ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. G. Endres, Kazuo Fukuzumi, J. Iavicoli, K. Kitsuta, F. A. Kummerow, Gladys Macy, E. G. Perkins, T. H. Smouse, J. A. Thompson and R. W. Walker

• Fats and Oils

Aminated polyoxyalkylene fatty amines. J. D. Zech (Atlas Chem. Ind., Inc.). *U.S. 3,352,916.* A composition is claimed, which is prepared by reacting a polyoxyalkylene derivative of an amine having a C_{10} to C_{20} aliphatic radical and 2 to 20 moles of ethylene oxide or propylene oxide units for each equivalent of amino hydrogen in the amine, with an aminating agent such as ammonia or C_1-C_8 primary or secondary alkyl amines, in the presence of a Raney metal hydrogenation catalyst at 175–275C.

Corandomized margarine oils. P. Seiden (Procter & Gamble Co.). *U.S. 3,353,964.* A margarine oil adapted to be manufactured into a margarine of good spreadability, oil-off, slump and eating qualities comprises at least 5% by wt of corandomized triglycerides containing C_6-C_{14} saturated fatty acids and C_{20}-C_{22} saturated fatty acids, the amount of long-chain fatty acids being 0.3 to 5.0% by wt of the margarine oil and the ratio of short-chain to long-chain fatty acids in the margarine oil being from 100:1 to 1:1.

Salad oils and method of making them. F. R. Hugenberg and E. S. Lutton (Procter & Gamble Co.). *U.S. 3,353,966.* A clear glyceride salad oil having improved resistance to deposition of high-melting solids contains in solution from 0.001% to about 1% by wt of an esterified carbohydrate substance selected from the group consisting of oligosaccharides and polysaccharides having from 2 to 15 saccharide units per molecule. The carbohydrate substance is 50 to 100% esterified, 15–85% of the esterifying carboxyl equivalency being contributed by C_{14}-C_{22} saturated and unsaturated hydroxy fatty acids containing 1–8 hydroxyl groups, 15–85% being contributed by C_{14}-C_{22} saturated fatty acids and any balance being contributed by C_2-C_{12} fatty acids and C_{14}-C_{22} unsaturated fatty acids.

Salad oils and method of making them. E. S. Lutton (Procter & Gamble Co.). *U.S. 3,353,967.* A clear glyceride salad oil having improved resistance to deposition of high-melting solids contains in solution from 0.001% to about 1% by wt of a mixed polysaccharide ester of a long-chain unsaturated fatty acid dimer having 28–44 C atoms in the dimer and C_{14}-C_{22} saturated fatty acids. The polysaccharide has 2 to 15 saccharide units per molecule and is at least one-half esterified, the unsaturated fatty acid dimer and saturated fatty acid being in a ratio of from about 1:6 to about 6:1.

Method of refining liquid fats and oils. H. Bock and H. Hommers. *U.S. 3,354,188.* A method of refining a crude edible oil comprises the steps of: (1) dispersing in the crude, liquid oil a refining agent selected from the group consisting of sulfuric acid, sulfurous acid, phosphoric acid, hydrochloric acid, formic acid, acetic acid, oxalic acid, citric acid, their alkali metal salts and acetic anhydride, in the presence of a sufficient amount of an emulsifying agent to form an emulsion in which the oil represents the continuous phase; (2) adsorbing the dispersed phase of the emulsion on a particulate solid; and (3) separating the solid having adsorbed on its surface the dispersed phase from the continuous oil phase.

Apparatus for recovery of tallow. E. J. Jemal (Mine and Smelter Supply Co.). *U.S. 3,355,255.* An apparatus for the recovery of tallow from waste animal flesh material comprises the combination of a vertically elongated housing, a number of foraminous partitions spaced vertically inside the housing and means for delivering the material to be treated into the uppermost zone. The material is able to drop successively from one zone to the next lower one, while hot gases are introduced into the several zones of the housing to melt and extract tallow from the material. A hollow vertical shaft extends through the housing, having a set of trays mounted on it below the respective partitions to collect the melted tallow dripping through the foraminous partitions. From the trays, the melted tallow is collected inside the hollow shaft and delivered outside the housing.

Anti-spattering plastic shortening. E. R. Purves, L. H. Going and R. D. Dobson (Procter & Gamble Co.). *U.S. 3,355,302.* A plastic shortening suitable for frying and baking is claimed, consisting of fatty glycerides having admixed 0.2–1.0% by wt of an acid-treated C_{12}-C_{22} fatty acid monoester of polyoxyethylene sorbitan containing about 20 oxyethylene units per molecule, the acid treatment being sufficient to give the monoester a pH of less than 7 in the presence of a trace of water, and from about 0.01 to about 0.25% by wt of an oil-insoluble, water-soluble salt of phosphoric acid.

Bleaching refined cotton oil. P. H. Eaves (U.S. Sec'y of Agr.). *U.S. 3,356,701.* A process for bleaching refined cottonseed oil with activated alumina comprises the following steps: (a) dispersing activated alumina having 0.5 to 40 microns diameter in 2–6 parts of water, to form a slurry, (b) mixing the slurry under high agitation with the refined cottonseed oil for 1 to 5 min., (c) heating the agitated mixture at 430–460F and 1–5 mm Hg vacuum for 20–60 min., (d) cooling the mixture under vacuum to 180–200F, and (e) separating the oil from the slurry.

Method and apparatus for separating fat and solids from meat scraps. P. Bradford (Swift & Co.). *U.S. 3,346,393.* An improved method is claimed for continuously rendering fat from packinghouse scrap, which comprises: comminuting fatty scrap material and heating to a flowable condition but below a temperature at which any protein material present would be denatured; continuously charging the melted fatty scrap material to a foraminous surface arranged as a sling having a bight hung between the two ends; reciprocating the ends of the sling thereby causing the liquid material to pass through the foraminous surface while any separated protein material is agglomerated and compacted into substantially a single mass by the rolling action within the bight; and continuously discharging said mass from the bight.

Continuous bread making process with pumpable shortening containing a high level of fatty triglyceride solids. P. M. Koren and J. H. Menzies (Procter & Gamble Co.). *U.S. 3,350,207.* An improvement is claimed in a process for the continuous production of bread, consisting of continuously introducing a pumpable shortening ingredient at a temperature of at least 140F into the first mixing stage of the process in which fermented yeast brew is mixed with other dough ingredients. The shortening, which is in pumpable condition at room temperature, consists of a suspension in a liquid glyceride vehicle of 10–60% by wt. of C_{16}-C_{22} fatty acid fully saturated triglyceride solids, the amount of the shortening added at the first mixing stage being between 2.0 and 2.8% based on the weight of the flour in the dough.

Formula and method for determining the proportion of fat in dairy products. J. H. Berry. *U.S. 3,351,431.* A process for determining the proportion of fat in milk or milk products comprises placing 10 grams of milk in a mixing vessel, adding one ml of a 1.5% aqueous solution of sodium bicarbonate and 40 ml of a solvent mixture consisting of about 40% acetone, 40% petroleum ether and 20% n-butyl alcohol, shaking vigorously and transferring to an open end separatory funnel with the stopcock closed. After 4 minutes a drop of alcoholic solution containing methylene blue is added and the contents of the funnel up to the blue line of separation are withdrawn. The contents of the funnel above the blue line are transferred to an evaporation container, the solvent is evaporated, the fat is dried and its weight is calculated as a percent of the original sample.

Determination of olefinic unsaturation by bromination. J. S. Fritz and G. E. Wood (Inst. for Atomic Res. and Dept. of Chem., Iowa State Univ., Ames, Iowa 50010). *Anal. Chem.* 40(1), 134–39 (1968). The direct titration of various unsaturates in 85% acetic acid-10% water-5% carbon tetrachloride with bromine in glacial acetic acid is described. Titrations are performed both with and without utilization of a mercury(II) chloride catalyst. In the absence of catalyst, compounds containing an isolated olefinic linkage can be determined in the presence of compounds which possess either strongly electron-withdrawing substituents allylic to the double bond or a double bond conjugated with a carbonyl group. An indirect spectrophotometric method for the determination of small amounts of unsaturation is also described.

Effect of batter ingredients on changes in fatty acid composition of fats used for frying. Marion Bennion (Dept. of Food and Nutr., Brigham Young Univ., Provo, Utah).

Food Technol. 21(12), 94–8 (1967). The effect of various ingredients in a fritter-type batter on changes in fatty acid composition and iodine values of a corn oil and a hydrogenated vegetable shortening used for approximately 8.5 hr of frying was studied. Absorbed fat was also extracted from samples of the fried batters and analyzed. Iodine values showed a significant decrease with time in both frying and absorbed fat.

TEXTURE OF ICE CREAM. IV. THE INFLUENCE OF FAT CONTENT AND COAGULATED FAT ON THE STRUCTURE OF MELTED ICE CREAM. J. Whitehead and P. Sherman (Unilever Res. Lab., Welwyn, Hertfordshire, Eng.). *Food Technol.* 21(11), 107–10 (1967). Low shear stress measurements in a coaxial cylinder viscometer at 20C simulate the conditions operating during subjective assessment of ice cream on the palate. Increasing the fat content from 0–10% increases all measured rheological parameters. Between 6 and 8% fat a significant change occurs in the structure. The influence of coagulated fat has also been investigated. No clear pattern emerged from the data other than that the ice cream with the lowest coagulated fat content showed the highest values for all the rheological parameters. Preliminary examination of "good" and "poor" texture ice creams suggest that all rheological parameters are significantly higher in the former samples.

NEW POLYESTER COLUMNS FOR GLC ANALYSIS OF FATTY ACID METHYL ESTERS. Shoichiro Watanabe, Yukiko Satō and Katsuyoshi Kitamura (Kitasato Univ., Tokyo). *Yukagaku* 16, 570–572 (1967). New polyesters prepared by the esterification of succinic or adipic acid with α-butyl-α′-hydroxy ethyl glyceryl diether were found to be useful liquid phase for gas-liquid chromatography for separation of linolenic, arachidic and eicosenoic acids. Good result was obtained by applying this polyester column for analysis of rapeseed oil methyl esters.

DETERIORATION OF OILS AND FATS OF HARDENED COCONUT OIL SERIES. II. CORRELATION BETWEEN CRYSTAL GROWTH AND HYDROLYSIS. Masao Imamura, Isao Niiya, Kazuko Takagi, Masakazu Okada, and Tarō Matsumoto. *Yukagaku* 16, 551–554 (1967). Acid value showed practically no change both in hardened and non-hardened oils when stored under anhydrous condition at different temperatures. In the storing of oil in saturated water vapor, the acid values were increased in the order of storing at 15° and 5°C., respectively. Methyl esters of hardened coconut oil in ethanol, n-hexane or benzene showed no increase in acid value even when stored at low temperatures.

DETERIORATION OF FRYING OILS IN CONTINUOUS WATER-SPRAYING AND HEATING SYSTEM. V. CONDENSABLE VOLATILE DECOMPOSITION PRODUCTS AND FREE FATTY ACID IN DETERIORATED OILS. Etsuji Yuki (Food Ind. Expl. Station, Hiroshima Pref.). *Yukagaku* 16, 545–550 (1967). Steam-distillates from soybean oil under continuous water-spraying and heating with and without air blowing were collected during the intervals of 0–14, 14–28 and 28–42 hours, respectively. In the absence of air, free fatty acids of monomeric form similar to original soybean oil were the main product and were produced mainly by hydrolysis. In the presence of air, fatty acids of monomeric form were the main product and these were mainly produced by hydrolysis; the volatile products were a mixture of acidic (short chained fatty acids, dibasic and keto acids), carbonyl and alcoholic compounds.

DETERIORATION OF FRYING OIL IN CONTINUOUS WATER-SPRAYING AND HEATING SYSTEM. V. CONDENSABLE VOLATILE DECOMPOSITION CONTACT WITH AIR BY HOOD-CONTROLLED STEAM FLOW. Ibid., 654–656. No thermal oxidative deterioration was observed when the flow rate of steam was over 10 g/cm^2/hr.

VI. EFFECT OF ACIDS, EMULSIFIERS AND OTHER MATERIALS ON THE HYDROLYSIS OF SOYBEAN OIL. *Ibid.*, 600–605. The effect of free fatty acid contents on the hydrolysis of soybean oil was determined in continuous water-spraying and heating system. The rate of hydrolysis was proportional to the acid concentration in the range of acid value of 0.1–10.0. The average value of velocity constant Khr^{-1} was 0.113. The effects on the kinds of fatty acid, alcoholic compounds, epoxy compounds and some amino compounds were described.

THIN-LAYER CHROMATOGRAPHY IN THE FIELD OF FATS AND OILS. ANALYSIS OF FATTY ACIDS AND GLYCERIDES. Yutaka Usui (Nissin Oil Mills Ltd., Yokohama). *Yukagaku* 16, 641–653 (1967). A review with 126 references.

ANTARCTIC WHALE OIL BY GAS-LIQUID CHROMATOGRAPHY USING A HYDROGEN FLAME IONIZATION DETECTOR. VIII. 7-METHYL-6-HEXADECENOIC ACID IN FIN WHALE BLUBBER OIL. Yoshihiko Sano (Miyoshi Oil & Fat Co., Tokyo.) *Yukagaku* 16, 605–610 (1967). 7-Methyl-6-hexadecenoic acid (0.01%) was found in whale blubber oil.

LIPIDS OF JAPANESE LITTLENECK, TAPES JAPONICA. II. COMPOSITION OF PHOSPHOLIPIDS. Shigejiro Yasuda (Hiroshima Univ., Hiroshima). *Yukagaku* 16, 596–600 (1967). The phospholipids were found to contain 23.1% phosphatidyl ethanolamine, 9.2% phosphatidal ethanolamine (ethanolamine plasmalogen) and 17.8% sphingo-ethanolamine. The others were 19.8% phosphatidyl choline, 10.8% phosphatidyl serine and 6.0% phosphatidyl inositol.

PREPARATION OF PHOSPHATIDYL INOSITOL. Takashi Takahashi and Takashi Hashimoto (Kitasato Inst., Tokyo). *Yukagaku* 16, 572–573 (1967). Phosphatidyl inositol (PI) was prepared from pig brains and soybeans by a combined method of solvent fractionation and DEAE-cellulose and silicic acid column chromatography. The PI showed m.p. 225C. Other analytical data are tabulated.

ESTIMATION OF RAW MATERIAL FATS AND OILS IN MARGARINE BY FATTY ACID COMPONENTS. Masao Imamura, Isao Niiya, Kazuko Takagi and Tarō Matsumoto. *Yukagaku* 16, 618–622 (1967). Properties and fatty acid composition of the oils and fats used as raw materials for margarines were determined and another determination was similarly made on 40 kinds of commercial household margarine. The approximate nature of oils and fats used in the margarines was presumed from the characteristics of their fatty acid components. As various kinds of raw material are used in household margarine in Japan, the fatty acid composition is very complicated. Twelve samples among the products packed in cartons were judged of vegetable origin, and 18 samples were found to contain laurine oil and some contained 56.9% of this. Also, there were 2 samples which contained chiefly hydrogenated fish and whale oils. The main components of the paper-wrapped margarine and unwrapped table margarine were hydrogenated fish and whale oils, and 2 samples which used laurine oil.

THEORY AND APPLICATION FOR DETERMINATION OF THE STRUCTURES OF UNSATURATED FATTY ACIDS BY OZONOLYSIS. *Yukagaku* 16, 575–577 (1967). Lecture of O. S. Privett described by Toshimi Akiya.

SEPARATION AND DETERMINATION OF ODOROUS COMPONENTS OF FATS AND OILS. *Yukagaku* 16, 626–633 (1967). A lecture of S. S. Chang described by Kosaku Yasuda.

DETECTION OF VOLATILE DECOMPOSITION PRODUCTS FORMED DURING FRYING. Lecture of S. S. Chang described by K. Yasuda. *Yukagaku* 16, 681–689 (1967).

SEED OILS FROM LOQUAT, LEEK, COMMON BROOM, SOAP-BERRY AND PERSIMMON, AND INSOLUBLE MATTER OBTAINED FROM LOQUAT SEED OIL. Shigeru Hamada and Sei-ichi Ueno. *Yukagaku* 16, 677–680 (1967). Yield and constants of each seed oil are listed. Petroleum ether extract of loquat seed oil contained a higher aldehyde or ketone.

UNSAPONIFIABLE MATTER OF SEI-WHALE BLUBBER OIL. PRESENCE OF PRISTANE AND SQUALENE. Tetsutaro Hashimoto and Hideo Mamuro (Gov. Chem. Ind. Research Inst., Tokyo). *Yukagaku* 16, 657–681 (1967). The blubber oil of *Baleenoptra borealis* was shown to contain the hydrocarbons and squalene in the unsaponifiable matter.

THE LIPID CONTENT OF CELL WALLS OBTAINED FROM JUVENILE, YEAST-LIKE AND FILAMENTOUS CELLS OF CANDIDA ALBICANS. D. E. Bianchi (Dept. of Biology, San Fernando Valley State College, Northridge, Calif.). *Antonie van Leewenhoek* 33, 324–332 (1967). Purified cell walls from juvenile cells, mature yeast-like cells and filamentous cells were extracted with chloroform-methanol (2:1). The lipid contents were 2.1% (on a dry weight basis) for the juvenile walls, 1.8% for mature yeast-like walls and 4.5% for the filamentous walls. The lipids were identified as sterol esters, triglycerides, sterols, free fatty acids and phospholipids. Juvenile cells were found to have greater concentrations of sterols. They and the mature yeast-like cells only were found to contain glycerol phospholipids.

EXTRACELLULAR LIPIDS OF YEASTS. F. H. Stodola, Maria H. Deinema and J. F. T. Spencer (Pioneering Lab. for Microbiol. Chem., Northern Regional Res. Lab., U.S.D.A. Peoria, Ill. 61604). *Bacteriol. Rev.* 31, 194–213 (1967). The extracellular lipids excreted by yeasts include many unusual compounds. They include polyolesters of hydroxy fatty acids (*Rhodotorula* species), sophorosides of hydroxy fatty acids (*Candida bogoriensis* and *Torulopsis apicola*), acetylated sphingosines (*Hansenula ciferri*) and hydroxylated C_{22} acids (from a *Torulopsis fujianensis*-like organism). The literature concerning these compounds is reviewed.

CHROMATOGRAPHIC REFINING OF COTTONSEED OIL. S. N. Mahapatra and B. H. Iyer (Dept. Org. Chem., Ind. Inst. of Sci.,

Bangalore, India). *Indian Oil Soap J.* 32(11), 305–307 (1967). Crude cottonseed oil has been refined by column chromatography over alumina using carbon tetrachloride as a solvent.

Storage behavior of sesame seed, oil and cake. C. Narayana, M. R. Surendranath, T. Lakshminarayana, D. Ramachar and S. D. Thirmula Rao (Oil Tech. Res. Inst., Anantapur, India). *Indian Oil Soap J.* 32(11), 297–304 (1967). Sesame seed stored for over a year under normal conditions did not undergo spoilage. Crude sesame oil was very stable toward hydrolytic and oxidative rancidities. Bleached oil was next in stability, while refined sesame oil was least stable. Expeller sesame cake developed a high free fatty acid content after a few months of storage.

Analysis of the lipids extracted from some organs of two bovine twin foetus of different sexes. G. Cumont (Lab. of Lipochem of C.N.R.S., Thiais (Val-de-Marne, Fr.). *Rev. Franc. Corps Gras*, 14(8–9), 533–535 (1967). Lipids were extracted from the depot, liver and thymus fats of two bovine twin foetus of different sexes, about 21 weeks old. The depot fats are mainly palmitic and oleic with no acids higher than C-18 or polyunsaturated in notable amounts. The liver and thymus are rich in polyunsaturated acids higher than C-18, primarily C-20:4 and C-22:6.

Polar molecules and power of catalyzation. Polymerization of tung oil. R. Thomas (Inst. of Chem., Fac. of Sci., Besancon). *Oleagineau*, 22(11), 687–690 (1967). A polar molecule creates an electric field in its neighborhood capable of modifying the distribution of the electric charge cloud of other molecules. Thus activated, those molecules can sometimes react more quickly between themselves. Such a catalytic effect is demonstrated using tung oil. In every case there is a direct, but not linear relationship between the dipole moment of the catalyzer and the reaction velocity. There is an optimum concentration strength and quantity of catalyzer required.

Influence of heating on physiological effects of some dietary fats. P. Ramel, M. T. Lanteaume, A. M. LeClerc and J. Rannaud. *Rev. Franc. Corps Gras* 14(8–9), 505–514 (1967). Homogeneous groups of Wistar male and female rats have been fed from their weaning with a standard dry diet containing 5% balanced fat supplemented with up to 20% of oils (corn germ, grape seed, peanut or hydrogenated palm oil). The oils were either fresh or damaged by heating at 200C for 8 days in the presence of air. The study is to proceed through 3 successive generations of rats. This report is concerned with the first generation. The rats studied were paired after 9 months and sacrificed when 12 months old. The growth, digestive utilization of the fats, circulating lipids, depot fats, and macroscopic or histological appearance of the main organs were investigated. The growth and digestive utilization are slightly affected by the heated fats. Biochemical examinations showed no derangement in metabolism and the physiological condition of the rat remained satisfactory. No spontaneous death has been noted and no histological injury has been detected.

Composition of the fatty acids of rapeseed oil as a function of variety, region, time of planting and harvest. F. Dembinski *et al. Pam. Pulawski* 25, 5–23 (1967). Five varieties of Polish and 3 varieties of German rapeseed were examined. It was found that the oils differ substantially in the percentage of oleic and linoleic acids, notably a function of variety. The harvest time does not influence the fatty acid composition of the oils. The time of planting does not influence the amount of C18:1 and C18:3 and C22:1, but does influence somewhat the amounts of C18:2 and C20:1. (Rev. Franc. Corps Gras).

Rheology of fats and oils. M. Rac. *Bilten biljna ulja masti* 4(1), 41–53 (1967). The fundamental concepts of viscosity and plasticity are explained. (Rev. Franc. Corps Gras).

Modification of lard during long term storage at refrigerator temperatures. S. Klein *et al. Prum. Potrav.* 18(7), 332–333 (1967). After 4-5 months' storage of refrigerator temperature, lard shows signs of oxidative rancidity. This alteration is observed irrespective of the initial quality of the lard. If, after 9 days of Schaal Oven test, the peroxide value is above 2, rapid development of rancidity can be expected. (Rev. Franc. Corps Gras).

Studies of the effect of steroids upon the odor reversion of soybean oil. H. Niewiadomski *et al. Rocs. Techn. Chem. Zynn.* 13, 23–40 (1967). Soy bean oil has been oxidized after the addition of beta-sitosterol, 7-hydroxy-beta-sitosterol, the acetate of 7-hydroxy-beta-sitosterol and with a mixture of beta-sitosterol and the acetate of 7-hydroxy-beta-sitosterol. It has been observed that these steroids influence the rate of autoxidation of soy bean oil. The oxidation process of the methyl esters of the fatty acids is described. During the oxidation caused by beta-sitosterol at 30C, the use of organoleptic tests has been very successful. The object of these tests has been to establish a correlation between the odor and the degree of oxidative transformation caused by beta-sitosterol. On the basis of the results obtained, it can be stated that modification of the fatty acids of the oils was not observed by any conventional method of analysis. (Rev. Franc. Corps Gras).

Characteristics and value of the fluid bed dryer SFZ-10 based upon drying studies of rapeseed. M. Kubicki. *Prace. Instytutow* **17**(1), 123–130 (1967). A progress report is given of the work done in Poland on the adaptation of fluid bed drying to the drying of oil seeds. The genesis of the prototype dryer SFZ-10 is presented. This dryer was used to determine the techniques and functional advantages of fluid bed drying as applied to oil seeds. The practical application of fluid bed drying has been established. Further work will center around design of a commercial dryer. (Rev. Franc. Corps Gras).

Modifications of fats and oils during heating. C. Barnu *et al. Tluszsze jad.* **11**(2), 57–69 (1967). The thermal oxidation of fats and oils gives rise to the formation of hydroperoxides and peroxides, which decompose to aldehydes and other products containing free carbonyl groups, and finally to polymers. Oxidation is especially intensive at 180C. Modification of fats and oils is manifested by changes in density, viscosity, acid value, iodine value, peroxide value and index of refraction. (Rev. Franc. Corps Gras).

Tocopherols and beta sitosterol in walnut oil. V. I. Dorodneva *et al., Piscev. Technol.* **5**(60), 101–104 (1967). Using preparative thin-layer chromatography, it is possible to separate the tocopherols from walnut oil. The quantitative relationship between the various tocopherols was determined through the use of GLC and spectrophotometry. The relation between the isomers is 50% alpha, 10% gamma and 40% delta. The amount of beta sitosterol, quantitatively identified by GLC and TLC is 0.5% of the oil. (Rev. Franc. Corps Gras).

Influence of the nature of the surface of the adsorbant upon the adsorption of pigments from soya bean oil. N. K. Nadirov. *Piscev. Technol.* **4**(59), 63–66 (1968). The nature of the surface of adsorptive materials constitutes an important factor in the adsorbing capacity of the adsorbant. With regard to the coloring pigments in soya bean oil, the highest capacity is demonstrated by an adsorbant having within the adsorbing complex, cations of hydrogen and of aluminum. (Rev. Franc. Crops Gras).

• Fatty Acid Derivatives

Topping composition. B. A. Patterson. *U.S. 3,353,965.* A high fat emulsion composition capable of being whipped into a rigid foam and of being thawed from below the freezing point without breaking the emulsion comprises a thoroughly blended mixture of an edible vegetable triglyceride fat, a proteinaceous bodying agent, invert sugar, a non-toxic nonionic emulsifying agent and stearyl monoglyceridyl citrate in an amount sufficient to stabilize the emulsion.

Lithium soap greases containing a rust inhibitor. W. P. Scott (Continental Oil Co.). *U.S. 3,355,384.* A lithium base lubricating grease is claimed, comprising a liquid lubricating oil and a grease-forming amount of a lithium fatty acid soap and containing a rust-inhibiting amount of 0.5–5.0% by wt of lead naphthenate and 0.5–5.0% by wt of a petroleum oxidation product obtained by controlled partial oxidation of petroleum hydrocarbons and containing 23–40% by wt saturated aliphatic carboxylic acids, 7–50% by wt neutral lactones and esters and 24–40% by wt unsaponifiable aliphatic compounds.

Diester plasticizers from mixed crambe dibasic acids. H. J. Nieschlag, W. H. Tallent, I. A. Wolff (Northern Reg. Res. Lab., Peoria, Ill. 61604), W. E. Palm and L. P. Witnauer. *Ind. Eng. Chem. Prod. Res. Develop.* **6**(4), 201–4 (1967). Twelve diesters were prepared from mixed dibasic acids and individual alcohols having from four to 10 carbon atoms. The diesters were evaluated as plasticizers for poly(vinyl chloride). The mixed dibasic acids, predominantly brassylic and azelaic, were obtained by ozonolysis of unsaturated fatty acids from crambe, a high-erucic acid oilseed. Monobasic acids produced by ozonolysis were easily removed by distillation. Use of the mixture of dibasic acids to make the "azela-brassylate" plasticizers requires neither isolation of individual fatty acids before ozonolysis nor separation of dibasic acids afterwards. All the azela-brassylates with six or fewer carbon atoms in the alcohol moiety were compatible; all compatible plasticizers, except for the dicyclohexyl ester, contributed excellent low-temperature flexibility to poly(vinyl chloride). Bis(2-methylpentyl) azela-brassylate had much better light stability than the bis-2-ethylhexyl) sebacate control and compared favorably in all other properties with this commercial, low-temperature plasticizer.

Polymerization of unsaturated fatty acids. II. Catalytic polymerization of linoleic acid and its methyl ester in the presence of thionyl chloride. Keizo Tanabe and Tetsutaro Hashimoto (Gov. Chem. Ind. Research Inst., Tokyo). *Yukagaku* **16**, 611–617 (1967). Polymerization of linoleic acid and its methyl ester was carried out in the presence of thionyl chloride under various conditions. The methyl ester yielded 75% of polymer with 0.5% catalyst for 20 hours at 300C. The dimer separated from molecular distillation was dehydrogenated and analysis of the dehydrogenated dimer was indicated that the polymerization involved mainly the Diels-Alder reaction.

• Biochemistry and Nutrition

Hydrolysis of phospholipids by a lysosomal enzyme. A. Mellors and A. L. Tappel (Dept. Food Sci. and Tech., Univ. of Calif., Davis, Calif.). *J. Lipid Res.* **8**, 479–85 (1967). The phospholipid-hydrolyzing activity of rat liver lysosomes has been studied. These lysosomes contain a phospholipase that cleaves both fatty acid ester linkages of lecithin and of phosphatidyl ethanolamine and releases free fatty acids from both positional isomers of lysolecithin. The enzyme does not require calcium for maximum activity, and is inhibited by diethyl ether and sodium deoxycholate. Mercuric ions and cetyltrimethyl ammonium bromide also inhibit the hydrolysis. Compared with lipase activity, this enzyme is relatively stable to heat. The specific activity of the hydrolyates of lecithin by the lysosomal enzyme is considerably higher than those reported for mitochondrial and microsomal phospholipases. The enzyme resembles other hydrolases of the lysosome in that it has an acid pH optimum (pH 4.5). This enzymic activity is present in both the lysosomal soluble enzyme fraction and in the lysosomal membrane fraction. The enzyme may participate in the intracellular digestion of mitochondria that is carried out by the intact lysosome *in vivo.* Localized inflammation and changes in vascular permeability following tissue damage could be catalyzed by this phospholipase.

Amino acid composition of the proteins from chylomicrons and human serum lipoproteins. R. S. Levy, Ann Lynch, Elizabeth McGee and J. W. Mehl (Dept. Biochem., Univ. of

Louisville School Med., Louisville, Kentucky and Dept. Biochem., Univ. of S. Calif. School Med., Los Angeles, Calif.). *J. Lipid Res.* 8, 463–72 (1967). By a combination of polyanion precipitation and ultracentrifugation, chylomicrons, very low density, low density and high density lipoproteins have been isolated from human serum as discrete classes free from contamination with any other major class of lipoprotein or protein. After removal of the lipid, the proteins from each class were hydrolyzed and their amino acid compositions were determined by use of the amino acid analyzer. Application of the "t" test to the concentrations of amino acid residues showed that the amino acid composition of the proteins from each of these lipoprotein classes differs significantly from class to class. However, when the logarithms of the moles of amino acid residues are plotted, there are similarities in the amino acid "profiles" between the chylomicrons and high density lipoproteins on the one hand, and between the very low density and low density lipoproteins on the other. The differences in amino acid composition between the lipoproteins suggest that any metabolic interconversions between them probably do not occur by simple lipolysis.

COMPARISON OF OXIDATIVE METABOLISM IN STARVED, FAT-FED AND CARBOHYDRATE-FED RATS. P. A. Mayes and J. M. Felts (Univ. of Cal. School of Med., San Francisco). *Biochem. J.* 103, 400–6 (1967). Rats were starved for 48 hr or fed for 1 week on a high-fat or a high-carbohydrate diet. The effects of these dietary changes on the rate of production of $^{14}CO_2$ from trace amounts of glucose-U-^{14}C, palmitate-1-^{14}C or acetate-1-^{14}C administered intravenously were studied. The oxidation of glucose-^{14}C was most rapid in the carbohydrate-fed condition and was decreased significantly and to the same extent after starvation and after feeding with fat. Under all dietary regimes studied the maximum rate of elimination of $^{14}CO_2$ from palmitate-^{14}C occurred within a few minutes after injection, but considerably more was oxidized after starvation and feeding with fat than after feeding with carbohydrate. Alterations in the diet had no effect on the oxidation and high recovery of administered acetate-^{14}C as $^{14}CO_2$. In all studies a marked similarity in oxidative pattern was noted between the starved and the fat-fed rat.

THE EFFECT OF FATTY ACID STRUCTURE ON UTILIZATION BY EHRLICH ASCITES TUMOR CELLS. A. A. Spector and D. Steinberg (Lab. of Metabolism, Nat. Heart Inst., NIH, Bethesda, Md.). *Cancer Res.* 27, 1587–94 (1967). The effect of fatty acid structure on utilization by Ehrlich ascites tumor cells was studied *in vitro*. Unesterified palmitate, stearate, oleate and linoleate were metabolized in a qualitatively similar fashion and at roughly comparable rates. Each of these fatty acids was rapidly taken up by the cells in unesterified form. The rates of oxidation and esterification were related to the fatty acid-albumin molar ratio in the medium and, thus, to the steady-state concentration of free fatty acid associated with the cells. Radioactive linoleate was oxidized at a somewhat greater rate than the other long-chain free fatty acids. Radioactive palmitate contained in biologically labeled rat chylomicrons was utilized very slowly relative to unesterified palmitate. These observations support the hypothesis that exogenously supplied free fatty acid is a major source of fat for this tumor cell.

EFFECT OF HIGH TEMPERATURE AND DIETARY FAT ON PERFORMANCE OF LACTATING COWS. E. G. Moody (Arizona State Univ., Tempe) and P. J. Van Soest, R. E. McDowell, and G. L. Ford. *J. Dairy Sci.* 50, 1909–16 (1967). Two Latin squares balanced for carry-on effects were used for evaluation of productive performance of 12 Holstein cows fed high levels of fat under various environmental temperatures: cool 15–24C and hot 32.2C, 60% relative humidity. The cows were fed 1.25 kg alfalfa-grass hay per 100 kg body weight and one of three concentrates: control (without added lipids), oil (10% soybean oil), or fat (10% hydrogenated vegetable fat, iodine value 48) replacing corn on a weight basis. Elevated temperature resulted in a marked depression in yield of milk and milk fat, SNF, and protein, of body weight, feed intake, rumen VFA, acetic:propionic ratio, and gross efficiency; water intake and rectal temperature increased. Significant ration effects were observed only in the case of FCM production, where the oil-fed cows excelled. Environmental effects were independent of ration effects, except in water intake, rumen total VFA and acetic acid levels, where interactions were noted. Significant period effects from repeated exposures to heat stress were noted only in FCM yield, water consumption, and rumen propionate. The drastic environmental stress imposed in this study served to mask many of the anticipated ration effects.

A REQUIREMENT FOR PHOSPHOLIPIDS BY THE MICROSOMAL REDUCED DIPHOSPHOPYRIDINE NUCLEOTIDE-CYTOCHROME C REDUCTASE. P. D. Jones and S. J. Wakil (Dept. of Biochem., Duke Univ. Med. Center, Durham, N. Carolina). *J. Biol. Chem.* 242(22), 5267–73 (1967). Evidence has been presented to show that the DPNH-cytochrome c reductase, but not the TPNH-cytochrome c reductase, activity of microsomes requires phospholipids. Two different phospholipids, phosphatidylcholine and lysophosphatidylcholine, when solubilized together, completely restore the DPNH-cytochrome c reductase activity to acetone-extracted microsomes. Micelles containing 40 to 70% (by weight) of phosphatidylcholine, when added to acetone-extracted microsomes, stimulate the DPNH-cytochrome c reductase activity to levels 4 times higher than that of the original microsomes. Micelles formed from the synthetic phospholipid, γ-oleyl-β-butyrylphosphatidylcholine, are also able to restore the DPNH-cytochrome c reductase activity to acetone-extracted microsomes, presumably because this phospholipid forms micelles having physicochemical characteristics the same as, or closely related to, those produced by mixtures of phosphatidylcholine and lysophosphatidylcholine. When ferricyanide was used as the electron acceptor, no such lipid requirement could be demonstrated, indicating that lipids may be required for the transfer of electrons in the region beyond the flavoprotein of the DPNH-cytochrome c reductase system of intact microsomes.

STORAGE OF FREE HIGHER FATTY ACIDS IN THE ROOT BARK OF IXORA COCCINEA (LINN.). A. R. S. Kartha (Ind. Agr. Research Inst., New Delhi, India). *Chem. Ind. (London)* **1967**, 830. The presence of large amounts (50–65%) of free higher fatty acids in the light petroleum extract of the root bark of *Ixora Coccinea* (Linn.) has been demonstrated. The acids consist predominantly of conjugated diethenoid acids with a small amount of conjugated triethenoid acids. It is concluded that vegetable fat depots are capable of storing free fatty acids without conversion into neutral forms such as triglycerides or wax esters, although the circumstances favoring such storage are not yet understood.

FATTY ACID SYNTHESIS IN ESCHERICHIA COLI. V. A. Knivett and J. Cullen (Twyford Laboratory, London, England). *Biochem. J.* 103, 299–306 (1967). Fatty acid formation by cells of a strain of *Escherichia coli* was studied in the exponential, post-exponential and stationary phases of growth. During the exponential phase of growth, the metabolic quotient for each fatty acid in the extractable lipid was constant. The newly synthesized fatty acid mixtures produced during this phase contained hexadecanoic acid (41%), hexadecenoic acid (31%), octadecenoic acid (21%) and the C_{17}-cyclopropane acid (4%). As the proportion of newly synthesized material increased, changes in the fatty acid composition of the cells during this period were towards this constant composition. Abrupt changes in fatty acid synthesis occurred when the exponential growth ceased. In media in which glycerol, SO_4^{2-} or Mg^{2+} were growth-limiting, there was a small accumulation of C_{17}-cyclopropane acid in cells growing in the post-exponential phase of growth. Where either NH_4^+ or PO_4^{3-} was growth-limiting and there were adequate supplies of glycerol, Mg^{2+} and SO_4^{2-}, there was a marked accumulation of C_{17}-cyclopropane and C_{19}-cyclopropane acid appeared. A mixture of glycerol, Mg^{2+} and SO_4^{2-} stimulated cyclopropane acid formation in resting cells.

THE EFFECT ON SOME ENZYMES OF RAT TISSUE OF DIETS LOW IN FAT CONTENT. W. Bartley, B. Dean, C. B. Taylor and E. Bailey (Univ. of Sheffield, England). *Biochem. J.* 103, 550–5 (1967). Rats of two strains were kept on three different diets; one was a commercial diet of rat pellets, one contained 80% sucrose and 20% casein and was supplemented with corn oil, and the third was a similar diet without the corn oil. On the commercial diet, the specific activities of pyruvate kinase, glucose 6-phosphate dehydrogenase and fructose 1,6-diphosphatase in the livers of one strain of rats (strain A) were 1.5–3 times those in the other strain (strain B). With the diet supplemented by corn oil, there were large increases in the specific activity of pyruvate kinase, glucose 6-phosphate dehydrogenase and fructose 1,6-diphosphatase in the livers of strain A rats, while in the strain B rats the increases were much smaller. Omission of corn oil from the diet caused a threefold increase in the specific activity of glucose 6-phosphate dehydrogenase in strain B rats, but had little effect on other enzymes. In strain A rats, the specific activity of pyruvate kinase in the heart more than doubled with the high sucrose-corn oil diet and increased threefold when corn oil was omitted. No changes were seen in strain B rats. In strain A rats, omission of corn oil from the diet increased the ability of the kidneys to synthesize glucose from lactate. In strain B rats, addition of corn oil to the diet resulted in a decrease in the liver in the specific activity of ATP citrate lipase and in the ability to incorporate acetate into lipid.

Process for preparing nut butter from soybeans. M. J. Pichel and T. J. Weiss (Swift & Co.). *U.S. 3,346,390.* A process for preparing a soy spread of improved flavor, color and consistency from soybeans comprises: moisturizing dehulled soybeans up to a moisture content of 5–50%, promptly contacting the soybeans with hot edible oil at a temperature sufficient to volatilize the water present, adjusting the fat content of the soybeans to about 35–60% by adding an edible oil, and reducing the particle size of the soybeans until at least 97.5% of the fat-free solids passes through a 200-mesh screen.

Absorption and metabolism of dietary triglycerides in germfree and conventional rats. N. L. Wiech, J. G. Hamilton and O. N. Miller (Dept. of Biochem. and the Nutr.-Metabolism Unit, Dept. of Med., Tulane Univ. School of Med., New Orleans, Louisiana). *J. Nutr.* 93, 324–30 (1967). Although it is well-known that the physiology, morphology and biochemistry of the germfree animal differs in many respects from its conventionally reared counterpart, these studies were initiated to investigate the effect of the absence of the intestinal microflora on the absorption and metabolism of triglycerides derived from dietary corn oil. Germfree and conventional male rats were trained to consume a semipurified diet within a 1.5-hour period daily. Fasting plasma triglycerides were elevated significantly in the germfree animals. Analysis of the fatty acid composition of the fasting plasma triglycerides showed a higher percentage of linoleic acid in the germfree group. Postprandial plasma triglyceride analysis indicated a faster rate of clearance of the absorbed triglyceride by the germfree rat but did not indicate any apparent difference in the rate of absorption of the dietary triglyceride. Fasting plasma glucose levels were found to be elevated in the germfree animals. Glucose tolerance tests showed that the germfree rats clear glucose from the plasma more slowly than conventional rats. Immunoassay of plasma insulin obtained during the glucose tolerance testing indicated a delayed and decreased insulin secretion by the germfree rats.

Studies on the mechanism of estrogen biosynthesis. III. The stereochemistry of aromatization of C_{19} and C_{18} Steroids. J. D. Townsley and H. J. Brodie (Worcester Foundation for Exptl. Biology, Shrewsbury, Mass. 01545). *Biochemistry* 7, 33–9 (1968). To elucidate the mechanism for oxidative attack in ring A resulting in the production of estrogens, the stereochemistry and cofactor requirements for aromatization of estr-4-ene-3,17-dione were determined and compared with the aromatization characteristics of androst-4-ene-3,17-dione. Results suggest that C_{18} and C_{19} steroids are converted to estrogens in a similar way with regard to desaturation in ring A. Possible mechanisms are discussed. Using washed placental microsomes suspended in 0.05 M phosphate buffer at pH 7.2, 5mM EDTA stimulated the conversion of 19-norsteroid to estrone and 1β-hydroxyestr-3-3ne-3,17-dione by 50%.

The importance of free fatty acid in tumor nutrition. A. A. Spector (Lab. of Metabolism, National Heart Inst., NIH, Bethesda, Maryland 20014). *Cancer Res.* 27, 1580–6 (1967). Free fatty acid was found in the ascites fluid of the Ehrlich ascites tumor, about 3% of the total fatty acid contained in the fluid being in unesterified form. The major components of the ascites free fatty acid fraction—palmitate, stearate, oleate, and linoleate—were also the main species of fatty acid contained in the tumor cells. Tracer experiments with palmitate and oleate indicated that from 40 to 50% of the free fatty acid flux in the ascites fluid resulted from uptake by the tumor cells. Most of the free fatty acid taken up by the cells was incorporated into lipid esters. In contrast, less than 1% of the glucose radioactivity administered intraperitoneally was recovered from tumor cell lipid, and 94% of that incorporated into lipid was in water-soluble material following saponification. A small fraction of the radioactive free fatty acid taken up was converted to water-soluble components of the cells. Estimates of the rate of utilization of the free fatty acid contained in the ascites fluid were made using palmitate as the isotopic tracer. Although large variations were noted, the values calculated for the free fatty acid turnover rate indicate that this substrate can provide a large fraction of the fatty acid required by these tumor cells *in vivo.* It is suggested that much of the fatty acid required by the Ehrlich ascites tumor cell is supplied preformed by the host and that most of this is circulated to the tumor as free fatty acid.

Age and genetic effects on pH changes in adipose tissue. J. D. Sink (Dept. of Animal Sci., The Pennsylvania State Univ., Univ. Park, Pa. 16802). *J. Agr. Food Chem.* 15, 778–80 (1968). Age and genetic (animal breed) effects on changes in adipose tissue (panniculus adiposus) pH and hydrogen ion concentration were studied. Initial (0-hour) pH were shown to increase ($P < 0.01$) with age in both the outer and inner layers of the panniculus adiposus. The reverse trend with age was noted for 4-hour and ultimate (24-hour) pH values. The genetic effect on pH changes in adipose tissues was demonstrated, particularly in older animals. Increasing animal age also resulted in greater pH and hydrogen ion concentration changes between initial (0-hour) and ultimate (24-hour) measurements in both layers of the panniculus adiposus. Only in the older (225-day) animals did animal breed affect these changes.

Long-term rat feeding study with used frying fats. G. A. Nolen, J. C. Alexander and N. R. Artman (The Procter & Gamble Co., Miami Valley Labs., Cincinnati, Ohio). *J. Nutr.* 93, 337–48 (1967). Partially hydrogenated soybean oils, cottonseed oil, and lard were used for frying under practical restaurant-type frying conditions until they became unfit for further use owing to excessive foaming during frying. The used fats were fed to groups of 50 male and 50 female rats as 15% of the diet for 2 years. The used fats were slightly less absorbable than unheated control fats, and gave correspondingly slower growth rates. Distillable non-urea-adductable fractions concentrated from the used fats proved somewhat toxic when large doses of them were administered by stomach tube to weanling rats.

Conversion of glucose to lipids by normal and leukemic leukocytes. C. J. Miras, N. J. Legakis and G. M. Levis (Dept. of Clinical Therapeutics, School of Med., Univ. of Athens, Vas. Sofias and K. Lourou Streets, Athens 611, Greece). *Cancer Res.* 27(11), 2153–58 (1967). The lipids of normal leukocytes and of leukocytes from chronic myelocytic leukemia (CML), acute leukemia (AL), and chronic lymphocytic leukemia (CLL), labeled *in vitro* from glucose-U-^{14}C (uniformly labeled with ^{14}C) were analyzed by mild alkaline hydrolysis, column chromatography on Florisil, thin-layer chromatography and autoradiography. Most of the incorporated glucose carbon in both normal and leukemic leukocyte lipids was found in the glycerol moiety of the glycerides. The sphingoglycolipid fraction was labeled with intact hexose, and the fatty acids also contained a low portion of the total radioactivity. The initial rate of incorporation into the total lipids of normal leukocytes was higher than in leukemic leukocytes, whereas the incorporation in the latter was of a longer duration. Thus, after a six-hour incubation, the incorporation into the CML and AL leukocytes was, respectively, two and three times higher than that into the normal leukocytes. Normal leukocytes and leukocytes from AL produced carbon dioxide constantly for 6 hours while leukocytes from CML and CLL produced carbon dioxide for shorter times. The percentage of the total lipid radioactivity incorporated into triglycerides by normal leukocytes was higher than that incorporated by leukemic leukocytes. The sphingoglycolipid fraction of leukemic leukocytes was found to contain a 10 times higher radioactivity than that of the sphingoglycolipids of normal leukocytes. The presence of galactose in the incubation medium produced a small dilution effect on the incorporation of glucose-U-^{14}C into the lipids of normal leukocytes, whereas in most of the leukemic cases examined it produced a marked decrease of incorporation of glucose-U-^{14}C into sphingoglycolipids.

Sarcoplasmic reticulum. III. The role of phospholipids in the adenosine triphosphatase activity and Ca^{++} transport. A. Martonosi, J. Donley and R. A. Halpin (Dept. of Biochem., St. Louis Univ., St. Louis, Missouri 63104). *J. Biol. Chem.* 243, 61–70 (1968). Treatment of skeletal muscle microsomes with phospholipase C inhibits the adenosine triphosphatase activity and calcium transport, parallel with the selective hydrolysis of membrane lecithin. The ATPase activity of phospholipase C-treated microsomes is reactivated by synthetic lecithin, lysolecithin, phosphatidic acid, and nonionic and anionic detergents. The reactivation of the calcium transport of phospholipase C-treated microsomes requires lecithin, lysolecithin, or phosphatidic acid. Detergents are ineffective. The activating effect of phospholipids on the ATPase activity and calcium transport is accompanied by tight binding of phospholipids to the microsomal membrane.

Effect of unsaturated fatty acid supplements upon mortality and clotting parameters in rats fed thrombogenic diets. H. J. Knauss and A. L. Sheffner (Mead Johnson Res. Center, Evansville, Indiana). *J. Nutr.* **93**, 393–400 (1967). The adhesiveness property of blood platelets has been implicated in the development of thrombosis; therefore platelet adhesiveness and other clotting parameters were studied in rats receiving the Thomas-Hartroft diet as such and as modified by supplementation with unsaturated fatty acids. The mortality of rats receiving the Thomas-Hartroft diet was reduced by supplementation of the diet with concentrates of linolenic, linoleic or oleic acid. However, the decreased platelet adhesiveness could be prevented by linolenic or linoleic acid, but not by oleic acid; thrombocytopenia was prevented by supplementation of the diet with linolenic acid, but linoleic and oleic acids afforded only partial protection; the decrease in thromboplastin generation could be significantly reversed only by linoleic acid. Thus, although mortality could be reduced by all 3 unsaturated fatty acids, changes in the clotting parameters studied were not necessarily affected by these treatments; and therefore, it is unlikely that these clotting parameters are involved in either the increased mortality induced by these diets or its reversal.

Biohydrogenation of unsaturated fatty acids. III. Purification and properties of a linoleate Δ^{12}-cis, Δ^{11}-trans-isomerase from Butyrivibrio fibrisolvens. Carol R. Kepler, and S. B. Tove (Dept. of Biochem., North Carolina State Univ., Raleigh, N. C. 27607). *J. Biol. Chem.* **242**, 5686–92 (1967). Incubation of *Butyrivibrio fibrisolvens* with linoleic acid produced a conjugated dienoic acid which was identified as *cis*-9, *trans*-11-octadecadienoic acid. When linolenic acid ($\Delta^{9,12,15}$) was used as substrate, it also was isomerized to a conjugated acid which was tentatively identified as *cis*-9,-*trans*-11, *cis*-15-octadecatrienoic acid. Subsequent hydrogenation of this conjugated trienoic acid produced a non-conjugated *cis,trans*-dienoic acid but no monoenoic acid. Incubation of whole bacteria with linoleic acid in D_2O produced *cis*-9,*trans*-11-octadecadienoic acid which contained a single deuterium atom at C-13. A spectrophotometric assay was developed for the presence of linoleate Δ^{12}-*cis*, Δ^{11}-*trans*-isomerase, an enzyme localized in the cell envelope. The enzyme did not require the addition of nucleotide cofactors or the presence of a hydrogen atmosphere. The K_m for linoleic acid was 1.2×10^{-5}M, and for linolenic acid it was 2.3×10^{-5}M. The average equilibrium constant for the isomerization of linoleic acid was 61 when measured from the forward and reverse directions.

Phospholipids of Clostridium butyricum. III. Further studies on the origin of the aldehyde chains of plasmalogens. P. O. Hagen and H. Goldfine (Dept. of Bacteriol. and Immunol. Harvard Med. School, Boston, Mass. 02115). *J. Biol. Chem.* **242**, 5700–8 (1967). The phosphatide plasmalogens of *Clostridium butyricum*, mainly ethanolamine and N-methylethanolamine plasmalogens, have been catalytically reduced and the resulting saturated glycerol ethers isolated as diacetate derivatives. Nuclear magnetic resonance spectra showed that the linkage of the ether chain was 1(3)-glycerol. Hydrolysis of the diacetates followed by periodate oxidation yielded close to an equivalent amount of formaldehyde, in confirmation of the 1(3)-linkage. The aldehyde chains released from the phosphatide plasmalogens were analyzed by gas-liquid chromatography and shown to be similar in composition to the published composition of the 1-linked fatty acids of phosphatidyl-ethanolamine from the same organism.

In vitro metabolism of testosterone-4-^{14}C and Δ^4 androstene-3,17-dione-4-^{14}C in human skin. E. C. Gomez and S. L. Hsia (Depts. of Dermatol. and Biochem., Univ. of Miami School of Med., Miami, Florida). *Biochemistry* **7**, 24–32 (1968). Testosterone-4-^{14}C was incubated with specimens of human skin. Metabolites were separated by paper chromatography and thin-layer chromatography. Androstenedione, 5α-dihydrotestosterone, 5α-androstanedione, androsterone, and epiandrosterone were identified as metabolites. The metabolites were identified by reverse isotopic dilution and the preparation of derivatives (formation of acetates or reduction with $NaBH_4$). Incubation of androstenedione-4-^{4}C with human skin produced metabolites with similar chromatographic mobilities, and the formation of testosterone was established by reverse isotopic dilution. No radioactive etiocholanolone or etiocholanedione could be detected among the metabolites.

The metabolism of bile acids in the developing rat liver. H. Danielsson and W. J. Rutter (Dept. of Biochem., Univ. of Washington, School of Med., Seattle, Wash. 98105). *Biochemistry* **7**, 346–52 (1968). The metabolism of cholic acid, deoxycholic acid, 5β-cholestane-3α,7α-12α-triol, and 7α-hydroxycholest-4-en-3-one was studied in homogenates of liver from rat embryos and suckling rats. The specific activities of the enzymes concerned with conjugation of bile acids were found to increase 30-to 40-fold between 15 days after fertilization and 5 days after birth. A similar increase in activity was observed for the enzymes catalyzing the oxidation of 5β-cholestane-3α,7α,12α-triol and the 12α-hydroxylation of 7α-hydroxycholest-4-en-3-one. The results suggest that the activities of the enzymes concerned with the conversion of cholesterol to bile acids increase synchronously in the developing rat liver.

Biosynthesis of plasma lipoproteins by rat liver ribosomes. J. J. Bungenberg de Jong and J. B. Marsh (Depts. of Biochem., School of Dental Med. and School of Med., Univ. of Pa., Philadelphia, Pa. 19104). *J. Biol. Chem.* **243**, 192–9 (1968). Rat liver ribosomes *in vitro* incorporated labeled amino acids into proteins which showed the immunological behavior of the plasma lipoproteins. The presence of carrier lipoprotein or carrier lipid was required for the isolation and ultracentrifugal purification of immunologically reactive, labeled low and high density lipoproteins. The identity of the lipoproteins was further characterized by solubility criteria and a peptide-mapping technique. A high correlation between the peptide labeling patterns of ribosome-labeled and slice-labeled preparations was found. It is suggested that rat liver ribosomes *in vitro* are capable of synthesizing the protein moieties of the plasma lipoproteins. These apoproteins are then capable of binding lipid. Rat liver mitochondria and rat kidney ribosomes *in vitro* were also capable of incorporating radioactive amino acids into lipoproteins, but these proteins were immunologically different from the plasma lipoproteins.

Studies on coenzyme Q: The origin of the carbon methyl group and its point of attachment to the aromatic precursor. R. Bentley, C. M. Springer, V. G. Ramsey, G. Hossein Dialameh and R. E. Olson (Dept. of Biochem. and Nutr., Grad. Sch. of Public Health, Univ. of Pittsburgh, Pitts., Pa. 15213). *J. Biol. Chem.* **243**, 174–7 (1968). Radioactive samples of coenzyme Q were obtained after administration of formate-^{14}C and benzoate-1-^{14}C (i.e. ring labeled) to rats. After reductive acetylation the hydroquinone diacetates were treated with ozone to obtain 3′,6′-diacetoxy-4′,5′-dimethoxy-2′-methylphenylacetic acid. The latter acid was, in turn, degraded (a) to tetramethylammonium iodide by the Zeisel reaction, and (b) to acetic acid by the Kuhn-Roth oxidation. The results of these degradations established that formate labels the two $O–CH_3$ and the $C–CH_3$ groups of coenzyme Q. The ingoing $C–CH_3$ group does not displace the carboxyl group of the benzoate precursor of coenzyme Q.

Effect of processing method on oxidative off-flavors of soybean milk. W. F. Wilkens, L. R. Mattick and D. B. Hand (New York State Agr. Expt. Station, Dept. of Food Sci. and Tech., Cornell Univ., Geneva, New York 14456). *Food Technol.* 21(12), 86–9 (1967). A high temperature, rapid hydration grinding process for dehulled soybeans was found to inactivate the lipoxidase system which is the primary off-flavor potentiator and so produced a nearly bland soymilk. Gas chromatography was utilized for profile comparison analysis to determine the effect of processing method on flavor development. An acceptable bland milk was produced by grinding unsoaked, dehulled soybeans with water at temperatures between 80 and 100C and maintaining the temperature for 10 min to completely inactivate the lipoxidase enzyme. Lower temperatures in the range of 60–80C can be used, if sufficient antioxidants are added to the water. The maximum yield of soymilk solids is obtained when the extraction temperature is 60C. The contribution of non-enzymic fat oxidation to off-flavor under these conditions was insignificant.

Glyceryl ether synthesis from long chain alcohols in elasmobranch stomach. S. J. Friedberg and R. C. Greene (Dept. of Med. and Biochem. of the Duke Univ. Med. Center, Durham, North Carolina 27706). *J. Biol. Chem.* **242**, 5709–14 (1967). The isolated stomachs of the dogfish, *Squalus acanthias*, and the skate, *Raja erinacea*, were found to incorporate long chain alcohols and acetate, but not long chain fatty acids, into glyceryl ethers. The criterion for evalulation of incorporation of radioactive substrates into glyceryl ethers was the measurement of activity of individual isopropylidene derivatives separated by means of gas-liquid chromatography. A pathway for incorporation of long chain alcohols involving aldehydes and fatty acids as intermediates was ruled out by means of studies which utilized mixtures of cetyl alcohol-1-^{14}C and cetyl alcohol-1-^{3}H. An unexpected finding was a relatively greater enrichment in tritium as compared with ^{14}C in the process of glyceryl ether synthesis from mixtures of cetyl alcohol-1-^{3}H and cetyl alcohol-1-^{14}C.

AOCS COMMITTEE MEETINGS

AOCS Headquarters Office
Chevy Chase Room, Lobby Level

SATURDAY, MARCH 30

3:00 P.M.	Biochemical Methods—Dupont Room

SUNDAY, MARCH 31

9:00 A.M.	Lipids Advisory & Editorial Board—Edison Room
10:00 A.M.	Governing Board—Dupont Room
10:00 A.M.	Examination Board—Farragut Room
2:00 P.M.	Blood Lipids Determination—Edison Room

MONDAY, APRIL 1

1:00 P.M.	Awards Committee—Dupont Room
1:00 P.M.	Membership—Edison Room
1:00 P.M.	Drying Oils—Farragut Room
2:00 P.M.	Advertising, Journal & Lipids—Edison Room
2:00 P.M.	Instrumental Techniques—Farragut Room
2:00 P.M.	Honored Student Program—Grant Room
4:00 P.M.	Education—Edison Room
5:00 P.M.	International Relations—Dupont Room

TUESDAY, APRIL 2

8:00 A.M.	Spectroscopy—Dupont Room
9:00 A.M.	Dibasic Acid—Edison Room
10:00 A.M.	Hydrogenated Oils—Dupont Room
10:00 A.M.	Feed Grade Fats—Edison Room
10:00 A.M.	Technical Safety and Engineering—Farragut Room
11:00 A.M.	Polymerized Acids—Edison Room
2:00 P.M.	Aflatoxin—Banfroft Room
3:00 P.M.	Seed and Meal Analysis—Dupont Room
3:00 P.M.	National Meeting, Program & Planning—Edison Room

WEDNESDAY, APRIL 3

8:00 A.M.	Journal—Dupont Room
9:00 A.M.	Standards—Edison Room
9:00 A.M.	Antioxidants—Farragut Room
9:00 A.M.	Neutral Oil Loss—Grant Room
9:00 A.M.	AOCS-ASTM (D12-T5, TG-5)—Hamilton Room
10:00 A.M.	Smalley Check Sample—Dupont Room
10:00 A.M.	Fatty Nitrogen—Farragut Room
10:00 A.M.	Gossypol Analysis—Grant Room
11:00 A.M.	Safflower Seed Analysis—Farragut Room
1:00 P.M.	Cellulose Yield—Dupont Room
1:00 P.M.	Communications—Edison Room
1:00 P.M.	Uniform Methods—Farragut Room
1:00 P.M.	AOCS-ASTM (D12-T5, TG-5)—Hamilton Room
2:00 P.M.	Bleaching Methods—Edison Room
3:00 P.M.	Governing Board—Dupont Room
3:00 P.M.	AOAC-AOCS Aflatoxin—Edison Room

AACC Headquarters Office
Adams Room, Lobby Level

SATURDAY, MARCH 30

6:00 P.M.	Board of Directors—Bancroft Room

SUNDAY, MARCH 31

2:00 P.M.	Board of Editors—Bancroft Room
4:00 P.M.	Technical Policy Committee—Hamilton Room
4:00 P.M.	Program Advisory Committee—Independence Room

MONDAY, APRIL 1

4:00 P.M.	Chemical Leavening Agents—Farragut Room
4:00 P.M.	Flour Particle Size—Farragut Room
4:00 P.M.	Enzyme Assay—Grant Room
4:00 P.M.	Falling Number/Subcommitte of Quality Tests—Hamilton Room
4:00 P.M.	Sanitation Methods—Independence Room
4:00 P.M.	Test Baking—Jackson Room
4:00 P.M.	Vitamin Analysis—Kalorama Room
5:00 P.M.	Monitoring Radioactivity in Cereal Products—Farragut Room
5:00 P.M.	Experimental Milling—Hamilton Room
5:00 P.M.	Oxidizing and Bleaching Agents—Jackson Room

TUESDAY, APRIL 2

3:00 P.M.	Advisory Council—Military Room
4:00 P.M.	Cookie Flour—Farragut Room
4:00 P.M.	Edible Fats and Oils—Grant Room
4:00 P.M.	Macaroni Products Analysis—Hamilton Room
4:00 P.M.	Pesticide Residues—Independence Room
4:00 P.M.	Physical Testing Methods—Jackson Room
4:00 P.M.	Udy Protein/Subcommittee of Quality Tests—Kalorama Room
5:00 P.M.	Bread Flavor—Grant Room
5:00 P.M.	Micro-organisms in Cereal Products—Hamilton Room
5:00 P.M.	Oilseeds Analysis Methods of the Oilseeds Division—Independence Room
5:00 P.M.	Proximate Analysis—Kalorama Room

WEDNESDAY, APRIL 3

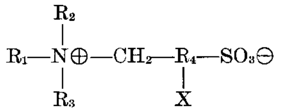
12:00 Noon	Board of Directors—Bancroft Room
4:00 P.M.	Technical Policy Committee—Hamilton Room

• Drying Oils and Paints

The direct determination of chemical solvents in coating materials by means of gas chromatography. R. J. Klepser (Napco Corp.). *Paint Technol.* 39(514), 663–671 (1967). The use of a packed column vapor phase chromatograph applied to the preliminary identification of chemical solvents directly in paint is described. Using a new technique, a pigmented paint without preliminary treatment is directly introduced into a gas-liquid chromatograph and the evolved solvents directly passed through the column where separation and analysis take place. Results of practical utility have been achieved. Standardization of the instrument is described. Data obtained on a number of diverse types of test paints indicate reliability and utility of the technique. The data are reported and discussed. The technique has been used to rectify production problems and to evaluate solvents in paints of unknown origin.

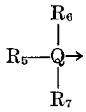
• Detergents

Detergent compositions. J. L. Almstead, H. R. Greeb and T. H. Ohren (Procter & Gamble Co.). *U.S. 3,351,557.* A built liquid detergent composition, in the form of a stable oil-in-water emulsion, consists essentially of: (1) 1–15% by wt of a non-ionic detergent having the formula $R(-OCH_2CHCH_3)_y$-$(-OCH_2CH_2)_zOH$, where R is a C_8-C_{18} alkyl radical or a C_9-C_{15} alkyl phenyl radical, y is an integer from 0 to 7 and z is an integer from 5 to 45; (2) 2–10% by wt of at least one of the following surfactants: a) a sultaine detergent having the formula



$$R_1-\overset{R_2}{\underset{R_3}{N^{\oplus}}}-CH_2-\underset{X}{R_4}-SO_3^{\ominus}$$

where R_1 is a C_{10}-C_{18} alkyl radical, R_2 and R_3 are either methyl or ethyl, R_4 is either a methylene, ethylene or propylene radical, and X is a hydroxyl group which is attached only to a secondary carbon atom; b) a detergent having the formula



$$R_5-\overset{R_6}{\underset{R_7}{Q}}\rightarrow O$$

where R_5 is a C_{10} to C_{24} alkyl or monohydroxyalkyl radical containing 0–3 ether linkages, R_6 and R_7 are selected from the group consisting of methyl, ethyl, hydroxyethyl, propyl and hydroxypropyl radicals, and Q is either a phosphorus or nitrogen atom; (3) 10–36% by wt of a builder selected from the group consisting of alkali metal pyrophosphates, potassium tripolyphosphate, alkali metal salts of nitrilotriacetic acid, EDTA or ethane-1-hydroxy-1,1-diphosphonic acid; (4) an emulsion stabilizer selected from the group consisting of ethylene/maleic anhydride copolymers and methyl-vinyl-ether/maleic anhydride copolymers, in an amount between 0.3 and 2.0% by wt; (5) the balance water, the pH of the composition being between 11.7 and 13.0.

Detergent composition containing organic phosphonate corrosion inhibitors. R. E. Zimmerer (Procter & Gamble Co.). *U.S. 3,351,558.* A detergent composition is claimed, consisting essentially of: (1) 1–98% of a detergency builder selected from the group consisting of amino polyacetates, tripolyphosphates and polyphosphonates; (2) 0.05 to 25% by wt of a corrosion inhibitor having the formula $R-PO(OQ)_2$, where R is selected from the group consisting of a straight alkyl chain with the phosphorus attached to secondary C atoms on the chain and C_9-C_{18} straight chain alkyl benzyl groups, and Q is a cation selected from the group consisting of hydrogen, alkali metal, mono-, di- and triethanolammonium; (3) 0–90% of other detergency builders such as alkali metal pyro-, ortho-, hexaphosphates, sesqui- and bicarbonates, tetraborates and perborates; (4) an anionic, nonionic, ampholytic or zwitterionic organic detergent, in an amount not greater than about 40% of the composition and such that the ratio of builders to organic detergent ranges from about 1:2 to about 10:1. The said detergent composition is inhibited with respect to the corrosion of Zamac.

Pourable and free-flowing detergent, wetting and emulsifying compositions. W. Stein, H. Weiss and O. Koch (Henkel & Cie., G.m.b.H.). *U.S. 3,351,559.* A solid particulate surface active composition is claimed, characterized by outstanding pouring and free-flowing properties and containing a non-ionic surfactant and an alkali metal, alkaline earth metal or ammonium salt of C_{10}-C_{24} alpha-sulfo fatty acids, the surfactant being present in an amount of 5-50% by wt, the remainder being the alpha-sulfo fatty acid.

PROCESS OF PREPARING BIODEGRADABLE ALKYLBENZENE SULFONATES BY DIMERIZING AN OLEFIN OF 5 TO 10 CARBON ATOMS WITH A SILICA-ALUMINA CATALYST. D. A. Gudelis (Esso Res. and Engineering Co.). *U.S. 3,351,654.* A process for the preparation of biodegradable alkylbenzene sulfonates comprises contacting a hydrocarbon feed consisting of straight-chain alpha-mono-olefin hydrocarbons of 5 to 10 C atoms with a silica-alumina catalyst having a 1:1 to 10:1 weight ratio of silica to alumina at 93–250C and at a pressure of 200 to 1500 psig, fractionating the reaction product to obtain a dimer-containing fraction, subjecting this fraction to alkylating conditions in the presence of benzene and aluminum chloride and thereafter subjecting the resulting alkylbenzenes to sulfonation.

PROCESS FOR PREPARING ODORLESS ALKYL-ARYL SULFONATES AND THE COMPOSITIONS PRODUCED THEREBY. W. K. Seifert (Chevron Res. Co.). *U.S. 3,351,655.* An improvement is claimed in the process of sulfonating a C_9-C_{18} alkyl aryl hydrocarbon with concentrated sulfuric acid. The improvement of producing a substantially odorless neutralized alkylaryl sulfonate detergent product comprises incorporating 0.004 to 2% by wt of a hydroxylamine salt into the sulfonic acid phase free of sulfuric acid.

SULFOXONIUM COMPOUNDS. J. S. Berry (Procter & Gamble Co.). *U.S. 3,352,786.* A bacteriostatic composition is claimed, consisting essentially of an anionic, nonionic or cationic surface active agent and from 1 to 20% of a high molecular weight sulfoxonium compound having the structural formula: $[RR'R''S{\rightarrow}O]^{+}X^{-}$, where R is C_{10} to C_{20} alkyl radical and R' and R" are selected from the group consisting of lower alkyl, benzyl, chlorinated benzyl and alkyl benzyl in which the alkyl substituent contains 1 to 4 C atoms, and X represents an anionic substituent.

STABLE DISHWASHING COMPOSITIONS CONTAINING SODIUM DICHLOROISOCYANURATE. D. S. Corliss, R. R. Keast and J. S. Thompson (FMC Corp.). *U.S. 3,352,785.* A dishwashing detergent composition having good stability against loss of available chlorine contains as essential ingredients: (a) 10–50% by wt of an alkali metal silicate having an M_2O to SiO_2 mol ratio of 0.5:1 to 1.5:1, (b) 10–30% by wt of sodium or potassium hydroxide, (c) 2–6% by wt of sodium dichloroisocyanurate, (d) 20–60% of a sodium or potassium polyphosphate having an R_2O to P_2O_5 mol ratio of 1:1 to 2:1, where R is Na or K, and (e) 0.5–5% by wt of a low-foaming nonionic surface active agent compatible with sodium dichloroisocyanurate.

PROCESS AND COMPOSITION FOR DRY CLEANING. J. Sugarman and F. E. Woodward (Gen. Anil. & Film Corp.). *U.S. 3,352,790.* A dry cleaning detergent composition is claimed, containing: (a) 90–99.8 parts by wt of a dry cleaning solvent and (b) 0.2 to 10 parts by wt of a mono- or diphosphate ester of a nonionic surface active agent, in free acid, sodium or amine salt form. The nonionic surfactant is a condensation product of an organic compound containing a reactive H atom selected from the group consisting of ROH, RSH, RCOOH, RNH_2, $RCONH_2$ and RSO_2NH_2, in which R is a C_8-C_{60} hydrocarbon radical, and of at least one mole of an alkylene oxide containing 2 to 4 C atoms.

AEROSOL HARD SURFACE CLEANER. L. F. Elmquist (General Mills, Inc.). *U.S. 3,354,088.* A package consisting of a pressure-tight container having a valve-controlled opening charged with an aerosol hard surface cleaner comprises the following ingredients in parts by weight: 5–15 p volatile propellant, 1–2 p amorphous silica, 2.5–10 p amphoteric detergent, 50–70 p water, 7.5–15 p lower aliphatic alcohol, 2.5–7.5 p liquid hydrocarbon, 2.5–7.5 p glycerin, 0.10–5 p auxiliary cleanser. The amorphous silica has a particle size of 0.005 to 0.1 micron and the amphoteric detergent has a general formula: $R'NHCR_2CR_2$-COOX, where R is either hydrogen or a lower alkyl radical, R' is a C_8-C_{22} aliphatic hydrocarbon radical and X is either hydrogen, alkali metal, or ammonium.

PREPARATION OF STABLE, FREE-FLOWING MIXTURES OF ALKALI METAL DICHLOROISOCYANURATES AND SODIUM TRIPOLYPHOSPHATE. R. R. Keast (FMC Corp.). *U.S. 3,354,090.* A process for producing fast-dissolving, stable, free-flowing mixtures of an alkali metal dichloroisocyanurate and a hydratable salt selected from the group consisting of sodium tripolyphosphate, tetrasodium pyrophosphate, trisodium phosphate, sodium carbonate and borax comprises reacting trichloroisocyanuric acid and an alkali metal cyanurate in a reaction mixture containing at least 11% by wt water at up to 80C, adding the hydratable salt to the reaction mixture in an amount sufficient to absorb all of the water as water of hydration and to leave no more than about 16% water in the final mixture, and recovering a free-flowing, fast-dissolving, stable mixture of the alkali metal dichloroisocyanurate and hydrated salt.

HOMOGENEOUS HEAVY-DUTY LIQUID DETERGENT. W. R. Hearn, A. N. MacLean and F. W. Trusler (Colgate-Palmolive Co.). *U.S. 3,354,091.* A substantially homogeneous, pourable, heavy-duty aqueous liquid detergent composition is claimed, consisting essentially of 5–30% by wt of an anionic sulfonated detergent containing at least 8 C atoms in the alkyl chain, 10–30% of a potassium polyphosphate salt and 4–12% by wt of an alkali metal toluene or xylene sulfonate as a hydrotrope. The detergent, polyphosphate and hydrotrope form a fully solubilized homogeneous solution from which carboxymethylcellulose (normally added as an anti-redeposition agent at the 0.1 to 2% level) tends to separate. Addition of 0.1–1.0% of hydrogenated castor oil is, however, sufficient to inhibit the separation of the carboxymethylcellulose.

AMMONIATED GRANULAR CLEANER. R. A. Perry (Procter & Gamble Co.). *U.S. 3,354,092.* A water-soluble, ammoniated, granular, non-caking hard-surface cleaning composition consists essentially of: (1) 0–34% ammonium dihydrogen phosphate, (2) 0–20% diammonium hydrogen phosphate, and (3) 40–97% of at least one granular alkaline material selected from the group consisting of trisodium phosphate, disodium hydrogen phosphate, sodium tripolyphosphate, tetrasodium pyrophosphate, sodium carbonate, sodium sesquicarbonate and sodium tetraborate; the total of (1) + (2) being sufficient to provide 0.75–5% by wt of ammonia and the pH of the composition being 9.5 to 10.5 when dissolved in water at a concentration of 1–2% by wt.

(Continued on page 205A)

(Continued from page 178A)

Process for making biodegradable detergents. H. S. Bloch (Universal Oil Products Co.). *U.S. 3,355,484.* A process for the production of detergents comprises telomerizing butadiene with an alkylbenzene containing an alpha-hydrogen group and 1 to 8 C atoms in the alkyl group, in the presence of an alkaline catalyst, at 80–200C, 200–2,000 psia, LHSV of 0.5–5.0 and alkylbenzene to butadiene mol ratio of at least 1.5:1 to add linearly the butadiene to the alkyl group. The aliphatic side chain of the resulting telomerization product is subsequently hydrogenated at 50–300C and 25–1,000 psia in the presence of a hydrogenation catalyst selected from the group consisting of Group VIII metals and copper chromite to form phenyl alkane.

Process for the manufacture of alkali metal tripolyphosphate having desirable characteristics. G. E. Taffer (Electric Reduction Co. of Canada, Ltd.). *U.S. 3,356,447.* A process is claimed which comprises compressing by external pressure a finely divided alkali metal tripolyphosphate into a compact mass in which water is distributed throughout the phosphate and subsequently heating to remove the water. The end result of the process is a granular tripolyphosphate having high bulk density, increased abrasion resistance and increased rate of solubility.

Stable detergent compositions. D. B. Guthrie (Petrolite Corp.). *U.S. 3,356,612.* A stable detergent composition for machine dishwashing consists essentially of a mixture of sodium carbonate, sodium tripolyphosphate, anhydrous sodium metasilicate, a low-foaming, ethoxylated nonionic surfactant, potassium dichloroisocyanurate, and an antioxidant selected from the group consisting of phenothiazine, 1,2-dihydro-6-ethoxy-2,2,4-trimethyl quinoline, t-butylphenol-formaldehyde resin, dicyclohexylamine and 2,2′-methylene bis-(4-methyl-6-*t*-butylphenol). The amount of antioxidant used should be sufficient to prevent degradation of both the nonionic surfactant and the potassium dichloroisocyanurate.

Built detergent compositions containing a synergistic mixture of STP, NTA and sodium silicate. B. H. Gedge III (Procter & Gamble Co.). *U.S. 3,356,613.* A detergent composition consists essentially of an anionic or zwitterionic synthetic detergent, a builder mixture and at least 10% sodium silicate, the weight ratio of detergent to builder mixture being from 2:1 to 1:10 and the builder mixture consisting of sodium tripolyphosphate and sodium nitrilotriacetate in a molar ratio of 4:1 to 1:4.

Disulfonate anti-caking agents for straight-chain sulfonate detergents. D. M. Marquis (Chevron Res. Co.). *U.S. 3,356,709.* A built particulate solid detergent composition is claimed, consisting essentially of straight-chain sodium C_9-C_{18} alkyl benzene sulfonate detergent having caking tendencies, an inorganic sodium salt detergent builder and an anticaking agent to suppress the caking tendencies of the composition selected from the group consisting of disodium benzene disulfonate, dipotassium benzene disulfonate, disodium toluene disulfonate, dipotassium benzene disulfonate and dipotassium toluene disulfonate. The detergent and detergent builder are each present at a level ranging from 5 to 95% of their combined total and the caking inhibitor is present at a level of 2–25%, by wt, based on the surfactant. The finished composition is obtained by spray-drying an aqueous dispersion of the components.

Emulsification. III. Required HLB value for interfacial viscosity and solubility parameter of oils. Sōichi Hayashi (Asahi Electrochem. Co., Tokyo). *Yukagaku* **16**, 554–559 (1967). In a case of given O/W system, there exists a required HLB value for interfacial viscosity as well as the required HLB values for emulsification. There is a linear correlation between required HLB value for interfacial viscosity and solubility parameter of oil. The empirical equations to determine required HLB value for interfacial viscosity at a given O/W interface were deduced experimentally as follows: $Y = 6.146\delta_0 - 46.0$ or $Y = 127.3 \log\delta_0 - 112.2$, where Y = required HLB value for interfacial viscosity, and δ_0 = solubility parameter of oil.

Retarder of acid corrosion of iron by sulfuric acid. Kenji Negoro and Tokio Hashioka (Hiroshima Univ., Hiroshima). *Yukagaku* **16**, 623–625 (1967). The effect of surfactants for corrosion of iron powder by acid was studied. The amount of undissolved residue of iron powder in dilute aqueous sulfuric acid solution in the presence of surfactants was measured at 5 minute intervals. Sodium dilauryldithiophosphate, laurylpyridinium chloride and thiourea, etc. retarded considerably the rate of dissolution of iron. The best result was obtained by a combined use of sodium dilauryldithiophosphate and sodium dodecylbenzenesulfonate.

Surface activity of addition polymers of tall oil and ethylene oxide. Bunya Kanatsuka, Yoshikiyo Urata and Ryuichi Yamada (Defence Academy, Yokosuka). *Yukagaku* **16**, 662–666 (1967). Tall oil with less than 17 moles of added ethylene oxide was a yellow-brown and viscous liquid. Tall oil with more than 17 moles was light yellow solid. The products with 4–6 moles of ethylene oxide were suitable as dispersing or emulsifying agents for wool fat. The product with 16–25 moles of ethylene oxide had high foaming power and good foam stability, and was an excellent detergent for cotton.

Metal-containing surfactants. II. Surface active properties of binary aqueous solutions of dodecyl pyridinium chloride-metal (Group Ia and IIa) soap (Part 2). Hiroshi Suzuki (Gov. Chem. Ind. Research Inst., Tokyo). *Yukagaku* **16**, 667–676 (1967). When metal soap was added to dodecyl pyridinium chloride, remarkable synergistic effects were found in wetting power for discs of felt or cotton cloth. Alkaline earth metal salts were superior to alkali metal salts in producing the effect. Particularly, barium ricinoleate was excellent in this respect. Foaming power and foam stability of the most binary solutions markedly increased as compared with that of either component. Among the kinds of metal salts constituting binary systems, barium salts of long chain fatty acids showed better values. All the laurates studied were excellent. Lithium stearate was excellent while magnesium stearate had no effect, inversely it showed very low foaming property. Alkaline earth metal salts were not always superior to alkali metal salts. In respect to synergistic effect, there were considerable similarities between the results of wetting power, foaming characteristics and surface tension.

(Continued on page 206A)

FIRST CALL FOR PAPERS

AOCS 42nd Annual Fall Meeting

S. S. Chang, Technical Program Chairman, has issued the first call for papers to be presented at the AOCS Fall Meeting, Oct. 20–23, 1968, Statler-Hilton Hotel, New York, N. Y.

Lipids, fats and oils—papers in these and all related areas are welcome. Submit two copies of a 100- to 300-word abstract with title, authors and speaker to Dr. Stephen S. Chang, Food Science Department, Rutgers, The State University, New Brunswick, N. J. 08903.

(Continued from page 205A)

BLEACHING DARK-COLORED SULFONATION PRODUCTS. W. Stein, O. Koch and H. Weiss (Henkel & Cie. G.m.b.H.). *U.S. 3,354,187.* An improvement is claimed in the process for bleaching dark-colored acid sulfonation products obtained by sulfonating with an excess of gaseous sulfur trioxide C_6-C_{28} saturated fatty acids or their esters with C_1-C_{20} alcohols. The improvement consists in treating the dark colored sulfonation product with hydrogen peroxide or with compounds producing hydrogen peroxide *in situ*, in an amount of 0.2 to 6% by wt, in the presence of sufficient water to dilute the free SO_3 to a concentration below 90%, until the blue color value in the sulfonation product has been lowered to at least 5. At least 75% of the sulfo groups are subsequently neutralized with ammonium, alkaline metal or alkaline earth metal hydroxides, carbonates and bicarbonates, after which the substantially neutralized product is further contacted with 0.2–6% by wt of hydrogen peroxide until the color of the product is substantially further lightened.

GERMICIDAL NONIONIC-DETERGENT IODINE COMPOSITIONS. A. Cantor and M. W. Winicov (West Laboratories, Inc.). *U.S. 3,355,386.* A detergent-iodine composition providing enhanced iodine color at high dilution is claimed, consisting essentially of a detergent-iodine complex in which the detergent component is one of the following: (1) a C_{12}-C_{20} primary alcohol-ethylene oxide condensate having n/2-1 to 2n-1 mols of ethylene oxide, n being the average number of C atoms in the alcohol; (2) a C_{12}-C_{18} alkylphenol-ethylene oxide condensate having a number of ethylene oxide units equal to 0.8 to 3.0 times the number of C atoms in the alkyl chain; (3) a C_{12}-C_{18} primary alcohol-alkylene oxide condensate having the formula $RO(EO,PO)_x(EO,PO)_yH$, where EO and PO are ethylene oxide and propylene oxide, the wt percent of EO is 0–45% in one of the blocks x, y and 60–100% in the other of the blocks x, y and the total number of mols of EO and PO is in the range of 6–40, with 1–10 mols in the PO-rich block and 5–30 mols in the EO-rich block. The ratio of detergent to available iodine in all those complexes is at least 5:1.

CLEANSING COMPOSITIONS ADAPTED TO INHIBIT THE FORMATION OF BODY ODOR. K. S. Karsten (R. T. Vanderbilt Co., Inc.). *U.S. 3,355,388.* A composition is claimed, consisting essentially of a detergent base and a skin-substantive antioxidant selected from the class consisting of mono-, di- and tri-styrenated phenols, tri-[(intermediate alkyl)phenyl] phosphites, 2,2′-ditertiary butyl-4,4′-isopropylidene diphenol (para intermediate-alkyl phenyl) phosphites, and 2,2′-methylenebis [6-(1-methyl-cyclohexyl)-para-cresol], the antioxidant being present at a level of 1–4% by wt of the composition and sufficient to inhibit the formation of body odor from an area of the human body cleansed with the composition.

DETERGENT BARS HAVING LIME SOAP DISPERSING CHARACTERISTICS. D. M. Marquis (Chevron Research Co.). *U.S. 3,355,389.* A detergent bar having good lime soap dispersing characteristics and suitable for use in hard water consists essentially of a water-soluble soap, a water-soluble nonsoap synthetic detergent salt containing in its structure either a sulfonic acid or a sulfuric acid ester radical, and, as a lime soap dispersant, a water-soluble salt of thiodisuccinic acid having at least two H atoms of its carboxyl groups replaced by either an alkali metal or magnesium. The relative amounts of the various ingredients in the detergent bar are: soap, 5–90%, synthetic detergent, 5–90% and lime soap dispersant, 5–25%, all by wt.

ALKALINE GERMICIDAL CLEANER WITH COLOR INDICATOR. A. Cantor, W. Schmidt and M. W. Winicov (West Laboratories, Inc.). *U.S. 3,355,392.* An alkaline germicidal cleaning composition having indicator means to signify the minimum contact time for effective germicidal action at usage concentrations consists essentially of a mixture of inorganic alkaline cleaning components providing a pH of 10.5 to 11.5 at a usage concentration of 1.0–2.5% by wt of the composition, 0.25–3% of a quaternary ammonium germicide, 0.01 to 0.1% of a water soluble dye and an oxygen releasing inorganic percompound in an amount to decolorize the dye at usage dilution in a time interval of 0.5 to 5 minutes, the inorganic percompound being selected from the group consisting of perborates, persulfates, perphosphates, percarbonates and stabilized sodium peroxide.

SURFACE CHEMISTRY OF METAL SOAPS. Ryohei Matsuura (Kyusyu Univ., Fukuoka). *Yukagaku* 16, 585–595 (1967). A review with 52 references.

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