☆ ☆ ☆ ABSTRACTS ☆ ☆ ☆

Oils and Fats

Edited by
M. M. PISKUR

CANADIAN ERUCIC ACID OILS. IV. H. J. Lips and N. H. Grace. *Can. J. Res. 27F,* 311-17(1949). Fanweed oil and shortening processed by standard methods did not differ appreciably from commercial salad oils and vegetable shortenings in most of the chemical and physical properties studied, and the few differences found are not regarded as important. Fanweed oil was generally not as palatable as corn or cottonseed oils, perhaps because of some tendency to flavor reversion, but appraisals of the palatability of fanweed shortening did not differ significantly from those of commercial hardened products. Hence, it is concluded that the small amount of fanweed oil present in mixed oil from weed seed screenings will not lessen the potential acceptability of the mixture.

METAL FILTER SHEETS SOLVE FAT FILTRATION PROBLEMS. Anon. *Soap Sanit. Chem. 25,* No. 8, 73(1949). These sheets were fitted over the faces of the plates and the filter papers fitted to the faces of the perforated sheets. When the filter was closed the plates and frames were perfectly gasketed. The flow rate was the same as when the cloths were used, the tearing of cloth or paper was eliminated, the press cleaning was easier, swifter, and more complete than before, the downtime for cleaning was reduced.

COMPARATIVE TESTS ON THE KEEPING QUALITIES OF α-BUTTER AND SOUR-CREAM BUTTER. R. Kellermann. *Die Milchwissenschaft 4,* 40-6(1949). Butter, manufactured by the α-process in 11 dairies, was stored at 10-12° and its keeping qualities determined by both bacteriological and sensory tests. Deterioration paralleled the bacterial content. At 20 days α-butter and sour-cream butter kept equally well but at 30 or more days the former showed less spoilage. (*Chem. Abs. 43,* 5127.)

REDUCTION OF FATTY ACID ESTERS TO HIGHER ALCOHOLS BY MEANS OF RANEY NICKEL. Seiichi Ueno, Saburo Komori, and Akira Kishimoto. *J. Soc. Chem. Ind., Japan 48,* 78(1948). The ester of coconut-oil fatty acid was reduced to higher alcohols with H in the presence of Raney Ni. The best condition was to let H at an initial pressure of 100 atm. react at 205-10° 5 hours in the presence of 10% Raney Ni. (*Chem. Abs. 43,* 5363.)

THE ANALYSIS OF MIXTURES OF FATTY OILS WITH HYDROCARBONS. K. A. Williams. *J. Assoc. Official Agr. Chemists 32,* 668-72(1949). A chromatographic method is described for the recovery of hydrocarbons from the unsaponifiable matter of fatty oils. Results are given for the application of the method to pure and contaminated oils; it is shown to yield figures within 0.1% of the amount of mineral oil present in samples of linseed, teaseed, and rapeseed oil. The method is of general application to oils which do not yield hydrocarbons in a pure state.

VITAMIN A IN FISH OILS. M. E. Chilcote, N. B. Guerrant, and H. A. Ellenberger. *Anal. Chem. 21,* 1180-84 (1949). The various methods of assaying for vitamin A were standardized in terms of the new U.S.P. vitamin A reference standard. The highest vitamin potency was indicated by the spectrophotometric method of assay when applied to the whole oils, whereas the biological method generally indicated the minimum potency. The antimony trichloride and glycerol dichlorohydrin methods of assay, when applied to the nonsaponifiable fraction, yielded vitamin values somewhat more comparable to those obtained by the biological assay than were the values obtained by the spectrophotometric procedure when conversion factors of 2000 and 1925 were used in the calculations.

A NEW CATALYST FOR THE HARDENING OF FATTY OILS AND ITS APPLICATION IN INDUSTRY. Mykola Zajcev. *Scientific Memoirs Ukranian Tech. Univ. 1,* No. 4, 123-38(1948). Seventy kg. $NiSO_4 \cdot 7H_2O$ and 18 kg. $CuSO_4 \cdot 5H_2O$ are dissolved in 4,000 l. of H_2O; 18 kg. kieselguhr and 50 kg. Na_2CO_3 dissolved in 200 l. of H_2O are added, sediment is filtered and washed with 2,000 l. of H_2O at 40°; dried; suspended in refined oil by means of a colloid mill and reduced by hydrogenation starting at 250° and completing at 270-275°. The advantages of this catalyst are: it has no influence on foaming, the duration of hardening is about the same as when Ni formate is used, the consumption of Ni is 37.5% lower than with common methods, catalyst has a good life period, it causes no filtering difficulties, it does not cause extensive increase in the acid value of the hardened oils, and it effects good selectivity.

A SIMPLE NEW METHOD FOR THE DETERMINATION OF FAT, THE COLUMNAR METHOD. G. Hampel. *Getreide, Mehl u. Brot 1,* 30(1947). The finely ground sample is placed in a glass tube 30 cm. long and 1 cm. in diameter which is drawn out at one end. The lower end is closed with a cotton plug. The sample is extracted 5 times with 10-cc. portions of petroleum ether. Each time after the ether is poured in, the glass tube is closed with a rubber stopper. In this way the rate of flow is regulated. After 4 hours' extraction, the extract is transferred to a tared flask, the solvent is evaporated, and the contents of the flask are dried for 3 hours at 96° and weighed. Agreement with the Soxhlet method is within 0.1%. (*Chem. Abs. 43,* 5972.)

SOLUBILITY AND PHASE RELATIONSHIPS. HIGH MOLECULAR WEIGHT ALIPHATIC COMPOUNDS IN LIQUID PROPANE. R. Bogash and A. N. Hixson. *Chem. Eng. Prog. 45,* 597-601(1949). The correlation between effective molecular weight and critical solution temperature, previously presented for fatty acids and their esters of mono- and polyhydric alcohols, has been strengthened by the data on myristic and lauric acid and their esters. The lower limit of effective molecular weight of a compound that will show a lower consolute point is about 460. The association of aliphatic amines and nitriles in propane solution is apparently considerably less than the corresponding acid. The presence of an amino group in a compound of high molecular weight has but slight effect on the critical solution temperature.

THE POLYMORPHISM OF SATURATED 1,3-DIGLYCERIDES. F. J. Baur, F. L. Jackson, D. G. Kolp, and E. S. Lutton. *J. Am. Chem. Soc. 71,* 3363-66(1949). A reexamination of the polymorphism of the even saturated 1,3-diglycerides, dilaurin through distearin, has revealed a uniformity of behavior which does not confirm the discontinuities reported by Malkin, *et al.* Each diglyceride has two forms, both classified as beta-like on the basis of strong 4.6 Å spacings. After a suggestion of Malkin, the two forms are called beta-a and beta-b and are readily distinguishable by differences in short spacings in the 3.8 Å. For a given glyceride the beta-b long spacing exceeds that of beta-a by about 2 Å. Beta-a is invariably obtained from the melt and may sometimes be obtained by solvent crystallization. Highly stable at room temperature, it transforms to beta-b near the m.p. Beta-b, apparently the only thermodynamically stable form, is obtained by transformation of beta-a and commonly by solvent crystallization. Purely on the basis of similarity in X-ray diffraction patterns, it is suggested that a structural similarity may exist between beta-a diglyceride forms and beta-2 triglyceride forms and between beta-b (diglyceride) and beta-3 (triglyceride).

THE RELATIVE AFFINITY OF A FATTY ACID CHLORIDE FOR THE DIFFERENT FUNCTIONS OF THE NATURAL AMINO ACIDS. M. Naudet and P. Desnuelle. *Bull. soc. chim. France* 1143-6(1948). The reaction between oleyl chloride and leucine, serine, tyrosine, histidine, arginine, and lysine was studied to determine the relative yields of the amide and soap formed in dilute and concentrated alkaline solution. The relative affinities of the different functional groups capable of being acylated were, for dilute and concentrated alkali, respectively, α-NH$_2$, 100, 100; alcohol OH, 36, 0; phenolic OH, 42, 63; ϵ-NH$_2$ 66, 66; imidazole NH, 25, 85; and guanidine NH$_2$, 20, 37. (*Chem. Abs. 43,* 5368.)

QUANTITATIVE CHANGES IN PLASMA FATTY ACIDS OF ALLERGIC AND NONALLERGIC INDIVIDUALS FOLLOWING SINGLE AND REPEATED ADMINISTRATION OF SOYBEAN OIL. P. Wheeler and F. R. Goetzl. *Permanente Foundation Med. Bull. 5,* 63-5(1947). Before and 3.5 hours following the ingestion of soybean oil, 14 healthy persons had lower plasma nonphospholipid fatty acids than did 13 who were subject to asthma and hay fever. After a month of daily ingestion of soybean oil, a second fat tolerance test, given to 6 in each group, gave values for plasma phospholipid fatty acid which, in comparison with the first test, were increased in the allergic group and decreased in the nonallergic subjects. (*Chem. Abs. 43,* 5107.)

SUCCINIC ACID IN THE URINE AFTER EATING SYNTHETIC FAT. K. Thomas and G. Weitzel. *Z. physiol. Chem. 282,* 180-5(1947). Two synthetic fats differing from natural fats by their higher odd-numbered fatty acid content (about 50%) were fed to human subjects at about 100 g./day for periods up to 28 days. One fat, fed to 4 subjects, caused no change while the other, fed to 5 subjects, caused a marked rise in the succinic acid content of the urine. The increased amount of succinic acid was probably due to fermentive decomposition of branched-chain monocarboxylic acids or to normal and branched-chain dicarboxylic acids. (*Chem. Abs. 43,* 5097.)

CORRECTION BY THIOURACIL OF THE AGGRAVATING ACTION OF CERTAIN FATS ON DIABETES. B. A. Houssay and C. Martinez. *Rev. soc. argentina biol. 24,* 242-8 (1948). In rats with 95% of the pancreas removed a diet contg. 34% of lard aggravated the diabetes while a diet contg. 34% of coconut oil seemed to have some beneficial effect. Treatment with thiouracil counteracted the unfavorable action of the high-lard diet. (*Chem. Abs. 43,* 7583.)

COMPARATIVE EFFECTS OF CARBOHYDRATE, PROTEIN, AND FAT WHEN FED AS SINGLE FOODS ON THE SURVIVAL TIME OF RATS UNDER CONDITIONS OF ACCELERATED METABOLISM. H. A. Templeton and B. H. Ershoff. *Am. J. Physiol. 159,* 33-9(1949). Rats fed sucrose or margarine fat lived significantly longer after thyroxin administration than those fed casein when these foodstuffs were administered as the sole constituent of the diet. When saline solution was administered in place of the thyroxin, no significant difference in length of survival was observed on any of the diets employed. Rats fed sucrose or margarine fat lived significantly longer at an environmental temperature of 2°C. following previous exposure to low environmental temperatures than those fed casein, when these foodstuffs were administered as the sole constituent of the diet. At 23° C. no significant difference in survival time was noted on any of the foodstuffs employed.

RELATION OF FAT DEFICIENCY SYMPTOMS TO THE POLYUNSATURATED FATTY ACID CONTENT OF THE TISSUES OF THE MATURE RAT. V. H. Barki, R. A. Collins, E. B. Hart, and C. A. Elvehjem. *Proc. Soc. Expt'l Biol. & Med. 71,* 694-6(1949). When the rats, after depletion, were maintained on the fat-free diet ad libitum for sufficiently long periods, spontaneous recovery was observed. The concentrations of linoleic and arachidonic acids in the body fat were found to vary with the appearance of the symptoms; it was high at the end of the depletion period, and low at the stage when fat deficiency symptoms were present. The higher levels of linoleic and linolenic acids at the time of recovery, after a long period on the fat-free diet, are considered as further evidence for the synthesis of essential fatty acids in the mature rat. Supplementation of ethyl linoleate increased the level of arachidonate in the body fat.

THE GROWTH-PROMOTING EFFECT ON THE RAT OF SUMMER BUTTER AND OTHER FATS. S. Larsen and E. K. Bacon. *J. Nutr. 39,* 83-91(1949). Rat growth experiments were conducted over a 70-day period in which summer butterfat, margarine fat, cottonseed oil, and olive oil were added at levels of 10% to an otherwise fat free basal ration capable by itself of producing essential fatty acid deficiency symptoms. Using growth and body length measurements as criteria, it is concluded that there are no heretofore unrecognized fat soluble growth factors such as vaccenic acid present in summer butterfat which are not also present to the same extent in margarine fat and cottonseed oil. The addition of each of the above fats to a fat free diet produced a significant growth stimulation.

STUDIES ON THE COMPARATIVE NUTRITIVE VALUE OF FATS. XII. THE DIGESTIBILITY OF RAPESEED AND COTTONSEED OILS IN HUMAN SUBJECTS. H. J. Deuel, *et al.* *J. Nutr. 38,* 369-79(1949). The digestibility of rapeseed oil has been found to be 99% in normal men, while that of cottonseed oil was found to be 96.7% when the excretion of the soap is also considered. While the differences in values between these fats are only slight, they are apparently significant. They result from the somewhat greater excretion of soap in the cottonseed oil tests. The results using rapeseed oil prove that a species difference obtains in respect to digestibility between man and the rat.

ANTIVITAMIN ACTION OF FISH LIVER OILS. Marcel Cormier. *Bull. soc. chim. biol. 30,* 921-40(1948). Prolonged administration of fish liver oils retards the growth of young animals and produces severe lesions of the genital organs and adrenals of mature animals. The mechanism of the action is not well understood, but in part it is an antivitamin E action. (*Chem. Abs. 43,* 5834.)

THE LIPOTROPIC EFFECT OF ESTROGENIC HORMONES IN INBRED RATS. P. Gyorgy and C. S. Rose. *Proc. Soc. Expt'l Biol. & Med. 71,* 552-5(1949). The fat infiltration of the liver in response to an alipotropic diet is more uniform and more intensive in rats of the inbred Fischer strain than that seen in the past in genetically less homogeneous strains. Estrogen, in particular ethinyl estradiol, when given in combination with methionine, exerts a very marked lipotropic effect with a corresponding reduction of the liver fat to normal values.

A PHYSIOLOGICAL AND CYTOCHEMICAL STUDY OF THE KIDNEY AND THE ADRENAL CORTEX DURING ACUTE CHOLINE DEFICIENCY IN WEANLING RATS. R. E. Olson and H. Wendler Deane. *J. Nutr. 39,* 31-55(1949). The renal lesion of acute choline deficiency is characterized by fatty infiltration of the tabular epithelium, congestion and hemorrhage of the cortex, fragmentation and disappearance of mitochondria in the tabular epithelium, and a decrease in the respiration of slices of kidney cortex in vitro. At the time of maximum kidney damage (9 days), casts of material resembling hemoglobin appear in the lumens of the tabules. The renal damage is accompanied by an enlargement of the adrenal cortex and atrophy of the thymus.

PATENTS

PREPARING MILKWEED SEED OIL FOR EDIBLE PURPOSES AND PROTECTIVE COATINGS. C. F. Reed. *U. S. 2,480,769.* Process comprises removing the fin from the seed, and then subjecting the seeds to pressure while at a moisture content not substantially in excess of 8%.

COUNTERCURRENT HYDROLYSIS OF FAT. M. H. Ittner. *U. S. 2,480,471.* Water at over 200° is used to hydrolyze the fat, to liquefy the fatty acids, and dissolve the glycerine.

METHOD FOR RECOVERING CORN OIL AND CORN PROTEIN. H. H. Schopmeyer (American Maize-Products Co.). *U. S. 2,479,519.* The starch remaining in crude corn protein is hydrolyzed and separated from the undissolved protein as a solution. The oil is then extracted from the protein with a solvent.

REFINING GLYCERIDE OILS. B. Clayton. *U. S. 2,478,089.* This is a continuous process in which free fatty acids are removed by distillation after a preliminary degumming and/or decolorization.

COD-LIVER OIL. R. Pollak. *Fr. 929,804.* Cod-liver oil is kept at 50° for some 10 days in contact with vegetable, fruit juice, or spice to remove the odors and taste of the oil. (*Chem. Abs. 43,* 5158.)

ESTERS OF MIXTURES OF POLYOXYALKYLENE MONOHYDROXY COMPOUNDS. H. R. Fife and F. H. Roberts. *U. S. 2,480,185.* This is made from a reaction product of butanol, ethylene oxide, propylene oxide, and a fatty acid.

STEARIC ACID POLYGLYCOL ESTERS. Ciba Ltd. *Swiss 244,048,* Feb. 17, 1947. Stearic acid polyglycol esters can be prepared by heating 1 molecule $C_{17}H_{35}CO_2H$ with 3.8 molecules CH_2OCH_2 with a catalyst at 150-65°. AcONa or $PrCO_2Na$ may be used as catalysts. The product may be used to give cellulose fibers a rustling matting. (*Chem. Abs. 43,* 6652.)

RUST PROTECTIVE LUBRICANTS. G. H. von Fuchs and G. Pilz. *U. S. 2,481,372.* This consists essentially of an ester of an aliphatic dicarboxylic acid and of an aliphatic monohydric alcohol having 2-20 C atoms and as an anti-corrosion agent, therefore, from 1-4% by weight a fatty acid, a sulfurized unsaturated fatty acid, or alkyl phosphoric acid having at least 10 C atoms in an alkyl substituent.

ALPHA-HALOGENATED KETO FATTY COMPOUND FOR RUST INHIBITORS, LUBRICANTS, AND INTERMEDIATES IN PRODUCTION OF SYNTHETIC ORGANIC CHEMICALS. D. Price and F. J. Sprules. *U. S. 2,481,036.* This is a free saturated keto fatty acid containing from 8-30 C atoms and, at positions αα′ to a keto group are 2 halogen atoms selected from the group consisting of chlorine and bromine atoms.

RUST INHIBITING LUBRICANTS. L. W. Sproule and L. F. King (Standard Oil Development Co.). *U. S. 2,479,424.* This consists essentially of mineral lubricating oil containing sorbitan mono-stearate and at least one of the compounds—sorbitan mono-oleate or pentaerythritol mono-oleate.

Drying Oils

Edited by
ROBERT E. BEAL

A STUDY OF THE OILS FROM THE SEEDS OF LUFFA AEGYPTIACA, BENINCASA CERIFERRA (N. O. CUCURBITACEAE), AND ALLIUM CEPA (N. O. LILIACEAE). K. D. Phadnis, A. V. Rege, D. G. Pishawikar, and S. V. Shah. *J. Univ. Bombay 17A,* No. 24, 62-71(1948). The decorticated seeds of *Luffa aegyptiaca* contained 40% oil of which the insoluble fat acid composition was: palmitic 9.6, stearic 7.3, linoleic 42.6, and oleic 40.5%. The decorticated seeds of *Benincasa ceriferra* contained 36.4% oil of which the insoluble fat acid composition was: palmitic 8.5, stearic 4.0, linoleic 68.3, and oleic 19.2%. Both oils contained an unsaponifiable solid (melting point 144-8°). The seeds of *Allium cepa* contained 20% oil of which the insoluble fat acid composition was: palmitic 2.8, stearic 1.6, linoleic 38.1, and oleic 57.6%. The oil contained an unsaponifiable solid (melting point 110°). (*Chem. Abs. 43,* 6842.)

PREPARATION OF DRYING OIL BY POLYMERIZATION OF OLEFINS. P. H. Cornell (Phillips Petroleum Co., Bartlesville, Okla.). *U. S. 2,481,498.* A mixture of an olefinic hydrocarbon and anhydrous HF are polymerized at 0°-150° and then fractionated at temperatures where the lower organic fluorides decompose into HF and olefin. The HF and olefin are recycled and the undecomposed polymer is further polymerized for 15 minutes to one hour at 100°-200° to form a drying oil.

CHANGES OF IODINE VALUE DURING PROCESSING OF FATS AND OILS. N. W. Gillam. *Australian Chem. Inst. J. & Proc. 15,* 126-34(1948). Reactions which tend to lower the I value and those which tend to raise it, during oxidation or polymerization of a fatty oil, are reviewed. The effects on I value, peroxide value, and viscosity of blowing rape seed oil at various temperatures are presented and discussed. (*Chem. Abs. 43,* 6840.)

ESTERIFICATION REACTIONS IN THE OXIDATION OF UNSATURATED FATTY OILS. N. W. Gillam. *Australian Chem. Inst. J. & Proc. 15,* 150-9(1948). Large molecules are formed by esterification between OH and COOH groups formed during the oxidation of unsaturated oils. The equivalent weights of the free carboxylic acids formed during the oxidation of castor and olive oils are calculated and shown to be higher for castor oil probably because of its OH group which is available for esterification. (*Chem. Abs. 43,* 6841.)

FILM FORMATION, FILM PROPERTIES, FILM DETERIORATION. J. S. Long. *J. Oil & Colour Chem. Assoc. 32,* 377-445(1949). Mechanism of film formation of drying oils is presumed to follow a course of oxidation of unsaturated groups, the aggregation of polar oxidation products to a micelle condition, an increase in micelle formation with the adsorption of the remaining small, liquid molecules to give a "set-to-touch" condition, and further oxidation with a decrease in acetone-extractable material and gradual changes in the physical properties of the film. The mechanism of oxidation is not entirely clear but probably begins with the formation of both conjugated and unconjugated monomeric hydroperoxides. Electron micrographs at 16,500 magnifications show evidence of micelle formation in "set-to-touch" films. Experiments with polyhydric alcohols containing a large number of OH groups demonstrated that fatty acids from semi- or non-drying oils form drying esters therewith provided at least 9 double bonds are present in the ester molecule. Film properties are discussed from the viewpoint of the stress-strain forces set up when the film or the surface to which it is applied undergo expansion and contraction. More durable films may be obtained by using higher molecular weight and higher functionality film formers which possess greater strength to withstand the stress-strain forces. Studies of film deterioration by water and by ultraviolet light show that the water absorption of immersed oil films is inversely related to their water resistance while ultra-violet light transmission of oil films is directly related to their exterior durability. Work being undertaken for a study of esters of single fatty acids with a number of alcohols is described. Forty-nine references and a bibliography of 995 references are given.

PATENTS

ESTERS. H. Wittcoff (General Mills, Inc., Minneapolis, Minn.). *U. S. 2,480,347.* A polyhydroxy product resulting from the condensation of one mole of formaldehyde with an amount of methyl ethyl ketone having one mole of active H, is completely esterified with an unsaturated higher fatty acid to form a useful compound.

DRYING OILS. L. D. Myers and J. W. Ritz (Emery Industries, Inc., Cincinnati, Ohio). *U. S. 2,479,857.* A drying or semi-drying oil, and a fatty acid polymer which had the same number of C atoms per molecule, before polymerization, as the non-drying fatty acids in the drying or semi-drying oil, are heated together to liberate the non-drying fatty acids in the oil. The latter are removed by distillation to give an improved drying oil.

MODIFIED DRYING OIL COMPOSITIONS, METHODS OF MAKING THE SAME, AND METHODS OF COATING AND UNITING SHEET MATERIALS THEREWITH. L. R. Whiting (Bakelite Corp., Harrison, N. J.). *U. S. 2,480,206.* Moisture-free cellulosic sheets are impregnated with a liquid binder comprising a conjugated drying oil and a catalyst mixture of an oxy-compound of β and an α-hydroxy aliphatic acid, an ortho-hydroxyaromatic acid, oxalic acid, or an ester of one of these acids, and the sheets are assembled into a sandwich and subjected to heat and pressure to form a flexible laminate.

WRINKLE COATING COMPOSITION CONSISTING OF CONJUGATED DOUBLE-BONDED OIL AND AN AQUEOUS EMULSION OF POLYVINYL ACETATE RESIN. N. T. Beynon (New Wrinkle, Inc., Wilmington, Del.). *U. S. 2,479,298.* A drying composition which forms a wrinkle coating consists of an aqueous emulsion of 100 parts conjugated drying oil and 10-50 parts polyvinyl acetate resin.

FATTY OIL ACID GLYCERIDE-VINYL RESIN COATING COMPOSITIONS. H. S. Rothrock and W. J. Wayne (E. I. duPont de Nemours & Co., Wilmington, Del.). *U. S. 2,479,410.* The composition comprises a homogeneous blend of 1-70% drying oil and the balance a vinyl resin which is a copolymer of vinyl chloride with 2-15% of a haloethylene containing F.

OIL-MODIFIED ALKYD RESIN MANUFACTURE. P. E. Marling (Monsanto Chemical Co., St. Louis, Mo.). *U. S. 2,479,951.* Drying or semi-drying oils are alcoholyzed with a polyhydric alcohol containing 0.022-0.12% of Ca as $Ca(OH)_2$, the product is esterified with a polycarboxylic acid anhydride, 0.2-2.0% of ortho phosphoric acid is added, and this product is heated to 440°-560°F. to form a useful resin.

Soap

Edited by
LENORE PETCHAFT

SPECIALTY SOAPS. Milton A. Lesser. *Soap Sanit. Chemicals 25,* No. 10, 33-5, 149, 151(1949). General review of specialized soaps such as the new deodorant soaps containing hexachlorophene, anti-perspirant soaps using aluminum compounds, indicator soaps, dental soap cakes, vitamin soaps, insecticidal soaps, and ox gall soaps. 35 references.

SYNTHETICS IN WATER SYSTEMS. Anon. *Soap Sanit. Chemicals 25,* No. 10, 77-8(1949). Studies show that the presence of domestic synthetic detergents in municipal water supply systems interferes with coagulation in water purification operations. The presence of such detergents in amounts of one p.p.m. and higher affects coagulation of alum and other coagulants due to the surface tension reducing properties of the detergents. Tests have shown that the addition of lime gives a marked improvement in the coagulation of the detergenated raw water with all the coagulants used.

LECITHIN IN SOAPS. Anon. *Soap Sanit. Chemicals 25,* No. 10, 81(1949). Methods are described for incorporating lecithin in soap without addition of unsaponified soybean oil. Addition of up to 5% of lecithin results in soap with improved and creamier lather and also having a pleasant action on the skin.

THEORETICAL CONSIDERATIONS OF DETERGENCY. Ernst K. Goette (University of Cincinnati, Ohio). *J. Colloid Sci. 4,* 459-84(1949). General review article covering such points as comparison of removal of solid soil and fatty soil, wetting and cleaning action, the importance of the critical micelle concentration (C.M.C.), effect of salts on the C.M.C., relationship of detergent action and foaming properties to the C.M.C., the importance of interfacial potentials, the effect of anionic and cationic soaps and electrolytes on these potentials, and complex phenomena with salts. 94 references.

TECHNIQUE IN DETERGENCY EVALUATION. J. Powney and A. J. Feuell. *Research* (London) *2,* 331-4(1949). A procedure has been developed for the laboratory evaluation of detergency in which soiled chopped fibers replace the usual artificially soiled fabric test pieces. Slivers of cotton cloth are stirred in water with a paddle stirrer until disintegration into single fibers is complete. The mass of fibers is filtered and soiled with a mixture of graphite, liquid paraffin, and CCl_4. The fibers are washed by using a solution of the detergent under test in a laboratory plunger type washing machine, rinsed, and dried. The dry pads can then be compared either visually or photometrically with blank pads or with pads containing a known amount of soiled fibers. Excellent reproducibility is achieved and considerable time is saved in making tests as compared with the fabric-test-pieces method. The main experiments have been with cotton, but wool and rayon can also be used. (*Chem. Abs. 43,* 8180.)

ADSORPTION OF SOAP BY CARBON BLACK. A. S. Weatherburn, G. R. F. Rose, and C. H. Bayley. *Can. J. Research 27F,* 179-93 (1949). The adsorption of Na soaps from aqueous solutions by C black was studied. Adsorption of fatty acid (I) and alkali (II) components follows the Freundlich adsorption equation; the extent of adsorption increases with chain length. Adsorption of I exceeds that of II, the more so the greater the chain length. Excess I results in increased adsorption of I, but does not affect adsorption of soap, whereas excess II increases adsorption of II but decreases that of I and of soap. Adsorption from 95% and absolute EtOH is much lower than from aqueous solution. (*Chem. Abs. 43,* 7289.)

X-RAY INVESTIGATIONS OF THE STRUCTURE OF COLLOIDAL ELECTROLYTES. IV. A NEW TYPE OF MICELLE FORMED BY FILM PENETRATION. Wm. D. Harkins and Rose Mittelmann. *J. Colloid Sci. 4,* 367-81 (1949). In aqueous solutions of soap the spacing of the X-ray diffraction band previously designated as M-band, which is independent of soap concentration and increases by as much as 11 Å when hydrocarbons are solubilized in the micelles, decreases by as much as 6 Å when alcohols with 10 or less C atoms are solubilized. Alcohols and other amphipathic molecules apparently form a new type of micelle in which the solubilized molecules take a position essentially the same as that of the soap molecules (polar groups toward the H_2O, hydrocarbon chains between the soap hydrocarbon chains). This position causes no increase in the micelle dimensions, and therefore no increase in the M-band spacing. The observed decrease may be due to the hydrocarbon chains of the soap folding into the holes left in the micelle at the ends of the shorter alcohol chains. Data are also given for the long or I-band spacing observed with various soap solutions, but these results cannot be interpreted at present. A model for a quasi-cylindrical micelle is developed. (*Chem. Abs. 43,* 7780.)

STUDIES OF SOAP SOLUTIONS. I. FATTY ACID SOAPS AND THEIR HYDROLYSIS IN AQUEOUS SOLUTIONS. G. Stainsby and A. E. Alexander. *Trans. Faraday Soc. 45,* 585-97((1949). The hydrolysis of soap solutions is discussed, based on the assumption that mixed micelle formation occurs between fatty acid moles (formed by hydrolysis) and soap ions. At the critical concentration for soap micelles as normally determined the ratio of soap ions to fatty acid moles is not far from unity. The dissociation constants of the higher fatty acids depend upon the variation of this ratio with total soap concentration. The effect of BuOH upon the hydrolysis curve of Na oleate at 25° is estimated in a semiquantitative manner, on the basis of a simple competition between fatty acid and alcohol moles for the limited number of sites in the micelles. (*Chem. Abs. 43,* 8179.)

THE PHASE STATE AND THERMAL TRANSITIONS OF GREASES. M. J. Vold, G. S. Hattiangdi, and R. D. Vold (University of Southern California, Los Angeles, Calif.). *Ind. Eng. Chem. 41,* 2539-46 (1949). X-ray diffraction patterns at room temperature and differential heating curves from room temperature to the liquefaction point have been obtained for numerous samples of aluminum, barium, calcium, lithium, sodium, and mixed base commercial lubricating greases and for the corresponding oil-free soaps. At room temperature the greases contain principally finely divided crystalline soap in oil, but the crystallites may be modified by in situ formation as compared with their structure when prepared in the oil-free state. The nature and extent of such effects vary with the soap cation and with the incorporation of additives. Lithium soap crystallites are almost unaffected by in situ formation except in size, while at the other extreme, greases stabilized with barium acetate contain crystallites of structure entirely different from that of either soap or salt. On heating, the greases undergo thermal transformations which are in some cases closely related to the soaps. In other cases there exists more complex solubility relations involving swelling of the soap to form liquid crystalline solutions of oil in soap.

PATENTS

PROCESS OF BLEACHING FATS AND OILS AND MAKING SOAPS THEREFROM. *U. S. 2,483,414.* Lloyd F. Henderson and Louis H. Libby (Lever Brothers Co.). Light colored soaps are made by treating soap stock with phosphoric acid to release nascent oxygen, saponifying the stock, and again bleaching the soap formed with a reducing (hydrosulfite) bleach.

SOAP PURIFICATION. Felix Lucien Lachampt (Union Francaise Commerciale et Industrielle). *U. S. 2,485,204.* A continuous process for the purification of glycerinated soap obtained in the more concentrated liquid phase known as "neat" soap comprises washing the soap by a continuous circulation with a solution of salt, concentration of which is close to the concentration below which the soap may be dissolved.

IMPREGNATING AGENT FOR METAL WOOL PADS. Henry A. Goldsmith and Alfred Leroy Humbert (Phipps Products Co.). *U. S. 2,483,135.* Soap pads suitable for use in hard water consist of a metallic wool pad impregnated with a hydrocarbon sulfonate, a resinate, an alkali soap of a solid fatty acid, a binder, corrosion inhibitor, and a water softener.

HARD WATER DETERGENT. Harland H. Young and David Rubinstein (Swift & Company). *U. S. 2,483,253.* Condensation products of alkylolamines and carboxylic acids are added to soaps to prevent deposition of soap curds.

METHOD FOR THE CONTINUOUS PRODUCTION OF SOAP. Felix Lucien Lachampt (Union Francaise Commerciale et Industrielle). *U. S. 2,485,205.* An improved method for continuous production of soap is based on increasing the rate of saponification by increasing the contact area between the fatty materials to be saponified and the alkaline lye by producing an emulsion of the "water-in-oil" type between the reagents.

NON-CRACKING SOAP BAR MANUFACTURE. Alvin H. Knoll (Procter & Gamble Co.). *U. S. 2,484,098.* A framed soap bar having improved, non-cracking properties is produced by passing a soap mass through a grid or screen having numerous apertures, and then reuniting the soap mass and chilling.