *U. S. 2,403,925.* The process of making floating soap comprises incorporating air into successive batches of molten soap of practically the same weight and at practically the same temperature until each batch occupies a predetermined greater volume, subjecting the aerated soap to agitation, while preventing further substantial incorporation of air, to comminute the gas to an extremely fine and substantially uniform stage of subdivision, the agitation being completed above the solidification point but not more than about 10° C. above the solidification point, and cooling and solidifying the soap.