ABSTRACTS.... R. A. REINERS, Editor

ABSTRACTORS: Sini'tiro Kawamura, F. A. Kummerow, H. S. Liles, C. C. Litchfield, Louise R. Morrow, E. G. Perkins, and Thomas H. Smouse

• Fats and Oils

Characteristics and fatty acid compositions of snake-gourd rind oil and rose-mallow seed oil. Akio Kato (Govt. Chem. Ind. Research Inst., Tokyo). *Yukagaku* **10**, 174–7 (1961). Rind (fruit-coat) oil from *Trichosanthes cucumeroides* and seed oil from *Hibiscus mutabilis* showed, respectively, the following characteristics and fatty acid composition: acid No., —, 25.9; saponification No., 191.4, 191.1; I No., 126.8, 126.0; unsaponifiable matter (%), 15.59, 2.19; saturated, 31.95, 14.92; oleic, 30.83, 25.41; linoleic, 23.43, 59.08; linolenic, 9.34, 0.26; arachidonic, 0.29, —; conjugated dienoic, 3.98, 0.33; conjugated trienoic, 0.15, —%.

Activity and selectivity of the copper-chromium-manganese oxide catalysts. IV. Revivification of the used catalysts. Shizuo Takumi and Toshio Hashimoto (Nikki Chem. Co., Tokyo). *Yukagaku* **10**, 150–3 (1961). X-ray diffraction data showed that Cu–Cr–Mn oxide catalyst which had been used in the hydrogenation of unsaturated fatty oils contained cupric oxide largely reduced to metallic Cu. However, the cupric chromite combined with Mn oxide, the true catalyst, had not been reduced to cuprous chromite. Authors succeeded in reviving the spent catalyst by removing the poisons adsorbed on the surface of the catalyst by the wet oxidizing method.

Activity and selectivity of the copper-chromium-manganese oxide catalysts. III. X-ray diffraction study of the catalysts. Shizuo Takumi (Nikki Chem. Co., Tokyo). *Yukagaku* **10**, 41–9 (1961). X-ray diffractometric studies showed that the standard catalyst (KW-1) consisted of CuO and $CuCr_2O_4$ combined with Mn oxide, and KW-6 (treated with hot HCl to remove CuO) was also $CuCr_2O_4$ combined with Mn oxide. KW-6 showed higher activity and selectivity on the unsaturated bond of fatty oils than CuO plus $CuCr_2O_4$ and CuO prepared by the wet method.

Isomerization of unsaturated fatty acids. V. Thermal change of pure methyl linoleate isomers. Yoshiaki Nagano and Tanaka (Kyûshû Univ., Fukuoka). *Yukagaku* **10**, 146–50 (1961). The process of isomerization was studied quantitatively by ultraviolet and infrared absorption spectra. Thermal change of 4 pure isomers of Me linoleate, *cis* nonconjugated (I), *cis-trans* conjugated (II), *trans-trans* conjugated (III), and *trans* nonconjugated (IV) isomers, were carried out. I gave a small amount of III and then IV. II rapidly isomerized to III until it accumulated to about 75%, and the latter isomerized to IV slowly. III slowly isomerized to IV. IV did not change to any other isomers. Thermal change of IV resulted in the dimer to the extent of about 25%.

Trans isomers in thermally oxidized lipids. Kazuo Fukuzumi (Nagoya Univ.). *Yukagaku* **10**, 143–6 (1961). Oxidation patterns of cottonseed oil, methyl oleate, and methyl linoleate with aeration at 0–180° for 24 hrs. were studied by measuring refractive index, viscosity, loss in weight, iodine No., and the content of total *trans* isomers (not only *trans* oleate, but also *cis-trans* conjugated, *trans-trans* conjugated, and *trans-trans* nonconjugated linoleates). *Cis-trans* conjugated linoleate was not found in any oxidized lipids. Total *trans* isomer content of the oxidized cottonseed oil, methyl oleate, and methyl linoleate, respectively, has appreciably increased for the lipid oxidized at above 90, 120, and 60°.

Regulation of acid value of fatty matter in rice bran. VI. Properties of fatty matter in the reaction of acid value increase. Goro Kimura (Tôyô Kôatsu Inds., Inc., Yokohama). *Yukagaku* **10**, 136–42 (1961). By treating a large quantity of different kinds of rice bran in large tubes of thin steel plate, examination was made on the effect of lipase on the hydrolytic velocity of fatty matter, on the variation of oil content and on its transformation due to the time by measuring different kinds of chemical characteristics and by fractional distillation. As the reaction time lasted longer, free fatty acid content increased, but the amount of unsaponifiable matter, iodine value, and peroxide value remained at almost definite values, and only a small amount of hydroxy acids was produced. Fatty matter after 140 hrs. of reaction contained ethyl esters as revealed by analysis of distillate. Ethyl alcohol formed from carbohydrate by alcoholic fermentation was presumed to combine with fatty acids produced. The order of selective hydrolysability by lipase was palmitic > oleic > linoleic acids.

Recent problems in rancidity and oxidation of fats and oils. Umajiro Shimamura (Nihon Yushi Co., Oji, Tokyo). *Yukagaku* **10**, 129–35 (1960). A review with 98 references.

Some problems of wetting relating to metallic surface and oil. Ken-ichi Goto (Nihon Univ., Tokyo). *Yukagaku* **10**, 64–70 (1961). A review with 36 references.

Friction in cutting of metals and cutting oil. Tomonobu Shonozaki (Kanagawa Univ., Yokohama). *Yukagaku* **10**, 71–6 (1961). A review with 15 references.

Metal-cutting oils. Ato Mugishima (Kôgakuin Univ., Tokyo). *Yukagaku* **10**, 76–82 (1961). A review with 15 references.

Rolling oils for steel plates. Kunio Saeki (Tôyô Kôhnan Co., Kasumi-gaseki, Chiyoda-ku, Tokyo). *Yukagaku* **10**, 83–8 (1961). A review with 26 references.

Rolling oils for nonferrous metals. Takayoshi Shimizu (Shôwa Oil Co., Shinagawa-ku, Tokyo). *Yukagaku* **10**, 88–93 (1961). A review with 19 references.

Washing of metals. Motoo Koike (Nihon Oils and Fats Co., Amagasaki, Hyôgo-ken). *Yukagaku* **10**, 93–8 (1961). A review with 66 references.

Spreading of lubricating oil on metallic surface. Mikio Takahashi (Nippon Oil Co., Yokohama). *Yukagaku* **10**, 99–104 (1961). A review with 17 references.

Quenching oils. Yoshinori Mito (Nippon Grease Co., Nishi-ku, Osaka). *Yukagaku* **10**, 104–10 (1961). A review with 16 references.

Rust-preventive oils. Minoru Kashima (Nippon Oil Co., Yokohama). *Yukagaku* **10**, 110–18 (1961). A review with 82 references.

Isomerization of unsaturated fatty acids IV. Effect of oxygen for thermal change of methyl linoleate. Yoshiaki Nagano and Takehide Tanaka (Kyûshû Univ., Fukuoka). *Yukagaku* **10**, 29–32 (1961). The isomerization was conducted by passing N_2 containing 1, 5, and 10 vol. % of O_2 into pure *cis* methyl linoleate at the rate of 3 l./hr. at 100 and 200°. In the presence of O_2, *cis* methyl linoleate isomerizes rapidly even at low temperature to the *trans-trans* conjugated or the *trans* nonconjugated forms. The increase of O_2 content is effective only to increase the speed of isomerization.

Circular paper chromatography as a simple analytical method for fatty acids and glycerides. Manjiro Noda and Osamu Hirayama (Kyoto Pref. Univ.). *Yukagaku* **10**, 24–8 (1961). Petroleum hydrocarbon, dodecylbenzene, and tetralin were used as the stationary solvents. As the developing solvents, 90% acetic acid and methanol-acetic acid, both saturated with a stationary solvent, were suitable for the separation of fatty acids and of glycerides, respectively. The fatty acids were detected on paper by successive treatment with 0.5% Pb acetate, water, and ammonium sulfide solution. The selective detection of unsaturated acids by spraying with a 2% solution of iodine in ethanol was also applied. Low-temperature development with petroleum ether under dry ice was also effectively utilized. The unsaturated glycerides were chromatographed as their mercuric acetate addition compounds, and were detected by spraying with a 0.2% solution of diphenylcarbazone in ethanol or by soaking in a Sudan black solution.

Action of the negative catalyst on the Twitchell reagent during fat-splitting reaction. Shunroku Kanno, Shiro Okuyama, Kazumi Kasamatsu, and Kyosuke Nishizawa (Tôhoku Univ.). Kôgyô Kagaku Zasshi **64**, 311–15 (1961). Negative catalysts are contained in rancid oils. Their action on the Twitchell reagent was examined by determining the reagent by the *p*-toluidine method in water layer. In standard splitting of

H_2SO_4-refined rapeseed oil, the amount of the Twitchell reagent in water layer decreased to constant (about 30%) in 5 hours, while in splitting of rancid soybean oil, that in water layer decreased to as low as 10% in 0.5 hour.

DETERMINATION OF SMALL AMOUNTS OF IRON AND COPPER IN VEGETABLE OILS. Tsugio Takeuchi and Tamotsu Tanaka (Nagoya Univ.). *Kôgyô Kagaku Zasshi* 64, 305–7 (1961). Fe and Cu in oils accelerate autoxidation of oils. Add 5 ml. inorganic acid to 20 g. oil. Heat at 800° to make ash. Determine Fe by the *o*-phenanthrolin method and Cu with Na diethyldithiocarbamate, both colorimetrically. Dissolution of ash was made by fusion with Na_2CO_3. About 0.1 p.p.m. Fe or Cu could be determined in 5 hours.

X-RAY DIFFRACTION OF BINARY SYSTEMS OF LONG-CHAIN FATTY ACIDS. Midori Saguchi and Eiichi Asada. *Nippon Kagaku Zasshi* 82, 958–62 (1961). Studies were made on binary systems, C_{12}–C_{22}, C_{14}–C_{22}, C_{12}–C_{18}, C_{16}–C_{22}, C_{12}–C_{16}, C_{14}–C_{18}, C_{18}–C_{22}, and C_{16}–C_{18}. Mixed solid solutions and equimolecular mixed crystals were present in each binary system.

LIPIDS OF BULIMUS STRIATULUS JAPONICUS. Tatsuo Mitsuhashi (Tokyo Gakugei Univ., Setagaya, Tokyo). *Nippon Kagaku Zasshi* 82, 465–8 (1961). Two samples collected in February and one sample collected in September were studied. Lipid content of dry samples was 5.9–7.8% and saponification No. of the lipid was 151.2–156.3; higher in September sample. Iodine No. of the lipid was 55.2–71.5 and unsaponifiable matter content was 14.5–16.7%; higher in February samples. Palmitic, oleic, C_{18} dienoic and trienoic, and small amounts of more highly unsaturated acids were present. Unsaponifiable matter contained 62.8–65.5% sterols, consisting of cholesterol and β-sitosterol (?). Red crystals, m. 182–3°, obtained were probably β-carotene.

DICHROISM OF THE INFRARED SPECTRA OF n-FATTY ACID CRYSTALS IN THE CESIUM BROMIDE REGION. Michio Kawano. *Nippon Kagaku Zasshi* 82, 161–2 (1961). Stearic, palmitic, myristic, and lauric acids were studied.

INFRARED DICHROISM OF n-FATTY ACIDS. *Ibid.*, 427–32. Infrared dichroism of stearic, palmitic, myristic, and lauric acids was interpreted from crystal structure elucidated by X-rays on lauric acid.

INFRARED DICHROISM OF METHYL STEARATE AND ELAIDIC ACID. *Ibid.*, 432–5. The results showed that the absorption of band progression inclined to the b axis as in case of C-type straight-chain fatty acids.

SYNTHESIS OF ARACHIDONIC ACID. A. I. Rachlin, N. Wasyliw, and M. W. Goldberg (Research Labs. of Hoffmann-La Roche Inc.). *J. Org. Chem.* 26, 2688–93 (1961). Arachidonic acid (eicosa-5,8,11,14-tetraenoic acid) has been synthesized from acetylenic intermediates. The properties of the methyl ester were found to be practically identical with those of the methyl ester of naturally occuring arachidonic acid.

PREPARATION OF CARBONYL-FREE SOLVENTS. D. P. Schwartz and O. W. Parks (Dairy Products Lab., U. S. Department of Agri., Washington, D. C.). *Anal. Chem.* 33, 1396–98 (1961). A method is described for the preparation of carbonyl-free solvents. A Celite column impregnated with 2,4-dinitrophenylhydrazine, phosphoric acid, and water was used to effect a rapid quantitative reaction with the carbonyls in the solvent. Estimation of the efficiency of carbonyl removal was accomplished using a column of partially deactivated alumina. The procedure is theoretically appliciable to all nonoxygenated, water-immiscible solvents on a continuous basis. The aliphatic monocarbonyl content of 13 solvents is presented.

FATTY ACID COMPOSITION OF LIPIDS EXTRACTED FROM RATS FED MILK FAT, CORN OIL, AND LARD. V. R. Bhalerao, J. Endres, and F. A. Kummerow (Dept. of Food Tech., Univ. of Illinois, Urbana). *J. Dairy Sci.* 44, 1283–92 (1961). The lipids extracted from rats fed milk fat differed in both minor and major components from the lipids extracted from rats fed corn oil or lard. The minor components consisted of 1.7–5.4% odd- and branched-chain fatty acids which were found in milk fat and in the lipids extracted from the carcass of rats fed milk fat, but not in corn oil or lard or in the lipids extracted from rats fed corn oil or lard. The major component fatty acids in milk fat, corn oil, and lard were selectively deposited in the carcass and liver tissue. The most drastic selectivity involved linoleate acid, which varied from 2% in those fed milk fat to 39% in those fed corn oil. On the other hand, the lipids extracted from the liver of rats fed milk fat contained 3% more arachidonic acid than the lipids extracted from livers of those on corn oil, or 13 and 10%, respectively. Heated miilk fat in the diet did not seem to alter statistically the mixed fatty acid composition of the carcass or liver lipids.

THE PALM OIL INDUSTRY. W. D. Raymond (Tropical Products Inst., 56–62 Gray's Inn Road, London, W.C. 1). *Tropical Sci.* 3, 69–89 (1961). The history of the palm oil industry is described and an account is given of the efforts to increase the quantity and quality of the palm oil manufactured overseas. The effect of climate on the nature of palm fruit and changes occurring during its development after fertilization are reported. Recent work on the improvement of the bleachability of the oil and on the minimization of lipolysis during its preparation and storage is also described.

FATTY ACIDS OF THE LIPIDS OF VEGETABLES. I. PEAS (PISUM SATIVUM). F. A. Lee and L. R. Mattick (New York State Agric. Exp. Station, Cornell Univ., Geneva, N. Y.). *J. Food Sci.* 26, 273–5 (1961). Changes taking place in the fatty acids of the lipid material of the edible pea were investigated. Peas were held one year in storage at −17.8° in the raw and in enzyme-inactivated condition, to determine changes taking place in the fatty acids. Under these conditions, all of the fatty acids in the phospholipid fraction showed large losses in the raw as contrasted with the enzyme-inactivated samples. During the same period the neutral fats in the raw sample showed lesser amounts of all the unsaturated fatty acids when contrasted with the composition of those extracted from the enzyme-inactivated material. The fatty acids in the neutral fat and the free fatty acids of the raw material showed a net gain in the total quantity of palmitic acid. It seems possible that this increase came from the three unsaturated C_{18} acids.

THE FATTY ACIDS OF VEGETABLES. II. SPINACH. L. R. Mattick and F. A. Lee (New York State Agr. Exp. Sta., Cornell Univ, Geneva, N.Y.). *J. Food Sci.* 26, 356–9 (1961). The fatty acids in the extracted crude lipid of spinach were studied to determine changes during storage of −17.8° in the blanched and untreated condition. It was further determined that the total free fatty acids increased in the unblanched samples during storage. Palmitic acid concentration increased during storage, whereas that of the longer-chain fatty acids, particularly linolenic acid, decreased. A fatty acid containing 17 carbon atoms, n-heptadecanoic acid, was present in fair quantity.

HIGH SMOKE POINT FRYING OIL. V. K. Babayan (E. F. Drew & Co., Inc.). *U. S. 2,998,319.* A fatty glyceride for use in deep-fat frying of foods has dispersed in it methyl or ethyl siloxanes. Methyl siloxane is present at a concentration of 1 to 25 p.p.m. and has a viscosity of 1,000 to 100,000 centistokes at 100°F.; ethyl siloxane is present in 5 to 45 p.p.m. and has a viscosity of 1,000 to 100,000 centistokes at 100°F. The siloxanes do not impart any odor during frying operations, but raise the smoke point from 15 to 35°F. during a relatively large number of fryings.

PROCESS FOR TREATMENT OF FATS. H. E. Seestrom, W. B. Guerrant, Jr., and R. L. Campbell, Jr. (Anderson, Clayton & Co.). *U. S. 2,999,021.* Fat is subjected to a modification reaction in the presence of 0.02% to 1.0% of a catalyst and from 0.3% to 1.0% of glycerine. The reaction is promptly stopped upon completion of the formation of diglycerides by the action of the glycerine.

LIQUID SHORTENING METHOD. E. T. Payne and R. A. Seybert (Anderson, Clayton & Co.). *U. S. 2,999,022.* The process of preparing a liquid shortening comprised of a stable suspension of discrete particles of solid fats in oil in a temperature range of 60 to 110°F. consists of the following steps: (1) Melting all the solid fats and crystal nuclei contained in a base oil; (2) cooling the base oil to a temperature slightly above the *alpha* melting point of the fats and maintaining the liquid shortening at that temperature for a period of time sufficient to form all crystals into relatively small *beta* prime crystals and *beta* crystals; (3) heating the base oil to a temperature slightly above the *beta* prime melting point and holding for a period of time sufficient to convert the *beta* prime crystals to *beta* crystals of the same size. The base oil is agitated during steps (2) and (3).

CONFECTIONERY COATING COMPOSITIONS. V. K. Babayan and G. N. Comes (E. F. Drew & Co., Inc.). *U. S. 2,999,023.* An improved confectionery coating contains cocoa, cocoa butter, and flavoring intimately mixed with a hard fat in which is dispersed sucrose esters of fatty acids having 10 to 24 carbon atoms.

FLUID SHORTENING AND METHOD OF MAKING THE SAME. E. Handschumaker and H. C. Hoyer (Spencer Kellogg & Sons, Inc.). *U. S. 2,999,755.* A fluid shortening consists of a normally liquid edible triglyceride oil as the major ingredient and uniformly distributed through it about 0.50% to 1.75% of normally solid monoglycerides of a saturated fatty acid having a chain length greater than 18 carbon atoms.

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• Fatty Acid Derivatives

EPOXIDATION OF MALEINIZED FATTY ESTERS. Saburo Komori, Yoshihiro Shigeno, Keisuke Yamamoto, and Koji Ikeda (Osaka Univ.). *Yukagaku* **10**, 18–24 (1961). Maleinized fatty esters were useful primary plasticizers for polyvinyl chloride. Attempts were made to improve them by epoxidation. This epoxidation was rather more difficult than the epoxidation of oleic esters. Epoxides with high contents of oxirane oxygen could not be obtained. However, the polyvinyl chloride film plasticized by the epoxides obtained (oxirane oxygen 0.2–0.4%) showed better properties than the film plasticized by the raw maleinized fatty esters in color, clearness, and thermal stability. The starting materials were sperm oil fatty acids and crude erucic acid.

REACTION OF HIGHER FATTY ACID ESTERS WITH METALLIC SODIUM. V. PREPARATION AND PROPERTIES OF α-GLYCOLS. Masatoshi Fukushima and Katsujiro Shimokai (Nippon Soda Co., Nihongi, Niigata-ken). *Yukagaku* **10**, 6–11 (1961). The C_{16}–C_{32} sym. α-glycols were prepared from acyloins by catalytic hydrogenation with Raney Ni. The melting points of the α-glycols were higher than those of the corresponding acyloins or α-diketones and decreased with chain length. Two OH groups could be quantitatively acetylated by acetic anhydride, and reacted with 3,5-dinitrobenzoyl chloride to give crystalline 3,5-dinitrobenzoates. The α-glycols obtained seemed to consist of meso or racemic form. Infrared spectra were also examined.

UTILIZATION OF TALL OIL. V. METHYL-ESTERIFICATION OF TALL OIL. Satoshi Nakasato (Chem. Ind. Research Inst., Tokyo). *Yukagaku* **10**, 37–41 (1961). Tall oil and methanol were heated with or without catalysts in an autoclave, and the soap of the oil was made to react with methyl iodide or dimethyl sulfate. $ZnCl_2$, MgO, and active clay were effective as catalysts. Heating should be at 300° under 100 kg./cm.^{2} pressure in an autoclave without catalysts.

ALKYL KETENE DIMERS. II. REACTION OF ALKYL KETENE DIMERS WITH ALCOHOLS, PHENOL, AND WATER. Ichiro Imai, Takeo Wakabayashi, Ippei Michihata, and Michio Yoshino (Nippon Oils and Fats Co., Amagasaki, Hyôgo-ken). *Yukagaku* **10**, 49–56 (1961). Reaction of tetradecyl ketene dimer with OH radicals was studied in the presence of catalysts. Hydroxy compounds examined included primary, secondary, and tertiary butyl alcohol, ethylene glycol, phenol, and H_2O. Catalysts were *p*-toluene sulfonic acid, KOH, and $KHCO_3$. The reaction products were esters of 2-alkyl-3-keto acids except in case of H_2O.

III. REACTIONS OF ALKYL KETENE DIMERS WITH AMINES. Ichiro Imai and Takeo Wakabayashi (Nippon Oils and Fats Co., Ltd., Amagasaki, Hyôgo-ken). *Yukagaku* **10**, 165–8 (1961). Tetradecyl ketene dimer (1 mole) was made to react with 2 moles of amines. Reaction with NH_3 gave 2-tetradecyl-3-ketooctadecanoic acid amide. Reaction with CH_3NH_2 gave 2-tetradecyl-3-ketooctadecanoic acid *N*-methyl amide. Reaction with $C_6H_5NH_2$ gave 2-tetradecyl-3-ketooctadecanoic acid anilide. Reaction with $H_2NC_2H_4OH$ gave *N*-monoethanolamide. Reaction with $NH(C_2H_4OH)_2$ gave diethanolamide. The products were identified by analysis and infrared spectrophotometry.

FATS AND OILS IN RELATION TO SYNTHETIC RESINS. Yoshihiro Shigeno (Japan Reichold Chem. Ind. Co., Amagasaki). *Yukagaku* **10**, 193–9 (1960). A review with 47 references.

SYNTHESIS OF HIGHER ALCOHOLS. Shunsuke Murahashi (Osaka Univ.). *Yukagaku* **10**, 383–7 (1961). A review with 15 references.

A REVIEW ON SPERM ALCOHOL INDUSTRY. Shigeo Kashima (Daiichi Kôgyô Seiyaku Co., Kyoto). *Yukagaku* **10**, 387–9 (1961).

EPOXIDIZED SPERM BLUBBER OIL AS A STABILIZER FOR VINYL CHLORIDE RESINS. Teizaburo Tateishi, Masao Fujiwara, and Hiroshi Sakurai (Osaka Uniiv., Sakai). *Kôgyô Kagaku Zasshi* **64**, 1028–30 (1961). Sperm blubber oil consisted of 70% unsaturated wax and 30% glycerides. The sperm blubber oil itself or its wax separated by winterization or distillation was epoxidized. The epoxidized product was used in place of 20–50% of dioctyl phthalate as a plasticizer.

RUST-PREVENTIVE PROPERTIES OF THE DERIVATIVES OF MALEINATED OLEIC ACID. Seimi Sato, Yoichi Kato, and Mutsumi Hori (Aichi-ken Kôgyô Shidôsho). *Kôgyô Kagaku Zasshi* **64**, 1017–20 (1961). Derivatives of maleinated oleic acid obtained by reaction with compounds with 1 or 2 groups of OH, NH_2, or NH were neutralized with stearyl amine. They were less effective as rust preventives than stearyl amine salt of maleinated oleic acid. Exceptionally good results were obtained with the amine salt of the derivative with *N*-octadecyl glycine.

SPECTROPHOTOMETRIC DETERMINATION OF FATTY ACID AMIDES IN LIPIDES. W. T. Haskins (Rocky Mt. Lab., Natl. Inst. Allergy and Infectious Diseases, Hamilton, Mont.). *Anal. Chem.* **33**, 1445–6 (1961). Standard curves were prepared from tripalmitin and N-acetylglucosamine. When plotted as equivalents of acid vs. absorbance, these curves were straight lines and coincident over the range of 1 to 5 μeq. To determine the amide-bound fatty acids (FAA) in relation to the ester-bound fatty acids (FAE), a second set of samples was analyzed by the procedure of Tauber (3) to obtain the FAE content. Subtraction then gave the FAA content.

N,N-DIMETHYLCEPHALINS. I. SYNTHESIS OF DISTEAROYL L-α-GLYCERYLPHOSPHORYL-(N,N-DIMETHYL)ETHANOLAMINE. E. Baer and S. K. Pavanaram (Banting and Best Dept. of Med. Res., Univ. of Toronto, Toronto 5, Ontario, Canada). *J. Biol. Chem.* **236**, 2410–14 (1961). The first chemical synthesis of an α-N,N-dimethylcephalin with the spatial arrangement of naturally occurring glycerophosphatides, *viz.* distearoyl L-α-glycerylphosphoryl-N,N-dimethylethanolamine, has been accomplished by condensing the silver salt of distearoyl L-α-glycerophosphoric acid monobenzyl ester with N,N-dimethylaminoethyl chloride, and removing the protective benzyl group of the reaction product by catalytic hydrogenolysis. The distearoyl L-α-N,N-dimethylcephalin and distearoyl L-α-N-monomethylcephalin, also recently synthesized, are representative members of two newly discovered groups of phosphatides which have aroused interest in recent years as intermediates in the biosynthesis of lecithin.

ALUMINUM SOAP THICKENED LUBRICATING OIL. L. U. Franklin and J. C. Gebhart (Gulf Oil Corp.). *U. S. 2,998,385.* A lubricating composition consists of a uniform dispersion of 0.3 to 2.0% by weight of aluminum tristearate, 0.03 to 0.3% aluminum naphthenate, and 0.3 to 2.0% aluminum soap of a branched-chain saturated fatty acid containing 8 carbon atoms in a mineral oil. The relative ratios of the aluminum soaps are aluminum tristearate: aluminum soap of C_8 fatty acid 1:1 to 1:3; aluminum soap of C_8 fatty acid: aluminum naphthenate 6:1 to 12:1; and aluminum tristearate: aluminum naphthenate 2:1 to 12:1.

LUBRICANT CONTAINING A FATTY ACID AMIDE OF PHENOTHIAZINE. J. W. Nelson (Sinclair Refining Co.). *U. S. 2,998,386.* A lubricant composition consists essentially of a lubricant base (mineral oil lubricant or synthetic ester oil-based metal soap-thickened grease) and an oil-compatible fatty acid amide of phenothiazine in which the fatty acid radical contains 10 to 32 carbon atoms. The amide is present in an amount sufficient to give improved oxidation stability in the temperature range of about 300 to 450°F.

PREPARATION OF SUCROSE MONOESTERS. G. W. Curtis. *U. S. 2,999,858.* Finely divided sucrose is reacted with a lower alkyl ester of a higher fatty acid in the presence of a finely divided basic compound (alkali and alkaline-earth oxides, hydroxides or carbonates) in a liquid hydrocarbon medium in which sucrose is substantially insoluble. The alcohol by-product formed is removed and the sucrose monoester is recovered in substantial yield as the principal reaction product.

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• Biology and Nutrition

CHANGE OF VITAMIN A CONTENT OF MARGARINE DURING STORAGE. Kimitoshi Nakazawa, Isao Niiya, and Motoko Imuro (Japan Margarine & Shortening Makers' Ass., Tokyo). *Yukagaku* **10**, 179–83 (1961). Monthly investigation was made on vitamin A content of 15 kinds of commercial household enriched margarine kept at room temperature for 12 months. Vitamin A content was 18,200–36,900 (average 26,370) i.u./450 g. The average retention % was 84.4% after 3 months, 76.3% after

6 months, 71.6% after 9 months, and 68.6% after 12 months. The 8 samples presumably containing milk ingredients showed much better results than those without milk ingredients. Lauric acid gave beneficial effects and liquid fatty acids gave worse effects on vitamin A retention. There was no correlation between the loss of vitamin A and increase of peroxide number.

Biosynthesis of lipids. Hiroyasu Fukuba (Ochanomizu Univ., Tokyo). *Yukagaku* **10**, 327–33 (1961). A review with 38 references.

Some biochemical problems on vitamin A. Keiji Harashima (Univ. Tokyo). *Yukagaku* **10**, 333–8 (1961). A review with 23 references.

Nutritional problems of lipids. Morio Yasuda (Hokkaido Univ., Sapporo). *Yukagaku* **10**, 339–43 (1961). A review.

Nutritionally essential fatty acids. Takashi Tomono (Univ. Tokyo). *Yukagaku* **10**, 344–7 (1961). A review.

Quantitative aspects of lipids in plasma. Seiji Kasuga (Kantô Teishin Hospital, Shinagawa-ku, Tokyo). *Yukagaku* **10**, 347–51 (1961). A review with 26 references.

Biochemistry of glycolipids. Akira Makita and Tamio Yamakawa (Univ. Tokyo). *Yukagaku* **10**, 352–60, 375 (1961). A review with 90 references.

Biosynthesis of cholesterol and terpenes. Gakuzo Tamura (Univ. Tokyo). *Yukagaku* **10**, 361–71 (1961). A review with 73 references.

Chemical aspects of lipoprotein. Ichiro Hara (Tokyo Med. and Dental Univ., Tokyo). *Yukagaku* **10**, 371–5 (1961). A review with 17 references.

The metabolism of plasmalogen: Enzymatic hydrolysis of the vinyl ether. H. R. Warner and W. E. M. Lands (Dept. of Biol. Chem., Univ. of Michigan, Ann Arbor). *J. Biol. Chem.* **236**, 2404–08 (1961). The results of this paper indicate that rat liver contains an enzyme that catalyzes the hydrolysis of the vinyl ether linkage of plasmalogen. The enzyme is located principally in the microsomal fraction. No additional cofactors are required for reaction to proceed in dialyzed preparations. Of the substrates tested, only a deacylated derivative (α′-[1-alkenyl]-glycerylphosphorylcholine) of plasmalogen was found to be active and the products of the reaction were free aldehyde and α-glycerylphosphorylcholine.

Fatty acids of human platelet phosphatides. A. J. Marcus, H. L. Ullman and H. S. Ballard (Dept. of Med., Cornell Univ. Med. College, N. Y. City). *Proc. Soc. Exp. Biol. Med.* **107**, 483–86 (1961). The fatty acids of blood platelet phosphatides have been studied by silicic acid, and gas-liquid chromatography. Phosphatidylethanolamine and phosphatidylserine were not separated on silicic acid. The fatty acids derived from this fraction contained primarily arachidonic, stearic, and oleic acids. Lecithin-sphingomyelin eluates contained principally palmitic, stearic, and oleic acids. These components may be quantitatively related to the specialized function of platelets in blood coagulation.

Factors affecting the metabolizable energy content of poultry feeds. I. R. Sibbald, S. J. Slinger, and G. C. Ashton (Dept. of Nutrition, Poultry Sci. and Physics (Statistics), Ontario Agri. College, Guelph, Ontario, Canada). *Poultry Sci.* **40**, 945-51 (1961). Three experiments have been conducted to measure the influence of calcium levels, antibiotics, pantothenic acid, phosphorus levels, and phosphorus sources on the metabolizable energy content of diets fed to chicks or poults. The precision of the resulting data as measured by the coefficients of variation was very high and many small treatment differences were shown to be statistically significant; however, from a practical standpoint it is doubtful if the treatment effects were of much consequence. An increase in dietary metabolizable energy associated with a decrease in calcium when diets contained Aureomycin or penicillin was observed.

Biogenesis of estrogens by the human ovary. III. Conversion of cholesterol-4-C^{14} to estrone. K. J. Ryan and Olive W. Smith (Fearing Research Lab., Free Hosp. for Women, Brookline, Mass.). *J. Biol. Chem.* **236**, 2204–06 (1961). The conversion *in vitro* of cholesterol-4-C^{14} to estrone by human ovarian tissue has been described. Criteria for the identity of the radioactive metabolite and complete data on recovery and changes in specific activity have been provided.

Biogenesis of estrogens by the human ovary. IV. Formation of neutral steroid intermediates. *Ibid.*, 2207–12. The conversion *in vitro* of acetate-1-C^{14} to 4-androstene-3,17-dione, 17-α-hydroxyprogesterone, dehydropiandrosterone, and pregenolone by the human ovary has been described. The formation of 17-α-hydroxypregenolone and progesterone were also suggested by less rigorous identification. The criteria for radiochemical purity of the individual metabolites were provided, and the relationship of the formation of these neutral steroid metabolites to the biosynthesis of estrogens was outlined.

A chick assay procedure for the edema-producing factor in toxic fat. W. H. Ott, A. M. Dickinson, and A. Van Iderstine (Merck Instit. for Therapeutic Research, Rahway, New Jersey). *Poultry Sci.* **40**, 1016–22 (1961). A chick assay procedure based upon measurement of pericardial fluid volume was described for the determination of the edema-producing factor in toxic fat. Hydropericardium in terms of log cc. was shown to be closely and directly related to the log dose of toxic factor. The standard deviation of an individual volume in log cc. was ± 0.322, and the slope of the dose response curve was 1.063. Detectable hydropericardium was produced by feeding 7 parts of pure edema producing factor per billion parts of diet in a 20-day feeding period. Mortality was caused in addition when 64 or more parts of the pure factor were fed per billion parts of diet.

The role of pyridoxine in the metabolism of polyunsaturated fatty acids in rats. J. C. Kirschman and J. G. Coniglio (Dept. of Biochem., Vanderbilt Univ. School of Med., Nashville 5, Tenn.). *J. Biol. Chem.* **236**, 2200–03 (1961). Polyunsaturated fatty acid concentrations have been determined and the metabolism of linoleic acid-1-C^{14} has been studied in pyridoxine-deficient and in pair-fed, pyridoxine-supplemented rats. Pyridoxine-deficient rats receiving daily 100 mg. of linoleic acid as the only dietary fat had slightly higher total amounts and higher concentrations of polyenoic acids than did their pair-fed partners. Pyridoxine-deficient animals on a diet containing 20% fat (hydrogenated cottonseed oil) had higher concentrations but slightly lower total amounts of polyunsaturated fatty acids than did the pair-fed supplemented animals. When the concentration of tetraenoic acid is calculated as milligrams per g. of defatted carcass, the ratios for pyridoxine-deficient and pyridoxine-supplemented rats are similar.

The biosynthesis of lignoceric, cerebronic, and nervonic acids. A. J. Fulco and J. F. Mead (School of Med., Univ. of Calif., Los Angeles, Calif.). *J. Biol. Chem.* **236**, 2416–20 (1961). Two-week-old rats were given intraperitoneal injections of acetate-1-C^{14} over a 4-day period and killed 3½ hours after the last injection. The fatty acids obtained from the crude brain cerebrosides of these rats were then separated into four groups which included saturated unsubstituted, unsaturated unsubstituted, saturated 2-hydroxy, and unsaturated 2-hydroxy fatty acids. Stepwise degradation of the C_{24} acids to determine the label distribution revealed that lignoceric acid is completely synthesized from acetate, with little dilution from acids of intermediate chain length during the chain elongation process. Cerebronic acid, in turn, is formed directly from lignoceric acid. Nervonic acid, on the other hand, is not derived from lignoceric acid by desaturation but rather appears to be formed by chain elongation of oleic acid.

Action of choline phosphorylation in the kidney, heart, and aorta. W. E. Cornatzer, G. A. Sarosi, and J. R. Newland (Guy and Bertha Ireland Research Lab., Dept. of Biochem., Univ. of N. Dakota School of Med., Grand Forks). *Proc. Soc. Exp. Biol. Med.* **107**, 463–66 (1961). The effect on lipid phosphorylation of a single dose of choline was compared in rats maintained on low protein-high fat diet or similar diet supplemented with methyl acceptor, guanidoacetic acid. Administration of a single dose of choline stimulated lipid phosphorylation in the kidney heart and aorta.

Studies on energy utilization by the growing chick. E. H. Bossard and G. F. Combs (Poultry Dept., Univ. of Maryland, College Park, Maryland). *Poultry Sci.* **40**, 930–37 (1961). Studies on energy utilization were conducted with two- to four-week-old chicks fed *ad libitum* amounts of four rations containing widely varying levels of glucose (Cerelose), corn oil, and soybean protein plus amino acids. Chicks which received a low-fat diet (2% corn oil), showed slightly lower gains in weight, higher gross energy content per gram of carcass gain, greater retention of metabolizable energy intake than chicks fed a ration containing 20% corn oil. No measurable differences in heat increment or carcass composition were attributed specifically to the carbohydrate or protein level of the rations.

Butyrate metabolism in the lactating cow. A. L. Black, M. Kleiber, and Alice M. Brown (School of Vet. Med., Univ. of Calif., Davis, Calif.). *J. Biol. Chem.* **236**, 2399–2403 (1961).

Lactating cows were injected intravenously with butyrate-1-C^{14}, and butyrate-3-C^{14}. At 3 and 10 hours after injection, milk was collected and used to prepare lactose and amino acids from casein. On a basis of relative specific activities among these compounds, butyrate is a better precursor of glutamate and aspartate than it is for lactose, serine, or alanine. The specific activities of these compounds and their intramolecular C^{14} patterns were compared with results that would be expected if the cow utilized special pathways that have been suggested to account for the "glucogenic" behavior of butyrate. Results indicate that the cow metabolizes butyrate in the classical fashion by β-oxidation.

BIOSYNTHESIS OF STIGMASTEROL IN TOMATO FRUITS. R. D. Bennett, E. Heftmann, A. E. Purcell, and J. Bonner (Nat'l Inst. of Arthritis and Metabolic Diseases, Nat'l Institutes of Health, Bethesda, Md.). *Science* 134, 671 (1961). The presence of stigmasterol in tomato fruits was demonstrated. Labeled mevalonic acid was incorporated into this sterol, while sodium acetate was not. The identity of the isolated product was established by rigorous purification to constant specific activity, melting point determinations, and infrared spectrum.

LIPID METABOLISM IN CULTURED CELLS. II. CHOLESTEROL UPTAKE FROM SERUM OF NORMAL AND ATHEROSCLEROTIC HUMAN ADULTS. J. M. Bailey, G. O. Gey, and A. Meymandi-Nejad (Dept. of Biochem., School of Med., The George Washington Univ., Wash., D. C.). *Proc. Soc. Exp. Biol. Med.* 107, 594–96 (1961). The cholesterol content of cells grown on serum samples taken from normal and atherosclerotic humans and rabbits was determined. Cells grown on atherosclerotic sera had significantly higher cholesterol levels than those grown on normal sera. In the group of normal human sera there was significant correlation between (a) age of the donor and cholesterol content of cells, (b) serum cholesterol level and cholesterol content of cells and (c) age of the donor and serum cholesterol level. In the atherosclerotic human sera there was significant correlation between serum and cell cholesterol but none with age of the donor.

FRACTIONATION OF THE LIPOPROTEINS OF THE FAT GLOBULE MEMBRANE FROM CREAM. K. M. Alexander and C. V. Lusena (Div. of Applied Biology, Nat'l Res. Council, Ottawa, Canada). *J. Dairy Sci.* 44, 1414–1419 (1961). The membrane material obtained by freezing washed cream has been fractionated from suspensions in 2% sodium desoxycholate into five sedimentable fractions representing 75% of the total material and one soluble fraction (25%). These fractions were clearly differentiated by their appearance and sedimentation behavior. Fractions A and D contained most of the xanthine oxidase activity and were about 32% lipid. Fraction B contained most of the alkaline phosphatase activity and was about 65% lipid. The other fractions were over 70% lipid. In fractions A, B, and D, the lipid was 15% phospholipid; in fractions C and E, it was 5–6% phospholipid; and in the supernatant, it was 50% phospholipid.

RAPID SPECTROPHOTOMETRIC DETERMINATION OF TOTAL CHOLESTEROL IN SMALL AMOUNTS OF BLOOD AND CEREBROSPINAL FLUID. Y. S. Shin and J. C. Lee (Dept. of Biochem., St. Anthony Hospital, Terre Haute, Ind.). *Anal. Chem.* 33, 1220–22 (1961). A simple method is given for the extraction of cholesterol with complete removal of color-interfering substances and for a rapid (1 minute), sensitive (1 μg.) micro spectrophotometric determination of cholesterol in 10 μl. of serum from skin puncture or in 1 ml. of cerebrospinal fluid in a maximum of 15 minutes. The sample is washed with water and ion exchange resin and extracted with chloroform-methanol. Color is developed with acetic acid and ferric chloride reagent within 1 minute in a boiling water bath. Quantitative recoveries of cholesterol (99.3 ± 4.7%) were obtained after extraction. Relative standard deviation of assay for cholesterol on duplicate determinations is 1.7%. Results for total cholesterol agreed with the method of Chiamori and Henry within 5.2%, and that of Bloor within 8.8%.

A STABLE REAGENT FOR THE LIEBERMANN-BURCHARD REACTION. APPLICATION TO RAPID SERUM CHOLESTEROL DETERMINATION. T. C. Huang, C. P. Chen, Verna Wefler, and A. Raftery (Research Dept., Timken Mercy Hosp., Canton, Ohio). *Anal. Chem.* 33, 1405–07 (1961). Measurement of total serum cholesterol is a valuable test in the study of lipide metabolism. It requires a stable reagent for cholesterol color development and a simple procedure for the routine determination. A reagent for the Liebermann-Burchard reaction is described, which is stable for 2 weeks at room temperature and 4 weeks or longer under refrigeration, in contrast to 24 hours' stability of the ordinary acetic anhydride-sulfuric acid reagent. This reagent is also useful for rapid serum cholesterol determination. Only one reagent and one step are required.

SPURIOUS RECOVERY TESTS IN TOCOPHEROL DETERMINATIONS. V. H. Booth (Dunn Nutri. Lab., Milton Road, Cambridge, England). *Anal. Chem.* 83, 1224–26 (1961). Fat solvents contained small amounts of reducing substances that simulated tocopherols by reacting with the ferric chloride-bipyridyl reagent. In proving new methods these substances enable 100% recovery to be reported, even though some tocopherol has really been lost. The substances were separable from tocopherols by paper chromatography, but were not always separable by column chromatography. Reducing substances were also found in solvents after they had percolated through columns of various adsorbents.

STUDY OF A LIPOHYDROPEROXIDE BREAKDOWN FACTOR IN SOY EXTRACTS. B. Gini and R. B. Koch (Quartermaster Food and Container Inst. for the Armed Forces, U. S. Army, Chicago 9, Ill.). *J. Food Sci.* 26, 359–65 (1961). The effect of high concentrations of the lipoxidase extracted from defatted soy flour on a purified linoleic acid substrate was studied. Rapid hydroperoxide production was followed by equally rapid decomposition. The hydroperoxide breakdown factor can be eliminated by high-temperature short-time treatment of soy extracts. The addition of KCN to reaction mixtures caused a partial inhibition of the breakdown factor activity. Variations in hydroperoxide breakdown activity with variations in pH and reaction time were studied. A possible optimum at pH 8–9 was indicated. Qualitative evidence for the presence of a lipohydroperoxidase was obtained with well-known reagents that produce a specific color reaction with peroxidase.

OFF-FLAVORS IN POTATO PRODUCTS, AUTOXIDATION OF POTATO GRANULES. PART I. CHANGES IN FATTY ACIDS. R. G. Buttery, C. E. Hendel, and Mildred M. Boggs. PART II. FORMATION OF CARBONYLS AND HYDROCARBONS. R. G. Buttery (Western Regional Research Labs., Albany, 10, Calif.). *J. Agr. Food Chem.* 9, 245–52 (1961). Analysis of the fatty acids in dehydrated Russet Burbank potatoes by gas-liquid chromatography of their methyl esters is reported. Linoleic, linolenic, palmitic, and stearic acids were found to be the main acids, their identity being confirmed by infrared spectra. Eight other fatty acids were also detected in small concentration and identified by their retention times. Oxidative degradation of linoleic and linolenic acids is fairly closely correlated with the actual volume of oxygen absorbed and with the degree of off-flavor of the reconstituted product. Volatile compounds present in the autoxidized dehydrated potato were found to include: methane, ethane, propane, butane, pentane, acetaldehyde, propanal, 2-methylpropanal, butanal, pentanal, 2- and 3-methylbutanal, and hexanal. These compounds have been identified by gas-liquid chromatography on at least two different columns and by chemical classification. Tentative identification is given for six other compounds.

CHANGES IN SOYBEAN LIPIDS DURING TEMPEH FERMENTATION. A. C. Wagenknecht, L. R. Mattick, L. M. Lewin, D. B. Hand, and K. H. Steinkraus (Fundamental Food Research Dept., General Mills, Inc., Minneapolis, Minn.). *J. Food Sci.* 26, 373–77 (1961). Changes in the lipids of soybeans brought about by *Rhizopus oryzate* during the production of tempeh were studied. The mold possesses strong lipase activity and caused the hydrolysis of over one-third of the neutral fat of the soybean during 3-day fermentation. The fatty acid composition of soybean tempeh was compared with that of cooked soybeans by vapor-phase chromatography of the methyl esters. The neutral fat was composed of palmitic, stearic, oleic, linoleic, and linolenic acids, with linoleic acid predominating. These acids were liberated during fermentation in roughly the same proportions found in soybeans after heating 90 minutes at 100°. During the most active mold growth, proportionately higher levels of palmitic acid were found, and the level of linoleic acid was somewhat lower. Except for the depletion of some 40% of the linolenic acid in the later stages of the fermentation, there apparently was no preferential utilization of any fatty acid.

LIPOLYTIC ACTIVITY OF MICROORGANISMS AT LOW AND INTERMEDIATE TEMPERATURES. II. FATTY ACIDS RELEASED AS DETERMINED BY GAS CHROMATOGRAPHY. J. A. Alford, L. E. Elliott, I. Hornstein, and P. F. Crowe (Meat Laboratory, Eastern Utilization Res. and Dev. Div., U.S.D.A., Beltsville, Md.). *J. Food Sci.* 26, 234–8 (1961). Determination was made of the types and quantities of fatty acids released from lard, tallow, corn oil, and coconut oil by lipases from psychrophilic strains of *Pseudomonas*. The fatty acids were measured by gas chromatography. The rate of fatty acid liberation fell off sharply after the first few hours, but the ratios of the types of fatty acids were not affected until after 24 hours. Much of the palmitic acid in lard is esterified at the *beta* position. Also discussed is the possible effect of differences in the rate of lipolysis of fatty acids from natural substracts on interpretation of their degree of randomness, as measured by enzyme specificity.

QUALITY OF DAIRY PRODUCTS, VITAMIN A, CAROTENOID, IODINE, AND THIOCYANOGEN VALUES, AND THE REFRACTIVE INDEX OF MILK FAT AS INFLUENCED BY FEED AND BY INDIVIDUAL AND BREED DIFFERENCES. V. N. Krukovsky (Dept. of Dairy and Food Sci., New York State College of Agr., Cornell Univ., Ithaca, N. Y.). *J. Agr. Food Chem.* 9, 326–30 (1961). Feed, individual, and breed differences had statistically significant effects on milk fat constants. An inverse relationship was indicated between carotenoid and iodine values of fat. As an average, Ayrshire fat was lower in carotenoid and higher in iodine values than fat from any other breed; Jersey fat was highest in carotenoid and lowest in iodine values; Brown Swiss and Holstein fats were intermediate. Information on these relationships is of value in connection with studies of storage life of fat in milk products, and of fat metabolism. Data suggest that conversion of carotene to vitamin A in an animal body may vary with the degree of unsaturation of fat and is regulated by the same metabolic processes which control the degree of unsaturation of secreted fat.

PAPER-CHROMATOGRAPHIC SEPARATION OF CHLOROPHYLLS AND CAROTENOIDS FROM MARINE ALGAE. S. W. Jeffrey (Marine Lab., Cronulla, Sydney, Australia). *Biochem. J.* 80, 336–42 (1961). Two-dimensional paper chromatography with propan-1-ol-light petroleum and chloroform—light petroleum mixtures separated the chloroplast pigments of marine algae belonging to the classes *Chlorophyceae, Bacillariophyceae, Dinophyceae,* and *Chrysophyceae.* Pigments separated included chlorophylls *a, b,* and *c,* their pheophytins, the carotenes, the xanthophylls lutein, violaxanthin, neoxanthin, fucoxanthin and isomers, peridinin, esterified astaxanthin and a number of minor xanthophyll components. Fucoxanthin and peridinin and their isomers constituted 80–90% of the total carotenoids in the organisms which contained these pigments.

PROCESS FOR PREPARATION OF ALPHA TOCOPHEROL. F. J. Sevigne (Collett-Week Corp.). *U. S. 2,998,430.* The process of converting a *beta, gamma, delta* tocopherol or mixtures thereof to the *alpha* tocopherol consists of (1) oxidizing a material containing the tocopherol under mild oxidizing conditions so that the chroman ring opens forming a tocopheryl para quinone; (2) chloromethylating the para quinone with formaldehyde and hydrogen chloride at about ambient temperature to replace any hydrogen atoms on the phenyl ring with chloromethyl radicals; (3) reducing the compound with zinc and hydrochloric acid to convert the chloromethyl radicals to methyl radicals; (4) acidifying the mixture to close the ring thus producing *alpha* tocopherol from the tocopheryl quinones.

GLYCERIDE GLYCEROL UTILIZATION IN TRIGLYCERIDE FORMATION. H. C. Tidwell and J. M. Johnston (Southwestern Medical School, Dallas, Tex.). *Arch. Biochem. Biophys.* 93, 546–9 (1961). A comparison of the utilization of labeled fatty acids and glycerol, both free and combined, in the formation of glycerides has been made employing an *in vitro* procedure with rat intestine. Small amounts of long-chain fatty acid glycerides were formed from glycerol-C^{14} or from monoacetin or monopalmitin, both labeled in the glycerol moiety, in increasing amounts in the order named. This result was obtained although an appreciable hydrolysis of the monoglycerides occurred during the incubation period. The partition of the glycerides in the intestinal tissue suggested the absorption of some intact monoglycerides. However, the relative amounts of the various glycerides found after the use of monopalmitin, fatty acid-labeled, resembled more those found after employing labeled free fatty acids than those after monopalmitin labeled in the glycerol moiety. Evidence suggests that most of the fat is completely hydrolyzed prior to absorption.

ON THE CONFIGURATION OF THE PHOSPHATIDYL GROUP AND THE DISTRIBUTION OF FATTY ACIDS ON PHOSPHATIDYLINOSITOL. H. Brockerhoff (Univ. of Washington, Seattle). *Arch. Biochem. Biophys.* 93, 641–5 (1961). D-2,3-Diglyceride was obtained by enzymic cleavage of beef liver phosphoinositide. The L-configuration of the phosphatidyl group is thereby established. As its main component, beef liver inositide contained the distearoyl compound. Diglycerides obtained from beef heart inositide and from rat liver inositide were subjected to the attack of pancreatic lipase to determine the distribution of saturated and unsaturated fatty acids on the *alpha* and *beta* positions of the phosphatidyl group. The results indicate that there is no positional specificity in the location of the fatty acids in these inositides. Rat liver inositide was shown to contain a diarachidonoyl inositide.

SILICONE RESINOUS COMPOSITION CONTAINING CAROTENE FOR COATING BANANAS. H. A. Toulmin, Jr. (Commonwealth Eng. Co. of Ohio). *U. S. 2,995,538.* A coating composition for application as a spray coating to fresh bananas, which dries to provide a yellow carotene coloring and protective coating, consists of a silicone resin mixed with a small amount of a coloring solution composed of carotene dissolved in ethyl alcohol and to which is added approximately 1% by weight of 1-methyl-5,5-dimethyl hydantoin as an antioxidant and preservative.

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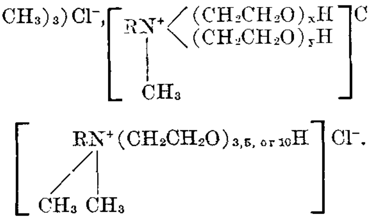
• Detergents

ANTISTATIC AGENTS. III. EFFICIENCY OF ANTISTATIC PROTECTION BY SURFACTANTS WITH NONIONIC (POLYOXYETHYLENE) AND IONIC RADICALS IN THE SAME MOLECULES. Koshitami Takahashi, Sadamichi Nishikawa, and Koji Funayama (Nippon Oils & Fats Co., Ltd., Amagasaki, Hyôgo-ken). *Yukagaku* 10, 168–74 (1961). A synergic antistatic effect was not obtained by having nonionic and ionic radicals in the same molecule. The surfactants examined include (R is $C_{18}H_{37}$) $RO(CH_2CH_2O)_3H$, $RO(CH_2CH_2O)_5H$, $RO(CH_2CH_2O)_{10}H$, $ROPO(ONa)_2$, $RO(CH_2CH_2O)_3PO(ONa)_2$, $RO(CH_2CH_2O)_5PO(ONa)_2$, $RO(CH_2CH_2O)_{10}PO(ONa)_2$, $(RO)_2POONa$, $(RO(CH_2CH_2O)_{3,\,5,\text{ or }10})_2POONa$, $ROSO_3Na$, $RO(CH_2CH_2O)_{3,\,5,\text{ or }10}SO_3Na$, $\underset{\substack{|\\ (CH_2CH_2O)_yH}}{RN}\text{-}(CH_2CH_2O)_xH$ (x+y = 3, 5, or 10),

$(RN^+(CH_3)_3)Cl^-$,



$$\left[\underset{\substack{|\\ CH_3}}{RN^+}\begin{matrix}\diagup (CH_2CH_2O)_xH\\ \diagdown (CH_2CH_2O)_yH\end{matrix}\right]Cl^-(x+y=3, 5, \text{or } 10),$$

and

$$\left[\underset{\substack{\diagup\ \ |\\ CH_3\ CH_3}}{RN^+}(CH_2CH_2O)_{3,5,\text{ or }10}H\right]Cl^-.$$

SYNTHESIS OF SURFACE-ACTIVE AGENTS. IV. SYNTHESIS OF SOME ORGANO-PHOSPHORUS COMPOUNDS WITH LONG ALIPHATIC CHAINS. Mikito Kawata (Dai-ichi Kôgyô Seiyaku Co., Ltd., Kyoto), Ryohei Oda, and Yoshihiko Ito. *Yukagaku* 10, 159–64 (1961). Several compounds with long aliphatic chains directly connected to P atom were synthesized and their properties were examined. All compounds showed relatively poor characteristics as surfactants, but they were applicable as antistatic finishing agents for synthetic fibers. The compounds synthesized were $C_{12}H_{25}PO(ONa)_2$, $C_{18}H_{37}PO(ONa)_2$, $CH_3(CH_2)_7\underset{\substack{|\\ PO(ONa)_2}}{CH}(CH_2)_8COONa$, $C_{12}H_{25}OCH_2CH(OH)CH_2PO(ONa)_2$, $C_{10}H_{21}CH(COONa)PO(ONa)_2$, and $C_{14}H_{29}CH{:}CHPO(ONa)_2$.

SOME PROPERTIES OF SYNTHETIC DETERGENTS DERIVED FROM DOCOSENOLS. Saburo Komori, Tochio Agawa, and Toshiya Kataoka (Osaka Univ.). *Yukagaku* 10, 153–9 (1961). Na docosenyl sulfates, NH_4 docosenyl sulfates, and Na docosenyl sulfoethyl ethers were synthesized in pure form from 11-docosen-1-ol (from liver oil of *Laemonema morosum*) and erucyl alcohol (i.e. 13-docosen-1-ol). They were examined as to surface and interfacial tension, foaming, detergency, and solubility in water. The results indicated that sulfates of C_{22}monoenoic alcohol were practically useful as detergents. Newly made high-vacuum apparatus having a rotary brush showed a good fractionation efficiency on the purification of higher fatty alcohol acetates.

EFFECTS OF SURFACE ACTIVE AGENTS ON THE AGING PROPERTY OF VINYLIDENE CHLORIDE-VINYL CHLORIDE COPOLYMER LATEX. Shigeyoshi Miura. *Kôgyô Kagaku Zasshi* 64, 405–8 (1961). Adsorption of surface active agents on the surface of the copolymer latex retarded the deteriorative aging. As the surface active agents Na laurylsulfate, Na dodecylbenzenesulfonate, Na dioctylsulfosuccinate, polyoxyethylene lauryl ether (20 moles ethylene oxide), and polyoxyethylenenonyl phenyl ether (20 moles ethylene oxide) were used.

EFFECTS OF SURFACE ACTIVE AGENTS ON THE WHITENING OF LATEX FILMS. *Ibid.*, 416–19 (1961). Nonionic agents (polyoxyethylene nonyl phenyl ether and polyoxyethylene lauryl ether) were more effective than anionic agents (Na oleate, Na laurylsulfate, and Na dioctylsulfosuccinate). Nonionic agents with low HLB were more effective.

EFFECTS OF SURFACE ACTIVE AGENTS ON THE MECHANICAL STABILITY OF SYNTHETIC RESIN LATEX. *Ibid.*, 408–11 (1961). Mechanical stability was examined on polystyrene latex in high-speed stirring. Good effects were obtained when much anionic agent was adsorbed and nonionic agent with high HLB was added.

EFFECTS OF SURFACE ACTIVE AGENTS ON THE CHEMICAL STABILITY OF SYNTHETIC RESIN LATEX. *Ibid.*, 412–15 (1961). Chemical stability was examined on polystyrene latex by measuring turbidity after adding $CaCl_2$ to diluted latex. Anionic agents showed no effect, while nonionic ones especially with high HLB were effective.

POLYMER SURFACTANTS. VI. SYNTHESES AND PROPERTIES OF POLYVINYLATED SURFACE ACTIVE AGENTS. Hikaru Konishi and Tetsuo Ishizuka (Dai-ichi Kôgyô Seiyaku Co., Kyoto). *Yukagaku* **10**, 11–18 (1961). The polymer surfactants prepared included sulfates of higher alcohols containing alkylated polyvinyl compounds, polyvinylated nonionics from polyoxyethylene series nonionics, polyvinylated soaps, and polyvinylated diethanolamides. Foaming and washing properties were examined.

FLUOROCARBON SURFACE ACTIVE AGENTS. Saburo Komori (Osaka Univ.). *Yukagaku* **10**, 2–5 (1961). A review with 32 references.

ADDITION REACTION OF ETHYLENE OXIDE TO LAURYL AMINE. Kunihiko Nagase and Kahei Sakaguchi (Kao Soap Co., Sumida-ku, Tokyo). *Kôgyô Kagaku Zasshi* **64**, 1031-4 (1961). There were 2 different types of reaction, acid-catalyzed and alkali-catalyzed. In the former, when less than 2 moles of ethylene oxide were added, it was a typical successive addition, and when 2 moles were added, selective production of diethanollaurylamine occurred. In the latter (alkali-catalyst type), ethylene oxide was added more to OH than to NH.

ADDITION REACTION OF ETHYLENE OXIDE TO LAURIC ACID. Kunihiko Nagase and Kahei Sakaguchi. *Ibid.* 1035–40. Metallic Na was used as the catalyst. When v (average no. of moles of ethylene oxide added) was more than 1, the reaction was

$$C_{11}H_{23}COO(CH_2CH_2O)_vCOC_{11}H_{23} + HO(CH_2CH_2O)_vH \rightleftharpoons C_{11}H_{23}COO(CH_2CH_2O)_vH.$$

SOLUBILITY OF ETHYLENE OXIDE IN ACTIVE HYDROGEN COMPOUNDS. Kunihiko Nagase and Kahei Sakaguchi. *Kôgyô Kagaku Zasshi* **64**, 1040-3 (1961). Solubilities of ethylene oxide were determined at 100, 125, and 150° and at pressures of 0–17 kg./cm.^{2} (above atmospheric). The order was lauryl alcohol$>$polyoxyethylene lauryl ether$>$polyoxyethylene nonylphenyl ether.

ADDITION REACTION OF ETHYLENE OXIDE UNDER PRESSURE. Kunihiko Nagase and Kahei Sakaguchi. *Ibid.* 1043–7. The addition reactions were studied between ethylene oxide and lauryl or nonylphenol at 1.5, 5.0, and 10.0 kg./cm.^{2} (above atmospheric), and at 100, 125, 150, and 175°. The reaction was speeded up by pressure, but it was simply due to the increase in the concentration of ethylene oxide.

PREPARATION AND PROPERTIES OF LONG CHAIN FATTY ACID MONOESTERS OF METHYL α-D-GLUCOSIDE AND THEIR POLYOXYETHYLENE DERIVATIVES. Saburo Komori, Mitsuo Okahara, and Kazuo Kondo (Osaka Univ.). *Kôgyô Kagaku Zasshi* **64**, 177–83 (1961). Methyl α-D-glucoside is water-soluble and is fairly stable to acids, alkalies, and heating. Its fatty acid partial esters may be useful as surface active agents. Interesterification was carried out between methyl α-D-glucoside and methyl esters of long-chain fatty acids (C_8–C_{18}) with dimethylformamide and formylformoline as solvents. Surface activity was measured for the monoesters. Those with C_{10}–C_{12} or shorter alkyls were water-soluble, while higher esters were difficultly soluble in water. Thus they were reacted with ethylene oxide to form polyoxyethylene derivatives, whose surface activities were also determined.

X-RAY DIFFRACTION STUDIES ON SOME SODIUM SOAPS. Keizo Ogino (Asahi Denka Kôgyô K.K., Arakawa-ku, Tokyo). *Kôgyô Kagaku Zasshi* **64**, 1021–4 (1961). Studies were made on Na soap hydrates of saturated C_8–C_{18} fatty acids. The crystals belonged to monoclinic system. The monohydrates gave most stable crystals. Hemihydrates were also stable, but structural changes were noted when the water content was less. C_{18}–C_{12} soaps presented stacking disorder in crystals, while C_8 or lower soaps showed regular structure.

PAPER CHROMATOGRAPHY OF SURFACE ACTIVE AGENTS. Hiromi Tajiri (Osaka Custom-House, Minato-ku, Osaka). *Kôgyô Kagaku Zasshi* **64**, 1024–7 (1961). Developing solvents were pyridine-water, methanol-acetic acid-water (1:1:1), n-butanol, 40% acetic acid, butyl acetate-ethyl acetate-acetic acid-water-pyridine, etc. Spraying reagents were Basacryl Blue Violet 507 and Rhodamine 6GCP for anionic detergents, Eocene for cationic detergents, and Draggendorf modified reagent for nonionic and amphoteric detergents. R_f values were discussed in relation to chemical structures. Some methods for purifying detergents were mentioned.

PREFERENTIAL WETTING OF FILM OF POLYVINYL CHLORIDE AND THE EFFECT OF NONIONIC SURFACE ACTIVE AGENTS. Shigetaka Kuroiwa (Shinshu Univ., Ueda). *Kôgyô Kagaku Zasshi* **64**, 420–1 (1961). Preferential wetting of polyvinyl chloride films to castor oil was lowered by surface active agents. This effect was more pronounced with smaller hydrophilic groups and larger hydrophobic groups. The agents were polyoxyethylene nonyl phenyl ethers and alkyl ethers of different degrees of polyoxyethylation.

REACTION CONDITIONS OF MANUFACTURE OF PHOSPHORIC ACID BY ADDING ALKYL BENZENE SULFONIC ACID. Keiji Kaji (Tagi Seihisho, Kakogawa, Hyôgo). *Kôgyô Kagaku Zasshi* **64**, 506–10(1961). In manufacturing H_3PO_4 solution containing 30% P_2O_5, 0.10–0.15 part alkylbenzene sulfonic acid per 100 parts phosphorite was used. with mixed acids (H_3PO_4 and H_2SO_4) at 65–72°.

SEPARATION OF POLYETHYLENEGLYCOL FROM NONIONIC SURFACTANTS BY THE METHOD OF COUNTERCURRENT DISTRIBUTION EXTRACTION. Kunihiko Nagase and Kahei Sakaguchi (Kao Soap Co., Wakayama). *Kôgyô Kagaku Zasshi* **64**, 635–8 (1961). The system n-butanol-water was the most suited. Other less effective systems studied include n-hexane-water, ethyl acetate-water, CCl_4-water, ethanol-water, benzene-water, isoamyl alcohol-water, etc. Nonionic surfactants separated were polyoxyethylene lauryl ether and polyoxyethylene nonyl ether.

GAS-LIQUID CHROMATOGRAPHY OF LINEAR DETERGENT ALKYLATES. J. M. Blakeway and D. B. Thomas (Colgate-Palmolive Ltd., Salford, Great Britain). *J. Chromatog.* **6**, 74–9 (1961). Apiezon L grease was found to be a selective liquid substrate for separating linear detergent alkylates by gas-liquid chromatography. The most important point which arises from this work is that substantially complete identification has been achieved of the components of a commercial alkylbenzene. Retention volumes, relative to n-hexadecane, are given for all compounds appearing in two commercial samples of linear detergent alkylate, namely Shell's Dob 83 and Dobane JN.

THE USE OF SODIUM CARBOXY METHYL CELLULOSE IN SYNTHETIC DETERGENTS. N. Philpel (20 Nassau Rd., Barnes, London). *Research (London)* **14**, 319–25 (1961). An account is given of the manufacture of sodium carboxy methyl cellulose and of the way it functions in synthetic detergents. It appears to function by being adsorbed on the surface of the fabric and into the boundary layers of the emulsion or dispersion of soil. Its efficiency is influenced by the nature of the surface active agent, by the natures and concentrations of the other ingredients in the blend and by the nature of the material being washed.

NOVEL COMPOSITION OF MATTER AND METHODS FOR PREPARING THEM. H. S. Mannheimer. *U. S. 2,993,918.* The described compositions consist of detergent sulfonic acids or detergent sulfates and an amphoteric surface active agent.

ALKYLOL-AMINOHYDROXY FATTY MATERIALS. T. W. Findley and B. H. Robin (Swift & Co.). *U. S. 2,993,919.* The surface-active composition is characterized by having from 10 to 22 carbon atoms in an alkyl chain and having an OH group and a lower alkylolamino group attached to adjacent carbon atoms on the carbon chain.

Heavy duty liquid detergent compositions containing a pair of cellulosic soil suspending agents. I. Reich and H. R. Dallenbach (Lever Bros. Co.). *U. S. 2,994,665.* A concentrated heavy duty liquid detergent composition consists of an aqueous solution of (1) 7% to 10% of a potassium alkylaryl sulfonate in which the alkyl group contains 8 to 15 carbon atoms; (2) 5% to 8% of an alkali metal aryl sulfonate such as toluene-, tetralin-, ethylbenzene-, isopropylbenzene-, o-xylene-, or m-xylene sulfonate; (3) 27% to 10% of a potassium polyphosphate; (4) 42% to 7% of a compound such as lauric isopropanolamide, capric diethanolamide, coconut monoethanolamide, lauric diethanolamide, or tallow diethanolamide; and (5 and 6) from 0.1% to 3% total of a pair of soil suspending cellulose ethers such as simple and mixed lower alkyl, hydroxyalkyl, or carboxyalkyl ethers of cellulose. The ethers form with one another in the aqueous solution, a network of particles of one cellulose ether dispersed within the other.

Detergent-softener compositions. R. P. Germann (W. R. Grace & Co.). *U. S. 2,995,523.* The described composition consists of a nonionic detergent, inorganic builders, and a softener (3% by weight of the total composition). The softener is a surfactant hydrazinium salt having the general formula $(RR'R''NNH_2)A$ in which R is an alkyl, alkenyl or alkadienyl radical containing 16 to 24 carbon atoms, R′ and R″ may be alkyl radicals having 1 to 24 carbon atoms, alkenyl radicals having 2 to 24 carbon atoms, or alkadienyl radicals having 4 to 24 carbon atoms, and A is an anion.

Detergent compositions. L. M. Wylie, R. E. Smith, and T. W. Sauls (Tennessee Corp.). *U. S. 2,995,524.* The described composition consists of (1) a neutralized or unneutralized dodecylbenzenesulfonic acid and (2) a neutralized or unneutralized sulfonated oleic acid that is monocarboxylic and predominantly unsaturated and contains approximately 1 mole of combined SO_3 per mole of oleic acid. Component (2) is present in the proportions of 10–50 parts to 90–50 parts of (1).

Personal use detergent lotion. W. Pilcher and S. L. Eaton (Procter & Gamble Co.). *U. S. 2,999,068.* An opaque pearlescent liquid detergent composition having a lotion-like consistency consists of: (1) 6% to 15% of sodium or potassium alkyl glyceryl ether sulfonates having an alkyl radical ranging in chain length from 10 to 14 carbon atoms; (2) 2% to 4% of sulfonates having an alkyl radical of 16 to 18 carbons; (3) 1% to 5% of an amine oxide having the fomula $R_1R_2R_3NO$ in which R_1 is an alkyl radical with 8 to 18 carbons and R_2 and R_3 are methyl or ethyl radicals, at least 50% of the amine oxide having R_1 of 12 carbon atoms in chain length; and (4) 0.05% to 0.2% of a water soluble polymer such as acrylamide or ethylene oxide polymers.

Detergent composition. J. N. Masci and N. A. Poirier (Johnson and Johnson). *U. S. 2,999,069.* A substantially neutral aqueous composition is described. It consists essentially of a sulfated polyethoxylalkylphenol which is neutralized with an excess of a substituted aminoamide.

Process of improving the odor of sulfoalkyl esters of fatty acids. L. M. Schenck (General Aniline & Film Corp.). *U. S. 2,999,871.* The odor of phosphine present in sulfoalkyl esters of fatty acids is substantially eliminated by treating with hydrogen peroxide in a quantity ranging from 200 to 2,000 p.p.m.

Phase diagram for soap made from sulfur olive oil. I. Study of the isotropic and medium soap phases. J. M. Martinez (Instituto de la Grasa y sus Derivados, Seville, Spain) and R. Caravaca. *Grasas y Aceites* 11, 132–138 (1960). The McBain phase diagram for soap made from sulfur olive oil was studied and the boundaries of the isotropic and medium phases determined. The effects of free fatty acids and oxidized fatty acids on the boundaries of the isotropic and medium phases were defined.

II. Study of the neat soap and kettle wax phases. *Ibid.*, 207–212. The complete soap-water-NaCl phase diagram for soap made from sulfur olive oil was determined. The effects of free fatty acids and oxidized fatty acids on the boundaries of the neat soap and kettle wax phases were defined.

Modern methods of toilet soap manufacture. F. Gattoni (G. Mazzoni, S. A., Busto Arsizio, Italy). *Grasas y Aceites* 11, 270–277 (1960). A review with particular emphasis on the Mazzoni continuous soap process.

Detergent compositions. K. M. E. Hellsten (Aktiebolaget Henkel-Helios, Stockholm). *U. S. 2,992,186.* The detergent composition consists of (1) 25 to 50% of at least one alkali metal phosphate (sodium or potassium salts of orthophosphoric, metaphosphoric, polyphosphoric, or pyrophosphoric acid); (2) 1 to 10% of magnesium oxide; and (3) 15 to 50% of a nonionic or anionic nonsoap synthetic organic detergent. The composition has a pH in the range of 7.5 to 9.5 when mixed with water at a temperature below 60°; the magnesium oxide is present in an amount to provide a pH of 9.5 to 11 when the composition is mixed with water at a temperature between 80 and 100°. The magnesium is in the form of a powder coated with an organic substance which is solid and insoluble in water at temperatures below 60° to prevent the magnesium oxide from dissolving until the temperature is above 60°.

Method of spinning protein-detergent filament. M. M. Besso, A. F. Diorio, and W. L. Hochner (National Lead Co.). *U. S. 2,992,882.* A mixture is formed consisting of a protein (12 to 16% on weight of mixture), an organic sulfonate detergent (2.5 to 4.8%), a strong alkali (an amount sufficient to give the mixture a pH between 11.8 and 11.9), and water. The mixture is passed through a constricted zone to form a filament; the filament is immersed in an acid-salt bath to coagulate the protein, thereby converting it to a fiber; and the fiber is then stretched, cured, washed, and dried. *U. S. 2,992,933,* Protein fiber and method describes a textile fiber which consists of a regenerated protein and an alkyl aryl sulfonate detergent in a ratio of between 85 parts of protein to 15 parts of sulfonate and about 89 parts of protein to 11 parts of sulfonate.

Anhydrous monocarboxylic acid detergent compositions. L. P. Curtin. *U. S. 2,992,992.* An anhydrous free-flowing, quick-dissolving powder consists of from 18 to 88% of a finely divided, anhydrous monocarboxylic acid of solidification point at least as high as 30° in intimate mixture with finely divided anhydrous sodium carbonate. The monocarboxylic acid may be a saturated fatty acid of 12 to 18 carbon atoms or a monoester of dicarboxylic acids having 2 to 4 carbons and an alkyl group of 12 to 17 carbon atoms. The sodium carbonate is present at a concentration of at least one mole for each 2 moles of monocarboxylic acid.

Liquid detergent compositions. P. J. Pengilly (Procter & Gamble Co.). *U. S. 2,992,993.* The described product is a nonsoap heavy-duty detergent in the form of an opaque, mucilaginous, aqueous liquid which remains stable over the temperature range of 40° to 80°F. It consists of sodium dodecyl benzene sulphonate (10–22% by weight), potassium pyrophosphate (15–22%), a fatty acid monoethanolamide in which the fatty acid moiety is derived from coconut oil (2–5%), ethyl alcohol (3–5%), a polyhydric alcohol such as glycerol (3–5%) or propylene glycol (1–3%), and water (41–69%). The proportions of the ethyl alcohol and polyhydric alcohol are adjusted to impart a mucilaginous character to the fluid.

Detergent composition for the hair. O. Albrecht and E. Matter (Ciba, Ltd., Basel. *U. S. 2,992,994.* The described composition consists of (a) at least 1 cation-active detergent compound free from imidazoline rings and containing at least 1 basic nitrogen atom and at least 1 aliphatic hydrocarbon radical of more than 6 carbon atoms in the form of a water-soluble salt and (b) a water-soluble condensation product of tertiary dodecyl mercaptan and ethylene oxide. The proportion of the condensation product is sufficient to counteract the skin-irritating effect of the cation-active detergent.

Nontarnishing detergent composition. J. C. Harris (Monsanto Chemical Co.). *U. S. 2,992,996.* The composition consists of a synthetic anionic or nonionic detergent which normally tarnishes copper base alloys in combination with a small amount of a 1-alkylamino-2,3,5,6-tetrahydro-1-imidaz-(1,2-a)-imidazole in which the alkyl radical has from 4 to 24 carbon atoms.

Fructoheptonate inhibited alkaline detergent solutions. J. V. Karabinos and E. J. Quinn (Olin Mathieson Chemical Corp.). *U. S. 2,992,998.* A method is described for inhibiting the formation of films and precipitates on articles being washed with water containing dissolved calcium and magnesium salts with caustic alkali solution. A mixture of fructoheptonic acids resulting from the cyanide carboxylation of fructose is incorporated into the wash solution.

Dry cleaning solvent containing haloalkyldiphenyl oxide sulfonates. J. A. Smith, A. P. Steinhauer, and J. C. Valenta (Dow Chemical Co.). *U. S. 2,992,999.* From 0.25 to 20% by weight of a salt of an alkylated halogenated diaryl oxide sulfonate in which the alkyl radical has from 8 to 22 carbon atoms is dissolved in a water insoluble dry cleaning solvent.

Detergent copolymers. F. A. Stuart, W. T. Stewart, and W. Lowe (California Research Corp.). *U. S. 2,993,032.* The described product is a copolymer of at least the (A) and (B) monomers of the following monomers: (A) higher alkyl methacrylate having from 8 to 30 carbon atoms in the alkyl group; (B) monoester of carboxylic acid selected from the group consisting of the ester of methacrylic acid and half ester of maleic acid in which the carboxyl group of the acid is esterified with a polyhydroxy substituted alkyl alcohol; and (C) methacrylic acid. The monomers are present in the ratio of from 1 to 20 monomer units of the oil-solubilizing compound (A) for each monomer unit of the ester (B) and the acidic compound (C).

Purification of salts of detergent amino acids. D. L. Anderson (General Mills, Inc.). *U. S. 2,993,071.* A process is described for purifying the salt of a detergent amino acid of the formula $RNH_m(CHR'CH_2COOMe)_n$ where R is an aliphatic hydrocarbon group contains 8–22 carbons, R′ is hydrogen or methyl, Me is sodium, potassium, or ammonium ion, m is not greater than 1, n is at least 1 and not more than 2. The zwitterion is formed and separated and dissolved in ethylene dichloride. The solution is cooled to cause separation of an ethylene dichloride phase, the ethylene dichloride is separated, and the purified zwitterion is recovered.

Detergent compositions. H. W. McCune (Procter & Gamble Co.). *U. S. 2,993,861.* The described composition consists of a calcium-sequestering phosphate and, as an inhibitor against the tendency to damage aluminum, a polyamine having the formula RX_nNH_2 in which R is an alkyl radical with 10 to 18 carbon atoms, X is the group C_2H_2NH or C_3H_3NH, and n is the integer 1 or 2. The polyamine is present in an amount from 5% to 15% by weight of the sequestering phosphate.

• Drying Oils and Paints

Physical-chemical analysis of paints and varnishes. J. Huesa (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 11, 180–192 (1960). A review of the standard methods and apparatus for testing paints and varnishes.

Preparing modified polyamide resins. H. H. Young and S. B. Luce (Swift & Co.). *U. S. 2,992,195.* Polyamide resins prepared from alkylene polyamines and polymeric fatty acids such as oleic, linoleic, linolenic, or eleastearic, are mixed with a small amount of a nitrogen-containing compound (urea, monosubstituted ureas, asymmetrically disubstituted ureas, malonamide, malononitrile, hydrazine, dimethyl hydantoin, or phthalamide) and heated to a point above the decomposition temperature of the nitrogen-containing compound. The modified resins exhibit improved toughness and decreased tackiness.

Polyepoxide-dicarboxylic anhydride compositions. C. S. Ilardo, C. T. Bean, and P. Robitschek (Hooker Chemical Corp.). *U. S. 2,992,196.* The described composition consists of a polyepoxide which has greater than 1 nonterminal epoxide group per molecule and which is derived from naturally occurring glyceride vegetable oils, a constituent selected from the group consisting of organic dibasic acids, organic dihydric alcohols and mixtures thereof, and 1,4,5,6,7,7-hexachlorobicyclo-(2,2,1)-5-heptene-2,3-dicarboxylic anhydride.

Modified oil copolymer emulsions and process of preparing the same. R. B. Boller (Archer-Daniels-Midland Co.). *U. S. 2,992,197.* The described emulsion is an aqueous system containing a continuous phase and an *in-situ* formed dispersed phase comprising: (1) in the continuous phase, water and about 2% to 35% oxidizable emulsifier with a film forming property and comprising water soluble salts of long chain fatty ester polymers modified with a dicarboxylic acid, alkyl modified dicarboxylic acid, dicarboxylic acid anhydride, or mixtures, and (2) in the dispersed phase, an *in-situ* polymerization product of: (a) about 3% to 35% unsaturated long chain fatty ester monomers containing polymerizable ethylenic linkages which are formed from drying oils, semidrying oils, etc. modified with an alcohol and polycarboxylic acid material selected from the groups consisting of polyhydroxy alcohols and *alpha,beta*-ethylenic polycarboxylic acids and their anhydrides, and (b) from about 5% to 40% polymerizable monomers having a terminal ethylenic $C=CH_2$ group.

Process of producing liquid color. T. Funahashi. *U. S. 2,992,198.* About 5 parts by weight of an animal or vegetable oil is emulsified in about 10 parts of an aqueous medium in the presence of 10 parts of a polyalcohol and 5 parts of an organic capillary active agent. About 3 parts of an emulsifiable synthetic resin is added, the emulsion is heated to 80°, and about 3.5 parts of a water-soluble dyestuff is then added.

Process for improving the efficacy of oils used as binding agents and core sands for foundry. L. F. N. Schmit and K. P. J. Cassart. *U. S. 2,993,796.* Sand core for foundry work contains powdered silica or ziroconium sand, a drying oil as a binding agent, and lead dioxide (0.3 to 10% by weight of drying oil) as a setting accelerator.

Modification of alkyd resins with meta- or para-hydroxy benzoic acids. R. L. Heinrich, D. A. Berry, and R. J. Dick (Esso Res. and Eng. Co.). *U. S. 2,993,873.* The described alkyd is the intercondensation product of about 3.1 to 3.4 mol. equivalents of a polyol containing an average of 2.5 to 4.5 hydroxyl groups per molecule with 2 to 2.5 mol. equivalents of a polycarboxylic acid and, correspondingly, from 1 to 0.5 mol. equivalent of a modifier component consisting of 20 to 80 mol. % of an unsaturated glyceride oil fatty acid portion and 80 to 20% of an aromatic monocarboxylic acid.

Resins and method of making the same. W. M. Budde, Jr., and G. W. Matson (Archer-Daniels-Midland Co.). *U. S. 2,993,920.* A liquid aliphatic higher fatty acid ester material containing 12–26 carbon atoms in fatty radical and an iodine value higher than 140 is epoxidized to an internal oxirane value of at least 8% and neutralized. The resulting product, containing from 10 to 200 p.p.m. of monovalent alkali metal ion, is reacted with the anhydride of a polycarboxylic acid in the molar ratio of 0.5 to 1.2 moles anhydride per mole of internal oxirane in the fatty ester.

Castor oil-based urethane coatings. G. O. Rudkin, Jr., J. E. Wilson, and M. A. Dunn (Atlas Powder Co.). *U. S. 2,994,674.* The described composition is the reaction product of an aromatic diisocyanate and the alcoholysis product of castor oil with a polyoxypropylene ether of a hexitol.

Thixotropic oil vehicle. H. M. Schroeder, R. L. Terrill, and H. M. Hauge (Spencer Kellogg and Sons, Inc.). *U. S. 2,996,396.* An oil vehicle having thixotropic characteristics is prepared by heating an oil selected from the group consisting of unbodied drying or semidrying oils, bodied drying or semidrying oils, a liquid copolymer of vegetable drying or semidrying oils with a benzenoid vinyl monomer (vinyl benzene or vinyl toluene) at a temperature in the range of 200 to 450°F. in the presence of 0.1% to 5% of ethylenediamine for 0.5 to 6 hours until the oil has acquired thixotropic characteristics greater than about 5/4.5.

Paint tinting color bases. C. W. Secker, Jr., (E. I. du Pont de Nemours and Co.). *U. S. 2,996,397.* A fluid multi-purpose paint tinting color base consists of (A) a dispersed pigment composition, (B) about 5–40% of an oleaginous nonvolatile organic vehicle consisting of dehydrated castor oil and soya lecithin in the proportion of 0.05 to 2 parts of lecithin per part by weight of the dehydrated castor oil, and (C) about 1 to 15% of a liquid nonionic surfactant composition which has a polyethanoxyethanol substituent linked through an ether oxygen atom to a ring carbon atom of a 5- to 6-member organic ring containing at least 4 ring carbon atoms, any atom in the ring other than carbon being a single ether oxygen atom. The organic ring also has a hydrophobic alkyl substituent of at least 8 carbon atoms linked to it.

Coating compositions. M. Kronstein and J. Eichberg (American Lecithin Co.). *U. S. 2,997,398.* A liquid coating composition consists of boiled linseed oil with a zinc salt reaction product of commercial lecithin (containing about 8% zinc) combined with red lead, using 65 parts of read lead for each 22 parts of linseed oil diluted with 19 parts of mineral spirits. The oil is light in color and high in light transmission.

Erratum

The September Journal, Vol. 38, No. 9, page 505, Effect of Extraction Temperature and Refining on the Halphen-Test Response of Cottonseed Oil, by Bailey, Magne, Pittman, and Skau.

The beginning of the fourth paragraph should read as follows: "The Halphen determinations were made by a modification of the procedure for the A.O.C.S. qualitative test (1) using a 0.5-g. oil sample. The Halphen-test response is expressed in terms . . ."