ABSTRACTS

Oils and Fats

Edited by
M. M. PISKUR

Coconut oil outlook. L. J. Chase (Spencer Kellogg and Sons, Inc.). *Soap Sanit. Chemicals 25,* No. 7, 28-30(1949). Price, taxes, production, etc. are discussed.

Solvent extraction and expeller processing. A. Cecil Wamble. *Oil Mill Gaz. 54,* No. 1, 85-90(1949). A lecture on modern technic, yields, cost, etc.

Potential of processing soya beans by hydraulic methods. Roy Castillow. *Oil Mill Gaz. 54,* No. 1, 81-4(1949). General information on the subject.

Extraction of soybean oil by trichloroethylene. O. R. Sweeney, L. K. Arnold, and E. G. Hollowell. *Iowa Eng. Exper. Sta., Bull. 165,* 89 pp.(1949). The commercial extraction plant designed to process 10 tons of soybeans in 24 hours satisfactorily processed 15 tons of beans containing up to 14% moisture. The steam used was 1,673 pounds per ton, the power 44 kilowatt-hours per ton, the labor (not including storage handling) 3.7 man-hours per ton, and solvent loss 10 pounds per ton. The meal contained less than 1% oil and the oil satisfactorily met commercial standards.

Studies on microbiological protein and fat synthesis. I. The basic requirements for protein and fat production by mold in submerged culture. K. Bernhauer and J. Rauch. *Biochem Z. 319,* 77-93 (1948). In the case of a strain of *Mucor circinelloides* it was found that the initially present relatively high-crude protein content sinks gradually while the fat content increases greatly. A reciprocal relationship is seen between the N/C coefficient and the accumulation of protein and fat: when the coefficient is 1-20, crude protein may reach the value of 40-50% but the fat content is low, not over 5-10% but when the N is very small the fat content attains about 50% while the protein content is only about 10%. II. Comparative studies on protein and fat formation by different molds in submerged culture. *Ibid.* 94-101. Studies were made on 14 different molds in submerged culture, which manifested large variations in capacity to accumulate fat. Some of these, although they can form much protein when the N concentration is high, can be spoken of as "fat molds"; others accumulate much carbohydrate in the mycelium and are spoken of as "carbohydrate molds" but these are apparently not suitable for fat or protein accumulation. III. Method of submerged cultivation in "stirred culture" and its application to the production of fat mycelium. *K.* Bernhauer and J. Rauch. *Ibid.* 102-19. *(Chem. Abs. 43,* 4335-6.)

Sodium chlorite in the fatty oil industry. M. J. Mouton and R. Borezee. *Oleagineux 4,* 271-80(1949). Action of $NaClO_2$ alone and with other chemicals is given. Uses with palm, olive, peanut, raisin seed, and linseed oils, tallow, lanolin, soap, etc. are discussed.

A new sensitive method for the chemical determination of organic peroxides. S. Hartmann and J. Glavind. *Acta Physiol. Scandinavica 16,* Supplement 53, 32-3(1948). The procedure depends on the color formed by peroxides of unsaturated fatty acids with leuco-base of 2,6-dichlorophenolindophenol in the presence of heme.

Polarographic studies of organic peroxides in nonaqueous solutions. W. R. Lewis (Kingan Co., Indianapolis 6, Inc.), F. W. Quackenbush and T. De Vries. *Anal. Chem. 21,* 762-5(1949). A polarographic procedure is outlined which permits polarographic study of water-insoluble peroxides, such as those which form in fats, ethers, and hydrocarbons. With each of these substances, more than one wave is obtained for the autoxidation products. The precision of measurement is within ± 5% for fats with a peroxide number of 5 or higher.

Fat losses in preparation of foods. I. Fat losses in preparation of egg pancakes. Bruno Rossmann. *Z. Lebensm.-Untersuch. u. -Forsch. 89,* 21-6(1949). The 2 cake formulas used were: (a) flour 30, egg powder 7.5, and fat 5 g. and b, resp., 60, 15, and 20 g. The fats used were butter, margarine, lard, and oil. The fat losses were 7-70% of the total fat. The percentage losses of fat in relation to the fat present was greater in formula a; in regard to the differences between the fats, lowest loss occurred with lard. The data are discussed in regard to caloric value of the pancackes.

Fat losses in the preparation of foods. II. Fat losses in the preparation of potato pancakes. Bruno Rossmann. *Z. Lebensm.-Untersuch. u. -Forsch. 89,* 274-8(1949). Butter, margarine, lard, oil, or synthetic fat were used in 15 g. amts. with 150 g. grated potato and 10 g. wheat flour in making potato pancakes. Fat losses were 10-39% of the total fat with pure fats and 10-53% of the moisture contg. fats. Pan residue contained 1.5-7.5% and 1.5-7.8%, resp., of the total fat. Sputtering and burnt losses were 9-33% and were least with oil and lard.

An x-ray and thermal examination of the glycerides. Part X. Symmetrical mono-oleoyl and monoelaidoyl disaturated triglycerides. T. Malkin and B. R. Wilson (The Univ., Bristol). *J. Chem. Soc.* 369-72(1949). 2-Oleo-distearin, -dipalmitin, and -dimyristin exist in 5 solid modifications, namely, vitreous, α, β'', β', and β, in order of ascending m.p. Thus, they differ from triglycerides previously studied, which exist in 4 forms. The suggestion of Lutton that only 3 forms exist, cannot, therefore, be sustained. Divergent results of Filer, Sidhu, Daubert, and Longenecker are shown to be probably due to the presence of diglycerides in their specimens. As was expected 2-elaido-distearin and -dipalmitin are similar to their saturated analogues in their structure and polymorphism.

Napalm, mixture of aluminum disoaps. K. J. Mysels (Stanford U.). *Ind. Eng. Chem., 41,* 1435-8 (1949). The over-all analysis of Napalm, its x-ray diffraction patterns, and behavior in the presence of moisture and of hydrocarbons are presented and compared with those of pure aluminum dilaurate. It is shown that Napalm and aluminum dilaurate are closely akin.

THE EFFECT OF INORGANIC ELECTROLYTES UPON THE CONDUCTIVITY OF AQUEOUS SOLUTIONS OF DODECYLAMMONIUM CHLORIDE. A. W. Ralston, D. N. Eggenberger, and F. K. Broome (Armour and Co.). *J. Am. Chem. Soc. 71*, 2145-9 (1949). Salts and strong acids reduce both the equivalent conductivity and the critical concentration. The reduction of the critical concentration in the presence of such electrolytes is independent of the nature and concentration of the cation of the added electrolyte. Weak acids, on the other hand, form molecular complexes with dodecylammonium salts and their presence does not reduce the critical concentration.

FATTY ACID AMIDES. I. PREPARATION OF AMIDES OF OLEIC AND THE 9,10-DIHYDROXYSTEARIC ACIDS. E. T. Roe, J. T. Scanlan, and D. Swern (Eastern Reg. Res. Lab.). *J. Am. Chem. Soc. 71*, 2215-18 (1949). Methods of preparation of oleamide and N-(*n*-alkyl)-oleamides from Me through hexyl and the even members from octyl through octadecyl have been studied, and the amides have been obtained in good yield. N-(2-hydroxyethyl)-oleamide, N-acetyloleamide, and several representative N-aryloleamides and N-alkyl-9,10-dihydroxystearamides also have been prepared. Fair yields of oleamide were obtained by relatively simple procedures. CHEMISTRY OF EPOXY COMPOUNDS. IX. EPOXIDATION OF OLEAMIDE AND N-SUBSTITUTED OLEAMIDES WITH PERACETIC ACID. *Ibid.* 2219-20. 9,10-Epoxystearamide and a series of N-substituted 9,10-epoxystearamides have been prepared in 30-90% yield by the epoxidation of oleamide and N-substituted oleamides.

THE THERAPEUTIC AND PROPHYLACTIC ADMINISTRATION OF WHEAT GERM OIL (VITAMIN E) IN INFANCY AND CHILDHOOD. S. Stone (Manchester, N. H.). *Arch. Pediatrics 66*, 189-200 (1949). Vitamin E in the form of wheat germ oil concentrates has been administered for the last 10 years to a large group of children with a variety of neuromuscular disorders and other disturbances of the nervous system. The administration of vitamin E is safe and should be included as a regular dietary supplement with all vitamin mixtures in view of the inadequate content of the average diet in vitamin E.

CONCENTRATES OF FAT-SOLUBLE CONSTITUENTS OF LEAF MEAL EXTRACTS. M. E. Wall (Eastern Regional Research Lab., Philadelphia, Pa.). *Ind. Eng. Chem., 41*, 1465-9 (1949). Crude hexane or acetone leaf meal extracts could not be molecularly distilled without preliminary treatment to remove phospholipides and oil-insoluble constituents. This treatment consisted in saponifying hexane or acetone solutions or concentrating hexane extracts, and then precipitating the phospholipides with acetone. The latter treatment was preferable because none of the leaf constituents were destroyed. In either case the solvent was then evaporated in the presence of vegetable oil, such as cottonseed; equal parts by weight of oil and total leaf solids were used. The solvent-free oil solution was then transferred to a falling-film molecular still, and the oil was degassed and finally distilled at pressures of 10 microns or less over a temperature range of 80° to 220°C. The following distillate fractions were obtained: phytol (from saponified extracts only) at 80° to 120°C., tocopherol-sterol fraction at 140° to 180°C., and a carotene-xanthophyll-cottonseed oil distillate at 200° to 220°C. The over-all recovery of tocopherol and sterol were 90% or more, but about half the carotene and xanthophyll was destroyed. About 60 to 70% of the tocopherol and sterol and about 30% of the carotene were found in the most potent fractions. The concentration of tocopherol and sterol was increased tenfold over the concentration originally present in the oil-leaf lipide solution. The concentration of carotene was increased only two-fold, owing to the fact that half of it was destroyed and that the cottonseed oil vehicle distilled with the carotene.

FAT IN FAECES. ESTIMATION OF FAT AND ITS MOLECULAR WEIGHT IN RELATION TO FAT ABSORPTION IN MAN. J. H. Van de Kamer, *Centraal Inst. Voedingsonderzoek T.N.O., Utrecht, Publ. No. 71,* 1948, pp. 100. A new method is presented for estimating the molecular weight of the fatty acids in faeces. Studies were made of the molecular weights of the faecal fatty acids in children and adults on different diets. The results are summarized. The molecular weights were: adult on mixed fats, principally margarine, range 247 to 275, mean 263; adult on butter alone, range 265 to 271, mean 269; adult on beef fat, butter and margarine, range 272 to 280, mean 275; child on butter alone, range 258 to 264, mean 261; two children on mixed fats, chiefly butter and cod liver oil, ranges 267 to 273 and 267 to 269, means 270 and 269. Hence, although the fat ingested affects the molecular weight of the faecal fatty acids, the molecular weights of foods and faeces acids are not correlated. A boy convalescent from sprue showed an improvement in fat absorption from 40 to 70 per cent. At the same time the molecular weight of the faecal fatty acids fell from 280 to 256. (*Nutr. Abs. & Revs. 18*, 3948, 1949.)

THE COMPARATIVE VALUE OF HIGH AND LOW FAT CONCENTRATES WITH ALFALFA HAY. J. H. Byers, I. R. Jones, and J. R. Haag (Oregon State College). *J. Dairy Sci. 32*, 596-602 (1949). A ration of alfalfa hay and ground soybeans containing 5.2% dietary fat did not increase milk production when compared to a ration of alfalfa hay and soy-bean meal containing 2.7% dietary fat.

EFFECT OF RAW SOYBEANS AND SOYBEAN OIL MEAL ON THE VITAMIN A AND CAROTENE CONCENTRATIONS IN THE BLOOD PLASMA AND MILK OF LACTATING COWS. R. L. Squibb, C. Y. Cannon, and R. S. Allen (Iowa State College, Ames). *J. Dairy Sci. 32*, 565-69 (1949). A reduction of the carotene concentration of the blood plasma and of the milk of lactating cows resulted when raw soybeans were fed. When soybean oil meal was fed in amount equivalent to that of the raw beans minus their oil content, the carotene concentrations in the blood plasma and the milk fat were similar to those when the cows were fed the control ration. Both the control and soybean oil meal groups excreted more carotene in their milk than did the group fed raw soybeans.

FILLED MILKS FOR DAIRY CALVES. I. SOYBEAN OIL VERSUS MILK FAT. N. L. Jacobson, C. Y. Cannon, and B. H. Thomas (Iowa State College). *J. Dairy Sci. 32*, 429-34 (1949). Under conditions of this experiment, a filled milk containing hydrogenated soybean oil produced growth in young dairy calves equal to the growth of calves fed whole milk. The growth and general appearance of the group of calves fed hydrogenated soybean oil were in sharp contrast to those of the group fed crude expeller soybean oil, the latter being characterized by poor growth, severe scouring and high mortality.

FILLED MILKS FOR DAIRY CALVES. II. COMPARATIVE EFFECTS OF VARIOUS TYPES OF SOYBEAN OILS AND OF BUTTER OIL ON HEALTH, GROWTH, AND CERTAIN BLOOD CONSTITUENTS. W. R. Murley, N. L. Jacobson, G. H. Wise, and R. S. Allen (Iowa State College). *J. Dairy Sci. 32,* 609-19(1949). Although there was considerable intra-group variation, the incidence of scouring was lowest for the calves fed butter oil, followed in order by the groups receiving, respectively, hydrogenated, refined, and crude soybean oils. Mean blood plasma fat levels for the calves receiving butter oil were significantly higher than those of the group fed hydrogenated soybean oil but significantly lower than the mean values of the other 2 groups.

THE CHOLINE REPLACEMENT VALUE OF ETHANOLAMINE IN CHICKENS KEPT ON A HIGH FAT RATION. F. A. Kummerow, R. Weaver, and H. Honstead (Kansas Agri. Expt. Sta., Manhattan, Kansas). *Poultry Sci. 28,* 475-8(1949). Chickens kept for 10 weeks on a simplified ration supplemented with 25% linseed oil developed perosis and gained less weight than those supplemented with 25% corn. Additional supplements of ethanolamine or choline to birds kept on the linseed oil ration prevented perosis and stimulated growth

NUTRITIVE VALUE OF FRESH, RANCID, HIGH-ACID, AND BAZAAR GHEE. J. N. Trivedy, V. R. Bhalerao, and N. N. Dastur. *Indian J. Dairy Sci. 1,* 93-100(1948). Ghee was prepared from fresh cow butter and allowed to rancidify to 4.45-6.15 or to 9.39-12.60 peroxide value. This treatment lowered vitamin A content in both samples, but at 10% level in a balanced diet caused no decrease in growth of first-generation rats. However, mother rats on rancid ghee diets produced smaller litters. High-acid ghee prepared from aged butter was high in vitamin A. Composite ghee samples collected from bazaars were low in vitamin A compared to fresh ghee prepared in the laboratory. (*Chem. Abs. 43,* 4394.)

PATENTS

PRODUCING ESTERS. S. B. Lippincott (Standard Oil Development Co.). *U. S. 2,476,053.* For the manufacture of partial esters of polyalcohols, the alcohols are submitted to ester interchange with a lower alcohol ester. The lower alcohol is volatilized during the process.

IMPROVE THE VISCOSITY AND POUR POINT OF LUBRICATING OILS. O. M. Reiff, F. P. Otto, J. J. Giammaria, and E. A. Oberright (Socony-Vacuum Oil Co.). *U. S. 2,475,916.* Waxy aromatic (phenols, cresol, etc.)-fatty derivatives are used as viscosity and pour point modifiers for lubricants.

LUBRICANTS WITH IMPROVED DETERGENT, ANTIOXIDANT, AND OILINESS PROPERTIES. H. G. Smith and T. L. Cantrell (Gulf Oil Corp., Pittsburgh, Pa.). *U. S. 2,475,727.* This comprises a mineral lubricating oil and an anhydrous, non-hygroscopic mixture of sperm oil alcohols, and the calcium salts of sperm oil fatty acids.

POLYMER SUITABLE FOR THE FRICTION ELEMENT IN BRAKE BANDS AND CLUTCHES. H. L. Gerhart (Pittsburgh Plate Glass Co.). *U. S. 2,475,664.* This is a molded, hard, infusible vulcanizate of sulfur and a copolymer of a glyceride drying oil and a cyclopentadiene or its lower homopolymers up to the pentamer.

LUBRICATING GREASE. A. A. Bondi (Shell Development Co., San Francisco). *U. S. 2,475,589.* A mechanically stable, thermally reversible product is obtained because the soap used is derived from a hydroxy fatty acid and a hydrogenated fatty acid.

ALCOHOLS. Procter & Gamble Co. and A. Abbey. *Brit. 573,788* (1945). Higher saturated primary alcohols are prepared by hydrogenating a mixture of saturated carboxylates of Zn and Cr. The reaction is carried out without the addition of a catalyst, at 240-400°, and at a H pressure above 2,000 lb./sq. in. The process is especially applicable to the treatment of Zn and Cr soaps of saturated fatty acids occurring in natural vegetable, animal, and marine fats and oils. (*Chem. Abs. 43,* 4284.)

Drying Oils

Edited by
ROBERT E. BEAL

DRYING OF FATTY OILS AND ITS CATALYTIC ACCELERATION. E. Karsten. *Farben, Lacke, Anstrichstoffe 3,* 69-75(1949). A review.

CHEMISTRY IN THE EVOLUTION OF THE MODERN VARNISH INDUSTRY. C. P. A. Kappelmeier. *Paint, Oil, Chem. Rev. 112,* No. 14, 18, 20, 28, 30, 32, 34 (1949). The chemistry of recent developments in the paint and varnish field is reviewed with respect to reactions involving the unsaturated center, the carboxyl group, and the reactive methylene group in the β position to the carboxyl group in unsaturated fatty acids.

CHEMICAL EXAMINATION OF THE SEEDS OF MALLOTUS PHILIPPINENSIS. I. ANALYSIS OF DRYING OIL AND SEED CAKE. J. S. Aggarwal, S. S. Bhatnagar, P. Narain, and Karimullah. *J. Sci. Ind. Research* (India) *7B,* No. 9, 136-8(1948). The oil is a thick, light brown liquid, density (40°) 0.9409, refractive index (30°) 1.5052, saponification number 195.0, SCN value 64.2, I number 166.8, acetyl value 15.7-44.0. It polymerizes in the presence of diethyl ether to a plastic mass but may be extracted from the kernels with petroleum ether. The acids polymerized during an attempt to separate saturated and unsaturated acids by the Pb salt method, but the saturated acids were calculated to consist of 65.6% palmitic and 34.4% myristic when analyzed by the Bertram oxidation method. (*Chem. Abs. 43,* 4027.)

THE PROPERTIES OF MAKITA (KUSTO) OIL. G. Winter. *Australia, Dept. Munitions, Paint Notes 3,* No. 12, 393-406(1948). Dried kernels of Makita or Kusta seed yielded 18% of an oil (n_D^{15}, 1.5610, saponification number 196, acid number 11.8) containing 46% of parinaric acid (4 conjugated double bonds) and 34% of a conjugated trienoic acid according to absorption spectra measurements. Varnishes from the oil were superior to tung oil varnishes in drying time and water resistance. (*Chem. Abs. 43,* 4031.)

GRAPE-SEED OIL. W. Nunn. *Australia Dept. Munitions, Paint Notes 3,* 238-9(1948); *Nat'l Paint, Varnish, Lacquer Assoc., Sci. Sect. Abstracts Rev. No. 140,* 222(1948). The seed recovered from wine and raisin industries contained a hydrolytic enzyme which may be heat inactivated. The oil (I No. 130) dried and bodied slower than linseed oil and gave soft films in alkyd and phenolic varnishes. The pentaerythritol esters obtained from the fatty acids dried in 8 hours to a hard film. (*Chem. Abs. 43,* 4027.)

COMPOSITION OF LINSEED OIL. H. Boekenoogen. *Verfkroniek 19,* 41-2, 53-4(1946). Calculation of the composition of linseed oils found in the literature, from I and CNS values, using a CNS value of 167.5 for linolenic acid showed the following variations in fatty acid composition: saturated acids 7-12%, oleic 2-24%, linoleic 14-51%, and linolenic 35-56%. (*Chem. Abs. 43,* 4496.)

DRYING OIL INDEX OF 1949. F. Scofield and L. Edwards. *Nat'l Paint, Varnish, Lacquer Assoc., Sci. Sect., Circ. No. 730,* 79 pp.

THE FLUORESCENT CHROMATOGRAPHY OF PERILLA OIL. J. Tischer and E. Tögel. *Z. physiol Chem. 282,* 103-17(1947). Soaps prepared from perilla fatty acids were chromatographed through Al_2O_3 columns. Under ultraviolet light distinctly colored bands corresponding to different degrees of unsaturation were visible. (*Chem. Abs. 43,* 4031.)

THE FILM AS A REACTION SITE AND ITS APPLICATION TO CONTINUOUS PRODUCTION OF PAINT MEDIA. E. Sunderland and C. W. Andrews. *Paint Technol. 14,* No. 163, 301-2(1949). A continuous method of dehydrating castor oil and of preparing alkyd resins is described in which the reactants containing a dissolved catalyst are passed downward through a packed column heated by Dowtherm. The dehydrated castor oil thus prepared was equal to a similar oil dehydrated in bulk by the conventional method, in drying tests, but had a slightly inferior color. The reaction time for the continuous process was about one-tenth of that for the bulk method. The reaction speed for an alkyd resin prepared in the continuous method was 30 times that of the reflux method and the products of the rapid method were equal or superior in drying properties to those of the reflux method.

CONTRIBUTION TO THE THEORY AND PRACTICE OF STAND OIL PRODUCTION. A COMPARATIVE STUDY OF THE POLYMERIZATION OF LINSEED OIL BY HEAT AND BY ELECTRICAL DISCHARGE. A Vian and L. Yzu. *Paint Technol. 14,* No. 160, 155-60, 168(1949); translated from *Ion 7,* No. 76, 749-62(1947). Polymerization of linseed oil at room temperature by means of an 8,000-volt, 500-cycle electrical discharge between two closely spaced electrodes in the oil and a stream of CO_2 through the oil gave a stand oil similar to that produced by thermal polymerization at 290°. Examination of samples removed at intervals during both processes for viscosity, refractive index, acidity, color, surface tension, saponification value, and ultraviolet absorption shows that both polymerization reactions undergo an induction period during which isomerization to a conjugated structure is the principal reaction. Voltolysis produces more isomerization than the thermal process.

PREPARATION OF POLYMERIZED OIL FROM HIGHER UNSATURATED FAT ACIDS. I. SELF-ESTERIFICATION OF THE HYDROXY ACID OF PERILLA OIL. A. Muranaka and Y. Yamazaki. *J. Soc. Chem. Ind., Japan 46,* 388-91 (1943). A considerable amount of polymerized oil can be obtained from the unsaturated acids of perilla oil after separation of the glycerol. (*Chem. Abs. 43,* 4872.)

ISOMERIZATION OF LINSEED OIL IN THE PRESENCE OF METALS. A. A. Ivanova and A. S. Petrova. *Khim. Prom. 1947,* No. 8, 20-1. The oil was isomerized for 24 hours at 225-280° with varying quantities of CaO, ZnO, PbO, Ca, Hg, Zn, Fe, Pb, and clays. All catalyzed isomerization but the oxides and clays also produced polymerization. With 2.5-5.0% Zn at 250° 27-28% conjugation was obtained and varnishes from this oil were superior to tung-linseed varnishes. (*Chem. Abs. 43,* 4027.)

NATURE OF PRODUCTS OBTAINED BY REFLUXING STYRENE AND DRYING OILS IN XYLENE SOLUTION. H. Brunner and D. R. Tucker. *Research* (London) *2,* 42-6 (1949). Refluxing at 140° without catalyst produced considerable copolymerization between styrene and tung oil. With dehydrated castor oil and styrene substantial amounts of oil-soluble polystyrene resulted. (*Chem. Abs. 43,* 4027.)

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COREACTION PRODUCTS FROM DRYING OILS AND COPOLYMERS OF CYCLOPENTADIENE AND STYRENE. Resinous Products & Chemical Co. *Brit. 614,532* and *614,533.* Dehydrated castor oil is reacted at 270-5° with a neutral solution obtained by adding a cyclopentadiene-xylene solution dropwise to a styrene-xylene-BF_3 solution, reacting for 3.5 hours at 25-30° and neutralizing. The product gives hard, flexible films resistant to organic solvents, acids, and bases when the films are baked 15-30 minutes at 150-200°. The films do not become brittle upon aging. (*Chem. Abs. 43,* 4029.)

PROCESS OF PRODUCING UNSATURATED PRODUCTS. I. M. Colbeth (The Baker Castor Oil Co., Jersey City, N. J.). *U. S. 2,469,370.* The ester of a mono- or dihydroxy straight chain alcohol which boils below 205° and a monobasic hydroxy acid is heated at 180-260° with the acid, anhydride, sulfate, pyrosulfate, halide, or acetate of B or metallic borates until the B esters are formed and then at 190-300° until dehydration is complete. The product is a pale, viscous liquid.

PROCESS OF REACTING GLYCERIDE OILS. I. M. Colbeth (The Baker Castor Oil Co., Jersey City, N. J.). *U. S. 2,469,371.* The methyl esters of a neutral fatty oil are prepared at 15-50° using a catalyst and at least 6 moles of the alcohol per mole of triglyceride, the reaction mixture is then reacted with added polyhydric alcohol at 65-95° with distillation of methyl alcohol, and the partial ester of the polyhydric alcohol is recovered.

BODYING OF OIL BY HEAT. E. W. Moffett (Pittsburgh Plate Glass Co., Pittsburgh, Pa.). *U. S. 2,471,577.* A glyceride oil is bodied at 290-310° after admixing 2-4% of 3,4 epoxy-l-butene therewith.

ALKYLENE OXIDE CONDENSATION PRODUCTS OF DIMERIZED FATTY ACID ALKYLOL AMIDES. J. T. Thurston and R. B. Warner (American Cyanamid Co., New York, N. Y.). *U. S. 2,470,081.* Alkylene oxides of 2-4 C atoms are condensed with dialkylolamides of dimerized polyunsaturated fatty acids to form a water soluble product having 8-175 moles of the oxide condensed therein.

STAND OILS. P. Cova. *Ital. 420,475.* Vegetable oils containing hydroxyl groups are dehydrated using 1-10% of a glycerophthalic resin as catalyst to produce a stand oil. (*Chem. Abs. 43,* 4873.)

Synthetic drying oil. Centre national de la recherche scientifique. *Fr. 869,132.* Phthalic anhydride is treated with 2 moles of the α-mono glycerol ester of 9-11 octadecadienoic acid and the product is heated with abietic acid. The resulting ester may replace linseed oil. (*Chem. Abs. 43,* 4873.)

Soap

Edited by
LENORE PETCHAFT

Nonionic compounds, their employment in the textile industry. J. P. Sisley. *Am. Dyestuff Reptr. 38,* 513-21(1949). The chemistry of nonionic compounds is reviewed. According to their behavior toward water they are classified as nondispersible, dispersible and soluble. As regards structure and source these compounds are classified as follows: I. Products obtained by polymerizing ethylene oxide, II. Products obtained by condensation of fatty bodies or their derivatives with ethylene oxide, II/A. Derivatives of fatty acids, II/B. Derivatives of fatty alcohols, II/C. Derivatives of fatty amides, II/D. Derivatives of fatty amines, III. Products obtained by condensation of oxyalkylaryl compounds with ethylene oxide, III/A. Derivatives of alkyl phenols, III/B. Derivatives of alkyl naphthols. Methods of preparing these various types are outlined. The uses of these compounds in the textile industry are reviewed in detail.

Theory and wetting out of textile materials. Dr. K. J. Nieuwenhuis. *Ingenieur 61,* No. 9, *Materialenkennis* No. 3, 26-30(1949). Experimental results obtained at the Experimental Station of Laundering at Delft both in laboratory experiments and in washing tests on a technical scale are given. A low value of the interfacial tension and a high rate of diffusion of the surface (or interfacially) active material are essential for a high rate of wetting out. On this basis differences in rate of wetting out by materials like dialkyl sodium sulfosuccinate, alkylsulphates and fatty acid soaps can be explained, as well as the effects of addition of inorganic salts, variation of pH with soap solutions, differences between several fatty acid soaps themselves, effects of changes of temperature, etc. Attention is drawn to the fact, that conclusions reached for the wetting out of yarns need not be necessarily valid for fabrics too, because of the differences in geometrical shape of the capillary voids.

How can medicinal soap of the pharmacopeia be tested for its olive oil content? H. Hadorn and Rob. Jungkunz. *Pharm. Acta Helv. 23,* 361-7(1948). The following procedures are outlined: (1) isolation of unsaponifiable material; (2) complete saponification; (3) chromatographic analysis; (4) determination of the hydrocarbons; (5) determination of the "squalen" number, and (6) calculation of the fatty ingredients. Results obtained with commercial olive-oil containing soaps are reported. (*Chem. Abs. 43,* 5538.)

Studies on ammonium soaps. I. Preparation of ammonium soaps and their stability. Toshio Ota. *J. Soc. Chem. Ind. Japan 47,* 672-4(1944). NH_4 soaps of stearic, palmitic, myristic, lauric, erucic, and oleic acids were prepared by passing dry, cold NH_3 gas through petroleum ether solutions of the fatty acids. The soaps were filtered with suction, or the solvent was removed with excess NH_3 under reduced pressure. Immediately after preparation the N content agreed with the calculated value. The sintering zones were as high as 113°. When the soaps were stored in a glass vessel for 1 month, the sintering zone became narrow, and the free fatty acid content became 8-15%. (*Chem. Abs. 43,* 5212.)

The relation between forms and the rate of drying of soap. Seichi Ueno and Hiroshi Imade. *J. Nippon Oil Technol. Soc. 2,* No. 2, 1-4(1948). The rates of drying of soaps decreased in the order: chips, sq. cubes (I), rectangle (II), pyramid (III), circular ball (IV), certical column (V). Rate of drying per unit surface area decreased in the order: IV, V, I, II, III. The rate of drying can be expressed in an equation of 1st order reaction at the beginning, 2nd order at the intermediate stage, and 1st order again at the end of drying. (*Chem. Abs. 43,* 5612.)

Synthetic detergents. T. E. Larson, *J. Am. Water Works Assoc. 41,* 315-21(1949). The use and chemical structure of soap are described. Soaps are chain compounds and the length of the chain has a decided bearing on the efficiency of cleaning. The pH of the water should be over 10; otherwise much soap is utilized for softening purposes. Synthetic detergents are also chain compounds. Aliphatic sulfates, sulfonated amides and alkyl-aryl sulfonates are among the many described. These compounds vary in activity and frequently must be mixed with inorganic salts to be effective, while not, as a rule, affected by Ca and Mg salts, water quality is important and should be considered when selecting the detergent, as not all detergents are equally satisfactory for all purposes. (*Chem. Abs. 43,* 5213.)

Formation of oxidized acids in soap stocks. R. Quelet, J. Allard, N. Duffaud, and R. Pineau. *Bull. mens. ITERG* (Inst. tech. etudes et recherches corps gras) *3,* 73-7(1949). The conventional petroleum ether method for the determination of oxidized acids (I) often furnishes results which accord neither with the quality of O absorbed nor with the variation of the characteristic numbers. Thus the analysis of peanut oil (II) treated for 105 hours with O at 100° showed only 2% of I, though the iodine number fell from 85.1 to 43 and the peroxide number (Lea) rose from 0.9 to 160. The autoxidation of II soap stocks was investigated with industrially prepared samples by analysis of their separated neutral and acid components after exposure to air between 10 and 20° during from 1 to 90 days. In all cases, even if the contact between II soap stock and air was artificially increased, the iodine number was hardly changed and the peroxide number was 53 at most. Then all the components were examined separately at 100° during 7-49 hours in an O atmosphere. The tabulated results show that the oxidation proceeds much quicker with neutral oil and fatty acids than with soaps. Mucilaginous matter and NaOH in excess has no influence, but ferrous salts have an accelerating effect. Na soaps prepared with II previously oxidized to a peroxide number above 125 cannot be grained out but give a jelly which retains all of the added salt. (*Chem. Abs. 43,* 5212.)

Surface-active agents in aqueous and nonaqueous media. H. Lomas. *J. Soc. Chem. Ind. (London), 68,* 37-40(1949). Surface-active agents affecting the solid-liquid interface are industrially important in pigment dispersions. The agents may be added during the manufacture, as a pre-treatment process, or in the final application. A stable monolayer of agent is adsorbed at the interface. On precipitation this prevents further growth. In preparing a dispersion from dry powder, the surface-active agent removes adsorbed layers (e.g. of gases, grease, or water) and disperses the resulting suspension. Useful agents for pigment dispersion are soaps, sulfated oils, and alcohols, compounds of the type $RC_6H_4SO_3Ma$, amides ($RCONHCH_2CH_2SO_3Ma$), cationic agents, compounds of the type $RO(CH_2CH_2O)_nCH_2CH_2OH$, and high-molecular aromatic sulfonic acids. Well-dispersed systems show a straightline shearing force/shear relation; flocculated systems show this only at high rates of shear. Well-dispersed systems settle more slowly and give less sediment value than flocculated systems. Adhesion tension, microscopy, and speed of wetting are only rough guides in the evaluation of surface-active agents. Addition of salts to colloidal electrolytes lowers the interfacial tension; addition of NaCl to anionic dispersing agents first increases the dispersing power, then may decrease it owing to the flocculating power of the cation. Forces acting between the particles of a dispersion are (1) van der Waals attraction, (2) a repulsion due to penetration of the diffuse ionic atmosphere, (3) a strong repulsion at short distance, resisting close approach of the atoms. (*Chem. Abs. 43,* 5213.)

CHARACTERIZATION OF SOME COMMERCIAL SOAPS BY X-RAY DIFFRACTION. Gopal S. Hattiangdi. (National Bureau of Standards, Washington, D. C.). *J. Research Nat. Bur. Standards, 42,* 331-41(1949). The diffraction of X-rays by 29 commercial soaps was investigated. The single long-spacing value obtained for the toilet, medicated, glycerin, coco, and washing soaps is indicative of the existence of a single crystal type in these soaps. The exhibition of two or three sets of long-spacing values by the shaving soaps is indicative of the presence in these soaps of two or three individual phases. The moisture content of these soaps indicates that the toilet and medicated soaps are either hemihydrates or monohydrates; the coco soaps, dihydrates; and the shaving soaps, monohydrates.

CRYSTAL FORMS OF ANHYDROUS CALCIUM STEARATE DERIVABLE FROM CALCIUM STEARATE MONOHYDRATE. Marjorie J. Vold, Gopal S. Hattiangdi, and Robert D. Vold. *J. Colloid Sci. 4,* 93-101(1949). Anhydrous Ca stearate can be obtained at room temperature in any of 3 forms, designated VIA, VIII and VIN, respectively. The stable modification is believed to be VIA, which is produced from pure K or Na stearate and $CaCl_2$, or by dehydrating Ca stearate hydrate by slow drying, steaming, or washing with an organic solvent. VIII, which has the same x-ray pattern as the monohydrate, is formed by neutralization of stearic acid with $Ca(OH)_2$ or by dehydration in the presence of excess $CaCl_2$. VIN, which is less crystalline than the other forms, is produced by dehydration of the hydrate above room temperature by vigorous agitation with organic solvents containing less than 75% H_2O. Samples of Ca stearate hydrate that exhibit a 2nd-order transition in heating curves at 48° yield VIA on dehydration, whereas hydrates that do not have this transition yield VIII. Transformations of VIII to VIA is inhibited by impurities in the Ca stearates, especially Ca salts and anions of other fat acids. Ca palmitate also exists in forms resembling in their type of x-ray pattern the stearate VIA and VIH. (*Chem. Abs. 43,* 5212.)

EFFECT OF SOAP ON SKIN. BENEFICIAL AND ADVERSE EFFECTS AS DETERMINED BY EXPOSURE TESTS. John A. Killian and M. Elizabeth Marsh. *Soap Sanit. Chemicals 25,* No. 6, 44-7, 151, 153, No. 7, 31-4, 133(1949). The method consists in submitting the subjects to a repeated series of arm immersion exposure tests and throughout the period of immersion the hands are maintained in soap solution for 1 minute and then to air above the surface of the solution for 30 seconds. This method of testing soaps helps in determining the "indirect effects" of soap as contrasted to patch testing which reveals the part of skin damage attributed to direct effects or primary irritation. In order to observe the damage resulting from these exposure tests and to supplement a visual examination of the hands, a method of measuring skin surface temperatures has been devised and it has been shown that this technique may aid in the quantitative evaluation of any such damage.

PATENTS

A NEW WETTING AGENT. Ciba Ltd. *Swiss 243,596.* A wetting agent is prepared by condensing coconut oil fatty acid, hydrazine, and acetone-sulfonic acid. (*Chem. Abs. 43,* 5216.)

SOAPLESS-GERMICIDALLY ACTIVE DETERGENT. Frederick C. Bersworth. *U. S. 2,474,412.* A detergent composition with improved resistance to hard water and with high germicidal activity is composed of a mixture of an alkali metal salt of ethylene diamine tetraacetic acid to overcome the effects of water-hardening constituents, a quaternary ammonium compound with germicidal properties such as alkyldimethyl benzyl ammonium hydroxide and alkali metal detergent salts such as phosphates, carbonates, silicates, borates and sulfates.

CONDENSATION PRODUCTS OF CITRIC ACID WITH LONG CHAIN ALIPHATIC MONOHYDRIC ALCOHOLS. James H. Werntz (E. I. du Pont de Nemours & Company). *U. S. 2,473,460.* Preparation of condensation products of citric acid with long chain aliphatic monohydric alcohols useful as detergents, detergent additives and textile assistants.

SYNTHETIC DETERGENT-TRIPOLYPHOSPHATE COMBINATION. Procter & Gamble. *Brit. 614,044.* A composition useful for laundry washing is produced by heat drying a combination of synthetic detergents such as an alkyl sulfate and tripolyphosphates to produce a product of good solubility and low dustiness.

BETA AMINO PROPIONATES. Arthur Isbell (General Mills). *U. S. 2,468,012.* Reaction of an ester of acrylic acid with an amine to form beta amino propionates useful as detergents.

SOAP WITH IMPROVED FILM-FORMING CHARACTERISTICS. Sylvania Industrial Corporation. *Brit. 614,049.* An improved soap composition is prepared by converting a cellulosic material into soluble cellulose ethers with alkaline substances and then preparing a soap in situ by reacting fatty acids with the excess alkali of the above operation.