ABSTRACTS R. A. REINERS, Editor. ABSTRACTORS: J. G. Endres, J. Iavicoli, K. Kitsuta, F. A. Kummerow, C. C. Litchfield, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

Isolation and structure of a new conjugated triene fatty acid. M. Chisholm and C. Hopkins (Div. of Pure Chemistry, National Research Council of Canada, Ottawa). *J. Am. Chem. Soc.* 27, 3137–3139 (1962). A fatty acid, found as a major component in the seed oil of *Jacaranda mimosifolia D. Don,* is shown to be the hitherto unknown *cis*-8-*trans*-10-*cis*-12-octadecatrienoic acid.

Oxidation of milk fat globule membrane material. I. Thiobarbituric acid reaction as a measure of oxidized flavor in milk and model systems. R. L. King (Dept. of Dairy Sci., Univ. of Maryland, College Park). *J. Dairy Science* **45**, 1165–71 (1962). The thiobarbituric acid (TBA) reaction was used for investigating oxidized flavor in model systems containing fat globule membrane material and ascorbic acid. Trichloroacetic acid was used to flocculate the proteins and the TBA reaction was carried out and determined in the filtrate. The method is highly satisfactory in reproducing and measuring rapid oxidation rates in the model system. When applied to milk, lactose was found to contribute considerable interference in the TBA reaction. This was shown by chromatographic separation and spectrophotometric analyses of TBA pigments. A satisfactory application for milk uses trichloroacetic acid to remove fat and protein and ethanolic-TBA to increase the rate of color formation at 60C, a temperature at which lactose degradation is minimized. Results are presented showing quantitative recovery of oxidized milk from mixtures of oxidized and nonoxidized milk. Effect of exposing homogenized milk to direct sunlight for 20-min intervals is readily detected by the method. Relation between organoleptic and TBA analyses is indicated.

Peroxide value—Flavor score relationships in stored foam-dried whole milk. P. Kliman, A. Tamsma, and M. Pallansch (Dairy Products Lab., U. S. Dept. of Ag., Washington, D. C.). *J. Agr. Food Chem.* **10**, 496–498 (1962). The possibility of determining the flavor score of stored, vacuum-foam, dried whole milk powders by determination of the peroxide content (P.V.) of the powders was studied. In both air packs and nitrogen packs, no useful correlation was found between P.V. and flavor scores. An interesting periodic fluctuation of P.V. with time was observed in nitrogen packs. It was concluded that information on the peroxide content of whole milk powders could not be used to establish flavor quality of fresh or stored samples.

Evaluation of support materials for use in gas chromatography. D. Sawyer and J. Barr (Univ. of California, Riverside). *Anal. Chem.* **34**, 1518–1520 (1962). The characteristics of a number of materials have been investigated with a view to their possible use as column supports for gas chromatography. Chromosorb W, glass beads, Nichrome beads, Carborundum, and Fluoropak show the least adsorption; this is further reduced by treating the materials with hexamethyl disilazane. The surface areas of the materials have been evaluated to permit comparisons of columns with equal thicknesses of liquid phase. Comparison of the chromatograms obtained by these columns for a nine-ketone mixture leads to the conclusion that silazaned Chromosorb W is the most satisfactory general support material, particularly for low-loaded columns. Some criteria for an ideal support material are discussed.

Acylated cyclodextrins as stationary phases for comparative gas liquid chromatography. H. Schlenk, J. L. Gellerman, and D. M. Sand (The Hormel Inst., Univ. of Minn., Austin, Minn.). *Anal. Chem.* **34**, 1529–32 (1962). β-Cyclodextrin acetate, propionate. butyrate, and valerate have been used as stationary phases for gas liquid chromatography (GLC) of α-olefins, alcohols, aldehydes, esters, aldehyde-esters, and diesters. The retention times of homologs follow the rule of logarithmic linearity. The shifts of retention times of a compound from phase to phase facilitate its classification and tentative identification. Esters of fatty acids having one, two, or three side methyl groups have been chromatographed and the phases compared for separation of such isomers. The heat stability of β-cyclodextrin esters makes them very suitable for comparative GLC.

Total organic chloride content in butterfat by a rapid method of neutron activation analysis. R. Schmitt and G. Zweig (Gen. Dynamics, San Diego, Calif., and Univ. of Calif., Davis, Calif.). *J. Agr. Food Chem.* **10**, 481–484 (1962). A rapid neutron activation method has been developed and applied successfully for the determination of the total organic chloride content in milk products. This neutron activation procedure consists of irradiating butterfat and a chlorine reference standard in a nuclear reactor for a short time and subsequently measuring and comparing the induced Cl^{38} radioactivity. From the total organic chloride content in milk products, an upper limit for the content of chlorinated pesticides in milk products may be estimated.

Densipolic acid: A unique hydroxydienoid acid from *Lesquerella densipila* seed oil. C. Smith, Jr., T. Wilson, R. Bates, and C. Scholfield (Northern Regional Research Laboratory, Peoria, Ill.). *J. Am. Chem. Soc.* **27**, 3112–3117 (1962). A new hydroxy fatty acid found as a major constituent of *Lesquerella densipila* seed oil glycerides, to be called densipolic acid, was shown to be 12-hydroxy-*cis*-9, *cis*-15-octadecadienoic acid (I). Structure I was deduced chemically by oxidative degradations and corroborated by n.m.r. spectra.

Determination of 2,6-di-tert-butyl-4-hydroxytoluene (bht): Application to edible fats and oils. C. Szalkowski and J. Garber (Merck Chem. Div., Rahway, N. J.). *J. Agr. Food Chem.* **10**, 490–495 (1962). BHT is a very effective antioxidant for many organic substances such as edible fats and oils. Its wide use either alone or in combination with other antioxidants has indicated a need for a specific and effective method for its quantitative determination to maintain effective control over processing operations and to ensure adherence to regulatory requirements. The method presented is based on separation of BHT from fat or oil by steam distillation and colorimetric determination with a dianisidine—nitrous acid reagent. The method is capable of determining 10 to 200 ppm BHT in the presence of other allowable antioxidants.

Separation and determination of mono-, di-, and tripentaerythritol by programmed temperature gas chromatography. D. S. Wiersma, R. E. Hoyle, and Hans Rempis (Res. Dept. Canadian Chemical Co., Ltd., Edmonton, Alta., Canada). *Anal. Chem.* **34**, 1533–35 (1962). A new method for analyzing mixtures of mono-, di-, and tripentaerythritol is presented. Polyhydric alcohols such as pentaerythritol can be converted quantitatively to the acetate esters by direct treatment with acetic anhydride. The monopentaerythritol tetraacetate, dipentaerythritol hexaacetate, and tripentaerythritol octaacetate are sufficiently stable and volatile to permit their separation by gas liquid chromatography. The acetylation reaction product is resolved using temperature programming techniques on a parallel dual column system. The acetate esters of pentaerythritol formals are also resolved and identified. A measure of the quantitative accuracy is given and agreement between hydroxyl value by calculation and chemical procedure is illustrated.

Application of gas chromatography in the field of fats. II. Quantitative evaluation. H. P. Kaufmann, A. Seher, and A. Mankel (Dert. Inst. Fett Forsch., Munster). *Fette Seifen Anstrichmittel* **64**, 501–509 (1962). For the quantitative evaluation of gas chromatograms, the peak area is generally used as a measure of the quantity of the corresponding components. The size of these areas is related neither to the weight nor molar percentage of the substance in a simple mathematical dependence. An empirical standardization of the apparatus is therefore necessary. Correction factors have been determined by use of pure methyl esters and the effects of operating variables on them discussed. The peak area method of measurement is still the main source of error during quantitative GLC application.

Paper chromatography of fats. LI. Preparative separation of triglycerides with the aid of paper chromatography. H. P. Kaufmann, H. Wessels, and C. V. Viswanathan (Deut. Inst. Fett Forsch. Münster). *Fette Seifen Anstrichmittel* **64**, 509–513 (1962). A method for the paper chromatographic separation of larger quantities of triglycerides is described. Circular paper chromatography or the ascending technique is used. Paraffin/acetic acid; paraffin/acetone/acetonitrile and paraffin/acetone/methanol systems are used for developing solvents. Up to 40 mg. can be separated on the chromatograms.

CATALYTIC GLYCERINOLYSIS OF NATURAL FATS IN PYRIDINE. K. Täufel, Cl. Franzke, and I. Schlicker (Inst. Lebensmittlechemie, Humboldt Univ., Berlin). *Fette Seifen Anstrichmittel* **64**, 513–517 (1962). The catalytic treatment of natural fats with glycerine in pyridine solution with sodium methylate, sodium ethylate or sodium carbonate as catalysts gives high yields of monoglycerides. The glycerinolysis of soybean, ground nut, sunflower, and rapeseed oils was reported in the current paper.

ISOLATION AND PURIFICATION OF SOYA LECITHIN. H. Pardun (Laboratories Margarine-Union, Tmb. H., Kleve). *Fette Seifen Anstrichmittel* **64**, 536–540 (1962). The author reviews the usual procedures for the recovery of soya lecithin from soybean oil and its purification. A new method for the manufacture of pure lecithin is described in which the raw lecithin is treated with a ternary solvent composed of hydrocarbons, acetone, and water. Two liquid phases are formed. The upper layer takes up the raw oil and free fatty acids and the lower one the phosphatides. In a multistage apparatus a yield of 95% pure lecithin with only 1–2% residual oil content can be obtained.

STUDIES ON THE COMPOSITION OF EGG LIPID. O. S. Privett, M. L. Blank, and J. A. Schmit (Univ. of Minn., Austin, Minn.). *J. Food Sci.* **27**(5), 463–469 (1962). The analysis and fractionation of egg lipids was performed using thin-layer chromatography. The fatty acid composition was determined using alkali isomerization and gas-liquid chromatography. The fatty acids distribution in the lecithin is mainly the α-saturated β-unsaturated type.

FATTY ACID COMPOSITION OF OIL FROM DAMAGED CORN AND WHEAT. Doris Baker (Market Qual. Res. Div., U.S.D.A., Beltsville, Md.). *Cereal Chem.* **39**(5), 393–397 (1962). The fatty acids from the oils of commercial samples of corn and wheat were analyzed by gas-liquid chromatography to study the differences in composition among different types of damage found in the grain. When corn was damaged by artificial drying, cob-rot, or blue-eye mold and when wheat was damaged by heat, their chromatograms showed a number of unresolved peaks appearing at the retention times for caproic and capric.

CAROTENOIDS OF CORN AND SORGHUM. II. CAROTENOID LOSS IN YELLOW-ENDOSPERM SORGHUM GRAIN DURING WEATHERING. C. W. Blessin, R. J. Dimler, and O. J. Webster (Northern Reg. Res. Lab., Peoria, Ill.). *Cereal Chem.* **39**(5), 389–393 (1962). Sorghum retained only 50% of the carotenoids after weathering that were present in protected seed heads. Both carotenes and xanthophylls decrease continuously during weathering. The presence of red pigments in the pericarp did not inhibit the loss of carotenoids.

RHEOLOGICAL STUDIES OF THE ROLE OF LIPIDS IN DOUGH. K. M. Narayanan and I. Hlynka (The Grain Res. Lab., Board of Grain Commissioners for Canada, Winnipeg 2, Canada). *Cereal Chem.* **39**(5), 351–363 (1962). Normal flour dough showed structural relaxation when mixed in atmospheric oxygen. Defatted doughs showed that lipids have a protective action against the improved effect of oxygen. Flour that is extracted with petroleum ether and reconstituted with lipids regained properties of normal flour. Oleic and linoleic acids showed a protective action but palmitic showed none. All well-known antioxidants showed an improving effect when doughs were mixed in air.

THE FLAVOR SPECTRUM OF APPLE WINE VOLATILES. II. VOLATILE FATTY ACIDS. H. Sugisawa, J. S. Matthews, and D. R. MacGregor (Canada Dept. of Agric., Summerland, B. C.). *J. Food Sci.* **27**(5), 435–440 (1962). This paper describes the separation and partial identification of ten volatile fatty acids present in apple wine. The acids were isolated using a rising film evaporator and separated using gas chromatography. The identification was made using retention times compared to known acids.

REACTION OF COD ACTOMYOSIN WITH LINOLEIC AND LINOLENIC ACIDS. F. J. King, Margaret L. Anderson, and M. A. Steinberg (Bureau of Commercial Fisheries, Emerson Ave., Gloucester, Mass.). *J. Food Sci.* **27**(4), 363–367 (1962). Small concentrations of linoleic and linolenic acids reduced the solubility of cod actomyosin rapidly. The extent of insolubility depended on the structure of the fatty acid, on its concentration, and on the duration of storage of the fatty acid treated actomyosin solutions. The results support the hypothesis that the accumulation of free fatty acids in frozen fish muscle causes the actomyosin of the muscle to become inextractable.

LIQUID SHORTENING AND ITS APPLICATIONS. H. Lawson (Procter & Gamble Co., Cincinnati, Ohio). *The Bakers' Digest* **36**(4), 60–63 (1962). The use of liquid shortening by the various food industries, including the baking industry, has been shown to be increasing. Some of the major reasons for this increase are given. Several problems related to stability, shelf life, uniformity, consistency, etc., are discussed.

THE EFFECT OF AN ANTIOXIDANT IN THE PIG RATION ON THE STORAGE LIFE OF PORK AND LARD. Dorothy L. Harrison, J. L. Hall, D. L. Mackintosh, Marjorie Barger, and Armetta Watson (Dept. of Foods and Nutrition, Kansas State Univ., Manhattan, Kansas). *Food Technol.* **16**(9), 127–131 (1962). The quality of loin roasts, sausage, and lard from pigs fed standard rations of corn, soybean, sorghum grain, and wheat and those standard rations plus ethanolamine hydrochloride (50 g/100 lb ration) was determined. In general, the storage life of pork loin, roasts, sausage, and lard stored at refrigerator temperature was not improved by feeding ethanolamine hydrochloride. When lard was stored at room temperature, the ethanolamine hydrochloride ration may have prolonged the storage life observed. Soybean rations usually resulted in products inferior to those from pigs fed the other rations.

PURIFICATION OF OILS AND FATS BY ION-EXCHANGE RESIN. VII. CONCENTRATION OF ORIZANOL IN RICE BRAN OIL. Hiroshi Inoue and Tatsuo Noguchi (Industrial Res. Inst., Hokkaido). *Yukagaku* **11**, 109–12 (1962). Two processes of using an anion exchange resin were investigated for the separation of oryzanol from rice bran oil. In one process, oryzanol and free fatty acid absorbed by resin were simultaneously desorbed with the mixture of benzene, methanol, and hydrochloric acid (or acetic acid or boric acid) and the oryzanol was recovered from the effluent. In the other method, oryzanol was separately adsorbed by the resin after esterifying the free fatty acid, the oryzanol was desorbed and recovered from the effluent. Both of these methods were found to be practical.

VIII. SELECTIVE EXTRACTION OF ADSORBED COMPONENTS BY METHANOL-ACID SYSTEM. *Ibid* 113–18. When rice bran oil, dissolved in organic solvent, is passed through a bed consisting of strongly based anion exchange resin treated in nonaqueous solvent, most of free fatty acid and oryzanol in the solution can be adsorbed by the resin. In order to obtain a selective extraction of these components, the $MeOH\text{-}H_3BO_3$ and the MeOH-HCl systems, as nonaqueous solvents, were tested. Satisfactory result was obtained with the former system, in which most part of oryzanol was desorbed but the free fatty acid was not.

IX. DECOLORIZATION OF RICE BRAN OIL. *Ibid* 162–5. Decolorization of rice bran oil in organic solvent by use of ion exchange resins was investigated. The method was not effective for the decolorization of the crude oil but it was very effective for the oil which had been treated with phosphoric acid and sulfuric acid. Amberlite IRA-401 (OH form) was more effective than the Amberlite IR-120 (H form). Combined use of the anion and cation exchange resins was much more effective for the decolorization of the oil when the anion exchanger was used prior to the cation exchanger.

IMPROVEMENT OF SOYBEAN LECITHIN. III. PRODUCTION OF POWDERED SOYBEAN LECITHIN. Kazuhiko Yoshitomi, Tetsuo Ohai, and Toshikazu Tokunaga (The Nissin Oil Mills, Ltd., Yokohama). *Yukagaku* **11**, 123–7 (1962). To analyze the miscella stripping process of solvent extraction of soybeans in the battery system, the specific interfacial tension of hexane miscella to water and their boiling points in various concentration were investigated. It was necessary to concentrate hexane miscella as much as possible at the beginning of stripping for preventing emulsification. It was possible to separate soybean lecithin of high purity by adding water into the stripper at the end of stripping process and also by charging water into setting tank. The optimum conditions were investigated to bleach lecithin by using hydrogen peroxide as bleaching agent and ammonium hydroxide as assistant. Further experiments have been made to survey the conditions for spray drying of materials. A powdered soybean lecithin of 92–96% purity could be prepared without using any additional solvent.

ISOMERIZATION OF UNSATURATED FATTY ACIDS. VII. A DIMER OF METHYL LINOLEATE. Yoshiaki Nagano and Takehide Tanaka (Kyushu Univ., Fukuoka). *Yukagaku* **11**, 119–23 (1962). Thermal polymerization of 4 kinds of isomer of methyl linolate in inert gas gave the same kind of a dimer and the yield of conjugated *trans-trans* isomer was the highest. There was an equilibrium relation between conjugated *trans-trans* isomer and non-conjugated *trans*-isomer under heating. Ozonization of the dimer, oxidation of the product with potassium permanganate and its methyl ester formation gave tetramethyl tetracarboxylate. By considering the formation of a monomethyl azelate as a by-product, it was considered that the dimer formed a six-membered ring by the Diels-Alder's reaction of *trans-trans* isomer and non-conjugated *trans*-isomer.

Utilization of rice bran oil. VII. Comparison of oils produced by expression and solvent extraction. Yasuhiko Takeshita and Miyoshi Shoji (Tokyo Oils & Fats Co., Ltd.). *Yukagaku* 11, 101–4 (1962). The mechanisms of separation of oil from tissues of rice bran have been investigated by the mechanical expression and solvent extraction methods. Rice bran oil was composed mainly of free fatty acids, glycerides, and waxy esters, from which the wax esters were separated out at first, followed by fatty acids in the expression method, whereas this order was reversed in the solvent extraction method. Extraction of rice bran at low temperature in a few steps yielded light colored oil with less wax content and high saponification number than the oil obtained by pressing and the product can be refined easily to edible oil. There was practically no difference in the properties of 3 kinds of oil obtained by stepwise pressing of the rice bran.

VIII. Upper limit of natural hydrolysis of rice bran oil and the influence of hydrolysis in rice bran cell to extraction of oil by solvent. Yasuhiko Takeshita, *Ibid* 105–9. An average composition of rice bran stored for 1–2 years under usual atmosphere was 12.6% moisture and 18.9% oil, and the acid value of the oil was 93. Therefore, the hydrolysis of rice bran oil by natural decomposition in bran was unsuitable as the raw material for obtaining fatty acid by distillation. There was about 2% loss of fatty material in bran during the storage and decomposition. Also, the acid value of residual oil after extraction of bran with solvent was lower than that of raw rice bran, with the indication that the fatty acids are extracted easier than glycerides and esters by the solvent.

IX. Refining of crude rice bran oil. Yasuhiko Takeshita and Yoichiro Kai. *Ibid* 165–8. Refining of crude oil with high acid number, moisture, and impurities has been investigated. For separation of moisture and impurities, the centrifuge process was better than the heating and setting process. A bowl type centrifuge with capacity of 1 ton/hour was effective to decrease the moisture content to 1% from 5% moisture and impurities.

X. Hydrogenation of rice bran oil. Yasuhiko Takeshita and Isao Oba. *Ibid* 168–74. Hydrogenation of rice bran oil of high acid number by Cu-Ni oxide catalyst did not proceed well but calcining of the catalyst at 300° gave good result. When the crude oil contained 1% residual trichloroethylene, its catalyst poisoning effect was not so great as it had been considered and it showed beneficial effect for bleaching and the regulation of velocity of hydrogenation at high pressure. Water content up to 2% was not so harmful in the high pressure hydrogenation but the water content of 2–8% caused hydrolysis of fat. Soap stock could not be hydrogenated with 1% nickel oxide catalyst, but the oil recovered by treatment of the soap stock with acid could be hydrogenated even with 1% unreduced Cu-Ni catalyst.

Soysterol. I. Chromic anhydride oxidation of soysterol. Tomishi Yamada and Ken-ichi Morita. *Yukagaku* 11, 290–8 (1962). Soysterol was acetylated, brominated, and oxidized with chromic anhydride-water-sulfuric acid-glacial acetic acid-carbon tetrachloride solution and the yields of anderostenolone and stigmasterol were investigated. Soysterol (150 g) with iodine number 77.3 yielded 22 g of stigmasteryl acetate tetrabromide and 5.4 g of androstenolone acetate semicarbazone by oxidizing with 228 g of chromic anhydride which was added in 7 hours and stirring for 15 hours at 20°. The yield of androstenolone acetate semicarbazone was slightly increased by the addition of cupric sulfate as catalyst.

II. Epoxidation of stigmasterol. Tomishi Yamada. *Ibid* 335–9. Δ^{22}-Stigmasten-3β-ol-5,6α-oxide was obtained from stigmasterol by the epoxidation with one equivalent of perbenzoic acid, and 5,6α- and 5,6β-oxide acetate were obtained from stigmasteryl acetate. 5,6α-Oxide was converted to 6β-chloro-Δ^{22}-stigmasten-3β,5α-diol-3-monoacetate by hydrochloric acid in chloroform and glacial acetic acid, further it was converted to 22,23-oxide, and to dichlorohydrine-3-monoacetate. By epoxidation with excess perbenzoic acid for 5 days, a stigmastan-3β,5α,6β-triol-22,23-oxide was obtained from stigmasterol.

Imporvement of soybean lecithin. IV. Production of granular lecithin of high purity from the powdered product. Kazuhiko Yoshitomi, Osamu Tsuji, and Toshikazu Tokunaga (Nissin Oil Mills, Ltd., Yokohama). *Yukagaku* 11, 344–8 (1962). The method of preparing granular soybean lecithin of high purity from powdered product was investigated. Granules were produced by extruding the powdered lecithin and cutting the extruded particles. Glycerides were extracted from the granules with acetone and granules desolventized *in vacuo*.

Proper components of rice bran oil. I. Isolation of a new ketone compound and its properties. Yasuhiko Takeshita, Yumi Watanabe, and Norio Yamashiro (Tokyo Oil & Fat Co., Ltd.). *Yukagaku* 11, 269–76 (1962). Residue after distillation of methyl ester of rice bran oil *in vacuo* gave a ketone compound with mol. wt. 404 (Rast), m.p. 95.3°, λ_{max} 268, $E^{1\%}_{1cm}$ 506, positive color reaction of Liebermann-Buchard but negative to Emmerie-Engel reagent. The substance was unstable and the λ_{max} changed to 230 on standing. Properties were similar to those of calciferol but not identical.

The determination of melting point of cocoa butter. Suekichi Shimatani and Chiyoko Iwasaki (Morinaga Confectionery Co., Amagasaki). *Yukagaku* 11. 357–64 (1962). Preliminary treatment of cocoa butter for the determination of melting point by capillary method is carried out as follows: The molten sample at 50–60° is filtered, transferred into a capillary tube at the same temperature, kept 1 hour at 16–18°, kept 24 hours in an incubator at 23–4°, then cooled for 1 hour at 16–18°. The inner diameter of the capillary tube should be 1.0 ± 0.1 mm.

Crystallization process. F. J. Baur (Procter & Gamble Co.). *U. S. 3,059,008.* A method is described for separating insoluble fatty material from glyceride oil. The glyceride oil is heated to a temperature at which substantially all of the fatty material is in solution. Then about 0.001 to 1.0%, by weight of oil, of dextrin esterified with an average, per glucose unit, of at least one saturated fatty acid having from 13 to 22 carbon atoms and from 0 to 2 saturated fatty acids having from 1 to 5 carbon atoms, is added to the oil. The glyceride oil is cooled to a temperature at which insoluble fatty material comes out of solution and the insolubles are separated. In *U. S. 3,059,011* the oil is treated with an ester of saturated long-chain fatty acid (14–22 carbons) and material selected from the group consisting of glucose, gluconic acid, and glucono delta lactone.

Fat crystallization process. D. F. Schmid and F. J. Baur (Procter & Gamble Co.). *U. S. 3,059,009.* Glyceride oil is treated with from 0.001 to 0.5%, by weight of oil, of sucrose esterified with an average of from 15–80% saturated fatty acid having from 12 to 22 carbon atoms in the alkyl chain and from 0 to 85% of unsaturated fatty acid having from 12 to 22 carbon atoms. The ester should contain no more than 5 unesterified hydroxyl groups. In *U. S. 3,059,010* by the same inventors the oil is treated with sucrose esterified with an average of at least 1 saturated fatty acid having 12 to 22 carbons in the alkyl chain, and at least 1 fatty acid having from 1 to 6 carbons. The total short-chain fatty acid content is equal to from 5 to 100% by weight of the total long-chain fatty acid content. The mixtures are cooled to a temperature at which insoluble fatty material comes out of solution and is separated.

Method for recovering vegetable oil distillates. R. J. Fiala (A. E. Staley Mfg. Co.). *U. S. 3,061,622.* Vegetable oil distillates forming a part of deodorization vapors are to a substantial extent condensed by scrubbing with water to form an oil-in-water emulsion. The improvement comprises maintaining fluidity of the water for continuous reuse by heating the emulsion formed to a temperature adequate to break the emulsion into an organic and an aqueous phase. The organic phase is separated from the aqueous phase by centrifugation.

Hard ester waxes and process for preparing them. J. Kaupp and A. Thalhofer (Farbwerke Hoechst Aktiengesellschaft). *U. S. 3,062,671.* The described material is a waxy esterification product of (a) a mono-unsaturated aliphatic carboxylic acid containing at least 12 carbon atoms and at most a carbon chain as long as the montan wax acids and (b) a polyhydric alcohol (oxalkylation products of pentaerythritol, oxalkylation products of trimethylol ethane, a mixture of such products, or a mixture of such oxalkylation products with up to 90 mol % of additional polyhydric alcohols in which the OH groups are bound to saturated aliphatic carbon atoms). The oxalkylated polyhydric alcohol of group (b) is obtained by an addition of at least 1 mol of alkylene oxide of 2 to 4 carbons to each OH group. The carboxylic acid and the polyhydric alcohol components are contained in the esterification product in the ratio of carboxylic to hydroxy groups of 1:0.7 to 1:1.4.

Fat and oil extraction process. C. V. Bruera. *U. S. 3,064,018.* A process for extracting oils and fats from animal and vegetable fatty substances comprises loading the substance into a hermetically sealed zone, evacuating the zone to purge the substance of air and moisture, applying an organic solvent vapor and condensing a portion of the vapor on and in the substance. The vapor is able to penetrate completely into the substance due to the prior purging of air and moisture therefrom and dissolve the fats and oils in the substance. The temperature of the resulting solution is raised with an additional portion of the vapor. The solution is filtered and drained into a separate zone. The vapor is drawn from the hermetically sealed zone through the solution in the separate zone in heat exchange relationship with the solution in the separate zone. The solvent is distilled from the separated fats and oils and recycled, along with additional fresh solvent, to the hermetically sealed zone.

• Fatty Acid Derivatives

Reaction of higher fatty acid esters with metallic sodium. XIII. Gas chromatography of higher fatty alcohols. Masatoshi Fukushima (Nippon Soda Co., Ltd.). *Yukagaku* 11, 128–33 (1962). Chromatographic separation of acetic acid esters of higher fatty alcohols was studied. When diethylene glycol succinate in high silica diatomaceous earth was used as the partitioning agent, the peak area ratio of each acetate coincided approximately with weight ratio. The operating conditions were discussed.

Glycerides of dibasic acids. II. Synthesis of the monomolecular type dibasic acid glyceride. Yoshiaki Nagano and Takehide Tanaka (Kyushu Univ.). *Yukagaku* 11, 209–11 (1962). Reaction of japanic acid (C_{22} acid), a main constituent of dibasic acid portion in japan wax, and palmitic acid gave monomolecular type glycerides, α-,α′-japanin-β-palmitin and α-,β-japanin-α′-palmitin, with melting points 61.2° and 68.3°, respectively. A pure japanic acid was used for these syntheses.

III. Synthesis of bimolecular type dibasic acid glycerides. *Ibid* 211–12. Reaction of 2 moles of glycerin with 1 mole of japanic acid gave a bimolar-type glyceride in which two moles of glycerin were bridged by japanic acid in α,α′-positions. The tetrapalmitate of this glyceride was prepared by esterifying it with palmitic acid, and the product showed the melting point at 59.6°.

Carbonyl compounds in fatty oils. VII. Carbonyl compounds from oxidation of rape seed oil. Yoshihito Suzuki and Senziro Maruta (Yamanashi Univ., Kofu). *Yukagaku* 11, 282–6 (1962). To clarify the mechanism of reversion of odor of refined rape seed oil, the oil was oxidized with dry air. The volatile carbonyl compounds were caught in a trap of 2,4-dinitrophenylhydrazine solution, while the non-volatiles in the oil were extracted with Girard reagent to convert into 2,4-dinitrophenylhydrazones. These compounds were passed through an alumina column with benzene to collect a mono-carbonyl compound only. Saturated and unsaturated mono-carbonyl compounds were determined by applying paper chromatography and ultraviolet spectrum analysis with following results: C_4 and C_6 aldehydes covered over 70% of the volatile carbonyl compounds and over one-half of the C_8 and C_{10} components consisted of unsaturated compounds. The non-volatile carbonyl compounds contained more saturated ones compared with the volatiles.

Labeling fatty acids by exposure to tritium gas. III. Methyl stearolate and methyl linolenate. H. J. Dutton, E. P. Jones, V. L. Davison, and R. F. Nystrom (Northern Reg. Res. Lab., Peoria, Ill.). *J. Org. Chem.* 27 (7), 2648–2650 (1962). It was found that saturated fatty acid methyl esters are labeled when exposed to tritium gas by tritium substitution for the hydrogen atoms in the aliphatic portion of the esters. However, methyl oleate on exposure to tritium added tritium exclusively to the double bond yielding radioactive methyl stearate. Furthermore, methyl linolenate was found to add tritium only to the 9,10 and 12,13 double bonds in a ratio of 1 to 1.4, respectively. The acetylenic ester—methyl stearolate—when exposed to tritium gave mostly *cis* and *trans*-9,10-tritio-octadecenoate with minor amounts of radioactive methyl stearate and tritium substituted stearolate.

Hydroxy methyl linoleate and the reaction of methyl linoleate with N-bromosuccinimide. L. Dulog, K. H. Burg, and W. Kern (Org. Chem. Inst., Univ. Mainz). *Fette Seifen Anstrichmittel* 64, 553–562 (1962). Hydroxy methyl linoleate is prepared by selective reduction of methyl linoleate hydroperoxide with sodium sulphite. The autoxidation of the hydroxy ester is non-autocatalytic in character and ceases after absorption of one mole of oxygen per mole of ester. Low molecular weight decomposition products are formed during the reaction. The reaction of methyl linoleate with N-bromo succinimide was studied and reaction products determined. Among others, the brominated hydroxy ester was isolated.

Zone refining of synthetic, primary, normal fatty alcohols with 19–30 carbon atoms. H. Schildnecht, G. Renner, and W. Keess (Inst. Org. Chem., Univ. Erlangen, Nuremberg). *Fette Seifen Anstrichmittel* 64, 493–500 (1962). The author describes the construction and application of a multistage microscale zone refining apparatus. The primary alcohols $C_{19}H_{39}OH$ to $C_{30}H_{61}$ OH were synthesized by conventional methods of chain formation and elongation. The application of the micro zone refining technique to the purification and the determination of the above alcohols was discussed.

Acid-catalyzed interchange reactions of carboxylic acids with enol esters. E. Rothman, S. Serota, T. Perlstein, and D. Swern (Eastern Regional Res. Lab., Philadelphia). *J. Am. Chem. Soc.* 27, 3123–3127 (1962). The reaction of vinyl acetate with carboxylic acids in the presence of sulfuric acid catalyst gives a mixture of the acylals—ethylidene diacetate, 1-acetoxy-1-acyloxyethane, and 1,1-diacyloxyethane. By contrast, the homologous isopropenyl acetate gives the ester-acid interchange reaction as well as anhydride formation previously reported. Attempts to isolate the geminal diester, bromoisopropylidene distearate via the reaction of isopropenyl stearate, N-bromosuccinimide, and sodium stearate were not successful, although evidence for its formation includes spectral disappearance of isopropenyl unsaturation bands, hydrogenolysis to *n*-octadecyl alcohol and *n*-octadecyl stearate, ethanolysis to ethyl stearate, and hydrolytic rearrangement to hydroxyacetone stearate.

Selective hydrogenation of methyl oleate ozonolysis products by palladium in pyridine-methanol solvent. E. Pryde, D. Anders, H. Teeter, and J. Cowan (Northern Reg. Res. Lab., Peoria, Ill.). *J. Am. Chem. Soc.* 27, 3055–3059 (1962). Decomposition of the ozonolysis products formed by ozonization of methyl oleate in methanol gave dimethyl azelate as a major by-product when reductive decomposition to aldehydes was carried out by hydrogenation over palladium on charcoal. The presence of pyridine during hydrogenation resulted in significantly reducing the amounts of dimethyl azelate and other by-products formed and poisoned the catalyst for hydrogenation of olefinic unsaturation.

• Biology and Nutrition

Conversion of glycine to fatty acids by adipose tissue. D. Feller and E. Feist (Univ. of Washington, Seattle). *Proc. Soc. Exp. Biol. Med.* 111, 18–21 (1962). Epididymal adipose tissue was incubated with glycine-1-C^{14}, glycine-2-C^{14}, glyoxylate-1-C^{14}, CO_2, and fatty acids were isolated and analyzed for radioactivity. Glycine-1-C^{14} was converted to labeled fatty acids to a greater extent than glycine-2-C^{14}. Radioactive acetate, propionate, glyoxylate, and succinate were recovered as intermediate products of glycine metabolism. Addition of unlabeled acetate, propionate, and glyoxylate reduced conversion of C^{14}-glycine to fatty acids. Results show that glycine can be a precursor in the biosynthesis of fatty acids in adipose tissue. The path of conversion of glycine to fatty acids is discussed.

Effect of gamma irradiation on pigs fed low vitamin A rations. T. Meacham, T. Cunha, G. Combs, H. Wallace, A. Warnick, R. Shirley, and C. Simpson (Univ. of Florida, Gainesville). *Proc. Soc. Exp. Biol. Med.* 111, 30–34 (1962). Pigs irradiated with 350 r bilaterally at the rate of 11 r per minute 9 feet from source survived an average of 254 hours. A moderate vitamin A deficiency had no effect on irradiation damage; in fact, the vitamin A low pigs lived an average of 2 days longer. Irradiation lowered the total white blood cell count rapidly. The major symptoms of irradiation damage were: (a) depression, (b) skin hemorrhages, (c) hemorrhaging from eyes and mouth, (d) increased respiration, (e) mild muscular spasms just prior to death, (f) extensive hemorrhage of lymph nodes plus varying amounts of hemorrhage in the kidneys, heart, urinary bladder, intestine, and stomach.

Liver lipid peroxide levels in carbon tetrachloride poisoning. R. Priest, E. Smuckler, O. Iseri, and E. Benditt (Vet. Adm. Hospital and Univ. of Washington, Seattle, Washington). *Proc. Soc. Exp. Biol. Med.* 111, 50–51 (1962). The peroxide content of livers of untreated, non-fasted animals is arbitrarily set at 100%. There is no difference in control and experimental animals in regard to the amount of lipid peroxides in hepatic tissue at the 3-hour time period, when there are demonstrable morphologic alterations in the ergastoplasm and when there is clearly demonstrable depression of protein synthesis. It appears, therefore, that lipid peroxides do not play a significant role in the early phase of carbon tetrachloride intoxication.

Influence of a family diet pattern high in linoleic acid on serum cholesterol level: One year study. L. Sewell, P. Schools, Jr., and C. Treadwell (George Washington Univ., Washington, D. C.). *Proc. Soc. Exp. Biol. Med.* 111, 48–50 (1962). Clinically healthy subjects with elevated serum cholesterol levels were placed on a family diet pattern high in linoleic acid for a one-year period. The diet produced a highly significant decrease in serum cholesterol level (from 293 to 230 mg %). The greatest decrease occurred during the first several months; thereafter the serum cholesterol level fluctuated around 230 mg %. The diet produced a marked increase in percentage of linoleic acid in the serum cholesterol esters and triglycerides, with concomitant drops in percentages of saturated and oleic acids. It is concluded that such a dietary regimen for lowering the serum cholesterol level is practical for long periods.

Comparative effects of pectin N. F. administration on the cholesterol-fed rabbit, guinea pig, hamster, and rat. A. Wells and B. Ershoff (Western Biol. Lab., Culver City, Calif.). *Proc. Soc. Exp. Biol. Med.* 111, 147–149 (1962). Citrus pectin with a methoxyl content of 10.7% when fed at a 5% level in the diet largely counteracted the increment in plasma and liver cholesterol and liver total lipids induced by cholesterol feeding in the rat but was without significant effect in the cholesterol-fed rabbit, guinea pig, and hamster.

The uptake of P^{32} by liver phosphatides of Ehrlich ascites tumor-bearing mice. Theresa C. Lee, Robert J. Salmon, Donn G. Mosser, and Merle K. Loken (Univ. of Minn., Minneapolis) *Cancer Res.* 22, 1046–1052 (1962). Normal mice and mice bearing Ehrlich ascites tumors were given injections of radioactive phosphorus P^{32}. The mice were killed at various time intervals after injection of the P^{32} and the phospholipides were extracted from the livers and the washed ascites cells. The phospholipides were fractionated by silicic acid column chromatography and the specific activities of individual peaks determined. The specific activities of the individual phosphatides of the livers of tumor-bearing mice were greatly increased above those of the normal livers. The specific activity of the total liver phospholipides of tumor-bearing mice reached a maximum 8–10 hours after injection and then decreased. The specific activity of the total phospholipides of the ascites tumor cells rose more slowly and continued to rise for 72 hours.

Effects of Krebs-2 carcinoma on the lipide metabolism of male Swiss mice. G. Costa and J. F. Holland (N. Y. State Dept. of Health, Roswell Park Mem. Inst., Buffalo, N. Y.). *Cancer Res.* 22, 1081–1083 (1962). Total body composition of mice bearing Krebs-2 carcinoma transplanted subcutaneously was studied at several times during the course of tumor growth. Adult male Swiss mice, averaging 38 gm. in weight, sustained a profound fat loss during growth of Krebs-2 tumor. Fat depletion occurred in three stages. The first stage, involving loss of approximately 50% of the lipide of the animal, occurred by 7 days after transplantation, before the tumor had reached appreciable size. The second phase was one of steady state in which no further fat loss occurred despite active tumor growth. This stage lasted approximately from day 7 to day 28. Premortally, the tumor-bearing animal lost another substantial quantity of fat. The first stage fat loss has been reproduced with nonviable preparations from tumor. The possible nature of the lipolytic factor is discussed.

The isolation, separation, and identification of the principal phospholipids of sugar cane juice. J. Friloux and N. Cashen (Sugarcane Products Lab., Houma, La.). *J. Agr. Food Chem.* 10, 509–511 (1962). This investigation of the phospholipides of sugar cane juice is part of a broad study on nonsugars in cane juice. Because of the emulsifying nature of phospholipides, it is believed that these compounds have a deleterious effect on the processing and clarification of cane juice. By utilizing a combination of solvent fractionation and silicic acid column chromatography, the principal phospholipides were isolated from lyophilized fresh sugar cane juice and separated. They corresponded chromatographically to phosphatidyl ethanolamine and lecithin on silicated glass paper.

Heat-induced changes in milk fat. W. W. Nawar, L. E. Cancel, and I. S. Fagerson (Dept. of Food Science and Tech., Univ. of Mass., Amherst). *J. Dairy Sci.* 45, 1172–1177 (1962). A study on the effect of heat on milk fat shows that acetone, pentatone-2, heptanone-2, nonanone-2, and undecanone-2 are formed in the absence of oxygen and moisture. The use of gas chromatography with capillary columns and flame ionization detection also reveals the presence of many other components. Among these, and present in relatively small quantities, are the even-numbered carbon ketones: butanone-2, hexanone-2, and octanone-2, as well as the n-alkanals C_1 to C_9. Temperatures above 100C appear to be critical for the development of an off-flavor. Samples of milk fat so heated and homogenized into fresh skim milk had a marked resemblance to reconstituted milk powder when subjected to a taste panel. The effects of heat in the absence of oxygen on the color of anhydrous milk fat are shown.

In vivo incorporation of acetate-1-C^{14} into cholesterol and fatty acids following testosterone propionate administration. R. L. Raiford and Harry Y. C. Wong (Dept. of Physiology, College of Med., Howard Univ., Washington, D. C.). *Circulation Res.* 11, 753–757 (1962). The administration of testosterone propionate for three weeks resulted in an increased incorporation of sodium acetate-1-C^{14} into cholesterol and fatty acids. This increased conversion was evident in both the plain-mash and the atherogenic-diet cockerels. Thus, hypocholesterolemic effect of testosterone propionate is not the result of a decreased synthesis of cholesterol and/or fatty acids. In addition, a trend towards lowering of the plasma and tissue cholesterol levels of the atherogenic-diet animals is indicated.

Positional specificities in phospholipid hydrolyses. A. Robertson and W. Lands (Univ. of Mich., Ann Arbor, Mich.). *Biochemistry* 1, 804–810 (1962). Lecithin containing a radioactive acid located specifically in either the β- or α'-position was synthesized enzymatically. Incubating these labeled lecithins with *Crotalus adamanteus*, *Crotalus atrox*, and *Bothrops atrox* venoms demonstrated the selective β-esterase activity of the venoms. The lecithinase of heat-treated pancreatin was also a β-esterase. In addition, lecithinase activity was demonstrated in homogenates of rat intestine, spleen, lung, heart, liver, and brain. In all tissue homogenates tested no radioactive lysolecithin accumulated, so that the lysolecithinase activity appeared to be at least as great as the lecithinase activity.

Chromatographic separation of brain lipids. 3. Serine-containing phospholipids. C. Long, B. Shapiro, and D. A. Staples (Royal College of Surgeons of England). *Biochem. J.* 85, 251–6 (1962). Rat-brain lipid, free from water-soluble contaminants and protein, was applied to a short alumina column equilibrated with chloroform-methanol-water (43:43:14, by vol.). The neutral lipids, together with the choline-, galactose-, ethanolamine-, and inositol-containing lipids, passed through the column. Phosphatidylserine was then eluted with an alkaline solvent system. Partial decomposition of the phosphatidylserine occurred and the eluted material also contained a non-nitrogenous phospholipid. Final purification of the phosphatidylserine was effected on a silicic acid column. The product contained about 6% of serine plasmalogen.

Lecithinated product. C. F. Obenauf and C. W. Tatter (Beatrice Foods Co.). *U. S. 3,060,030.* A lecithinated, spray dried, free flowing powder is described containing 30–60% lecithin, 10% edible shortening oil, and 30–60% of a coating material selected from the group consisting of milk solids not fat, sodium caseinate, mixtures of the proteins, and mixtures of the protein with a compound such as sugar, dextrin, or gum arabic. The fat forms the core of each powder particle and includes some of the lecithin, and the core has a coating of the protein and protein mixtures with the remainder of the lecithin.

Radioactive iodinated (I^{131}) fatty material admixed with wax-like material in capsule. P. Numerof and J. Knoll (Olin Mathieson Chemical Corp.). *U. S. 3,061,510.* A pharmaceutical preparation is a 2-piece capsule containing an intimate admixture of from 50–99.9% of a digestible, non-toxic wax-like material having a softening point at least above room temperature, and from 0.1% to 50% of a normally radioactive iodinated (I^{131}) fatty material.

Reagent for the determination of fat in blood serum. P. Schain. *U. S. 3,062,623.* A test reagent for extractive determination of fat in blood serum consists of an aqueous solution of (1) a non-ionic surface active agent (tetradecyldesoxypolyethylene glycol, polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, alkarylpolyethoxy ethanol, alkylphenoxypolyethoxy ethanol, isooctylphenoxyethoxy ethanol, or alkyl phenyl polyethyleneglycol ether); (2) an anionic surface active agent (dioctyl sodium phosphate, sodium tetradecyl sulfate, triethanolamine tetradecyl sulfate, sodium octyl sulfate, diamyl sodium sulfosuccinate, diisobutyl sodium sulfosuccinate, or sodium lauryl sulfate); and (3) as an agent to render the anionic surface active agent miscible in aqueous medium, ethoxy triglycol in an amount by volume equivalent to at least 50% of the volume of the anionic surface active agent. The ratio of the agents should be in the dange of 1:1 to 1:20 of nonionic to anionic by volume.

Drying Oils and Paints

Emulsion polymerization—Some theoretical and experimental aspects. A. G. Parts and D. E. Morse (Dept. of Physical Chemistry, Univ. of Sydney). *J. Oil Color Chemists' Assoc.* **45**(9), 648–652 (1962). A critical examination of the currently accepted quantitative theory of emulsion polymerization has revealed flaws in the assumptions used to derive the formulae. The derivation predicts that the rate of reaction should pass through a maximum then fall off to a lower constant value, features which are not observed experimentally. The emulsion polymerization of the highly water-insoluble monomer vinyl stearate is also described. In general the kinetics do not follow any of the predictions of the Smith-Ewart theory.

Use of thin layer chromatography for following a glycerolysis reaction. S. M. Rybicka (Paint Research Station, Teddington, Middlesex). *Chem. & Ind. (London)* **1962**, 1947–9. Thin layer chromatography with silicic acid as adsorbent has been applied to follow glycerolysis of linseed oil. A plate coated with silicic acid plus 10% plaster of Paris was spotted with solutions of the reaction mixture sampled at about 10 minute intervals. The plate was developed by the concentration gradient method starting with petroleum ether (bp 60–80C) and finishing with 50% diethyl ether in petroleum ether. The dry plate was sprayed with concentrated sulfuric and heated at 110C until dark spots developed. The trains of spots for each time of reaction showed the gradual decrease of triglycerides concentration and the increase of mono- and diglycerides. During the first 60 minutes the concentration of monoglycerides increases and then falls a little. The concentration of diglycerides increases for the first 30 minutes; no changes of concentration occur later. It can thus be concluded that the equilibrium is reached in about one hour at the conditions of the reaction (235C).

Drying oils. E. Bortnek and J. A. Vona (Celanese Corp. of America). *U. S. 3,059,002.* The method for improving a drying oil having secondary hydroxyl groups on unsaturated fatty acid chains consists of reacting the drying oil with β propiolactone.

Polycarboxy acid esters of polyoxyethylated castor oil. W. H. Kirkpatrick, V. L. Seale, and Alice W. Church (Nalco Chemical Co.). *U. S. 3,061,620.* The described composition is an organic polycarboxy acid ester of oxyethylated castor oil oxyethylated with 15 to 45 mols of ethylene oxide/mol of castor oil in which the ester is composed of at least one mole of the acid per mole of the castor oil.

Detergents

Analysis of surface-active agents. XVII. Analysis of surfactant mixtures. 3. Direct titration of cationics in ternary system of cationic-ampholytic-nonionic by a semi-micro bromophenol blue-dichloroethane method. Yasuji Izawa, Osamu Nakagawa, and Wasaburo Kimura (Nagoya Univ.). *Yukagaku* **11**, 309–12 (1962). The anionic standard solution was titrated with a sample solution containing cationics by using bromophenol blue as an indicator. The end point is reached when the indicator shifts from the water to the solvent phase. The experimental results with various binary or ternary mixtures showed that ampholytics and nonionics had no influence on the titration by adjusting the pH at 9.8–12, and the cationics in the mixture could be directly titrated with sufficient accuracy by this bromophenol blue-dichloroethane method.

XVIII. Analysis of the surfactant mixtures. 4. Determination of the total active material and the individual surfactants in the cationic-ampholytic-nonionic ternary system. *Ibid* 364–8. The determination of total active material was made with butanol using Kieselbach's liquid-liquid extraction method. A direct titration of cationic was made by a semi-micro bromophenol blue-dichloroethane method. The determination of nonionic was made by a semimicro cation-exchange ultraviolet absorption spectrophotometric method. Ampholytic = total active material − (cationic + anionic).

Foaming properties of binary systems of poly(ethylene glycol) nonylphenyl ether-sodium soaps. Wataru Yano, Takashi Takeda, and Wasaburo Kimura (Nagoya Univ.). *Yukagaku* **11**, 304–8 (1962). The foaming properties of mixtures of poly(ethylene glycol) nonylphenyl ethers and sodium laurate, myristate, and palmitate have been investigated. The ratios of mixing of above surfactant and sodium soaps were limited in a narrow range and the foaming was decreased with an increase of the surfactant. The ratio of addition of above surfactant could be increased with an increase of moles of addition of ethylene oxide, with an increase in carbon atoms in alkyl chain of the soap and with an increase of temperature in case of sodium myristic and palmitate. In general, the foaming properties of surfactant were decreased by addition of a small amount of soap. The foaming properties of the mixtures of surfactant and each kind of soap were shown in graphs.

Evaluation methods of surface active agents. I. Evaluation of dye dispersing power by a semi-micro azo pigment method. Seiichi Imahori and Wasaburo Kimura (Nagoya Univ.). *Yukagaku* **11**, 134–7 (1962). For the evaluation of dye dispersing power of surface active agents, a semi-micro azo pigment method has been developed. The method consists of coupling diazotized base with naphthol (molar ratio 1:1) in the presence of dispersing agent at pH 4.5, and measuring an amount of dispersing agent just sufficient to prevent the precipitation of one of several azo pigments. The ratio of this amount of dispersing agent and the weight of azo pigment is defined as the dispersion value. It has been confirmed that the suitable diazo components are: Red KB base, Red TR base, and *p*-nitroaniline, and the coupling components: Naphthol AS and Naphthol AS-SW. Among the various dispersing agents examined, sodium alkylnaphthalene sulfonate and sodium naphthalene sulfonate-formaldehyde condensate showed the best azo pigment dispersing power (dispersion value 2).

Colored cleaning agents. H. Sinner and W. Fries (Henkel & Cie. G.m.b.H.). *U. S. 3,058,916.* A laundry detergent in solid form is decoratively colored by a dye capable of being oxidized to a substantially colorless form. In addition the detergent contains an oxygen-yielding material in an amount sufficient to oxidize the dye to colorless form in an aqueous washing solution of the laundry detergent.

Liquid dishwashing detergent. A. E. Lintner (Hagan Chemicals & Controls, Inc.). *U. S. 3,058,917.* The described detergent consists of (1) 1 to 3.5 parts by weight of an alkali metal hypochlorite; (2) 5 to 20 parts of sodium or potassium tripolyphate, tetrapotassium or tetrasodium pyrophosphate; (3) 10 to 30 parts of trisodium or tripotassium orthophosphate; (4) 2 to 6 parts of sodium or potassium metasilicate; (5) up to 5 parts KOH; and (6) sufficient water to form a solution.

Liquid detergent gel compositions having stability against separation. M. E. Ginn (Monsanto Chemical Co.). *U. S. 3,060,124.* An aqueous liquid detergent gel consists of 40–65% by weight of water and 5–25% of a synthetic, non-ionic, organic detergent compound in combination with 10–50% of an alkaline substance selected from the group consisting of sodium and potassium chain polyphosphates, silicates, and combinations thereof together with 0.25–2% of a cross-linked vinyl polymer having a viscosity of from 100 to 10,000 centipoises.

Detergent composition containing soil-redeposition inhibitor. M. W. Rutenberg and O. B. Wurzburg (National Starch and Chemical Corp.). *U. S. 3,061,551.* A synthetic organic detergent has incorporated in it an agent for promoting the soil-suspending power of the detergent. The agent consists of a water-dispersible cyanoalkylated polysaccharide in an amount from 0.05% to 250% based on the weight of the detergent.