ABSTRACTS

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

• Fats and Oils

Fatty alcohols (normal and isoprenoid) in sediments. Judy Sever and P. L. Parker (Univ. of Texas, Marine Science Inst., Port Aransas 78373). *Science* **164**, 1052–4 (1969). Normal long-chain alcohols were isolated from recent marine sediments from several environments. The isoprenoid alcohol, dihydrophytol, which is thought to originate from phytol, the side chain of chlorophyll, by hydrogenation in the reducing environment of the sediment, was also present in most of the samples. Both the normal and isoprenoid alcohols were found in the Green River shale (Eocene). Geochemical implications are considered.

Stability of asymmetric phospholipid membranes. D. Papahadjopoulos and S. Ohki (Depts. of Biochem. and Biophysics, State Univ. of New York at Buffalo, Buffalo 14214). *Science* **164**, 1075–7 (1969). Bilayers (black films) composed of phosphatidylserine are unstable under conditions of asymmetric distribution of calcium or hydrogen ions with respect to the membrane. Addition of calcium ions to the solution (100 millimolar sodium chloride, pH 7.0) on one side only, produces lowering of the direct-current resistance and results in breaking of the membrane. However, with calcium ions on both sides the membranes are stable and show very high electrical resistance.

Lipids of defatted soybean flakes: extraction and characterization. D. H. Honig, D. J. Sessa, R. L. Hoffmann and J. J. Rackis (Northern Utilization Res. and Development Div., U.S. Dept. of Agr., Peoria, Ill. 61604). *Food Technol.* 23(6), 95–9 (1969). Dehulled soybean flakes, defatted with pentane-hexane, were further extracted with various nonpolar and polar solvents to remove free and bound lipids with the object of determining sources of flavor in these flakes and their products. The flakes contain 0.16% residual oil as determined by official test methods. They contain about 3% crude lipids extractable with an azeotropic mixture of hexane: ethanol. Phospholipids, including phosphatidic acid, account for about 60% of the crude lipids. Sterols, triglycerides, sugars and amino acids, together with lesser amounts of the isoflavones, daidzein and genistein and their glucoside derivatives, are also present. Palmitic acid content of the phospholipids is nearly three times higher than that in typical soybean oil. The higher content of palmitic acid is balanced by decreases in oleic and linoleic acids. The hexane-ethanol azeotrope and hot 95% ethyl alcohol are effective solvents in removing the more intense flavors of defatted soybean flakes and the extracted flakes are much reduced in flavor. Fractionation of the crude lipids by silicic acid column chromatography is an effective method for concentrating the soybean flavors.

The use of gas phase analytical methods for the analysis of phospholipids. M. G. Horning, G. Casparrini and E. C. Horning (Inst. for Lipid Res., Baylor Univ. Coll. of Med., Houston, Tex. 77025). *J. Chromatog. Sci.* **7**, 267–75 (1969). Gas phase analytical procedures have been developed for the direct study of phospholipids. Glycerophospholipids undergo thermal cleavage to yield diglycerides. The reaction apparently involves an ortho acid (ester) structure as an intermediate. The phosphate ester group was also eliminated from silylated sphingomyelins when these compounds were subjected to direct GLC analysis. The derivatives corresponded to dehydration products. Ceramides were investigated by GLC, because of their structural relationship to sphingomyelins. It was possible to obtain TMSi derivatives of ceramides which could be studied by GLC and GLC-MS methods. The mass spectra of the derivatives showed characteristic fragmentation patterns that permitted their identification in terms of specific structural relationships.

Analysis of labeled fatty acids by argentation chromatography of their methyl esters on glass fiber sheets. G. Graff, Y. L. Marcel and R. T. Holman (Univ. of Minn., The Hormel Inst., Austin, Minn. 55912). *J. Chromatog. Sci.* **7**, 298–9 (1969). Chromatographic analysis on glass fiber sheets impregnated with silver nitrate yields reproducible separations. Variation in the composition of the developing solvent permits the separation of any given pair of methyl esters of fatty acids on the basis of degree of unsaturation. Measurement of radioactivity by liquid scintillation is accurate; the glass fiber present in the scintillation vial does not cause significant quenching.

Rapid quantitative method for determining carotenoids of the California sweet orange. P. Bernath and H. E. Swisher (Res. and Dev. Div., Sunkist Growers, Inc., Ontario, Can. 91764). *Food Technol.* 23(6), 107–110 (1969). A rapid method is presented for the extraction of total carotenoids, separation of carotenes and identification of isolated fractions from orange juice products. The method involves: extraction of carotenoids with a one-phase aqueous-organic solvent system and immediate separation of carotenes from carotenoids on a chromatographic column. The preparation of a column adsorbent is described. This adsorbent, after partial deactivation, is very stable. The separation and retention of natural carotene esters (cryptoxanthin, etc.) on the column is excellent. Identification of components is accomplished by paper and thin-layer chromatography and comparative spectra.

Surface active agents effects on drying characteristics of model food systems. F. Salas and T. P. Labuza (Dept. of Nutr. and Food Sciences, M.I.T., Cambridge, Mass. 02139). *Food Technol.* 22, 80–84 (1968). The effects of surface active agents on the air-drying characteristics of a model food system composed of cellulose, oil and water were studied. The drying rate and shrinkage of these systems with added surfactants were measured as a function of moisture content. The drying rate pattern was composed of an initial constant-rate period followed by two falling periods. Non-ionic surfactants at high concentration decreased the rate during the constant rate period and shortened the length of this period. In addition, shrinkage was less for these models. The effects were shown to be related to the decrease in liquid surface tension of the water in the pores due to the addition of surfactant.

Type and level of fat and amount of protein and their effect on the quality of chicken frankfurters. R. C. Baker, J. Darfler and D. V. Vadehra (Cornell Univ., Ithaca, N.Y. 14850). *Food Technol.* 23(6), 100–103 (1969). Chicken frankfurters were made using chicken, beef, and pork fat and cottonseed oil at 25% of the formula; 4 levels (20, 25, 30, 35%) of each of the 4 fats with the protein at a constant 12% and 4 levels (9, 12, 15 and 18%) of protein, using chicken fat as the fat component. A trained taste panel and the Kramer shear press were used for testing. The finished product was analyzed for fat and water. Beef fat and cottonseed oil produced significantly firmer frankfurters than chicken fat when unheated, but not when heated. Juiciness was not affected. Frankfurters made of chicken and pork fat had higher flavor scores when unheated, but when heated there was little difference. As the level of fat in the formula was raised, the frankfurters became less tender when unheated and less juicy regardless of the type of fat used. Flavor was not affected by fat level. Increasing the level of protein from 9 to 18% produced significantly firmer frankfurters as determined by taste panel, chew count and Kramer shear press. The lowest level of protein was less preferred when compared with the other levels, both unheated and heated.

Separation and identification of the polar lipids of Chromatium strain D. S. Steiner, S. F. Conti and R. L. Lester (Dept. Microbiol., Univ. of Kentucky, Lexington 40506). *J. Bacteriol.* 98, 10–15 (1969). The four major phospholipids identified from the photosynthetic bacterium *Chromatium* were: lyso-phosphatidylethanolamine, phosphatidylethanolamine, phosphatidylglycerol and cardiolipin. Three glycolipids were also found: monoglucosyldiglyceride, mannosylglucosyldiglyceride and dimannosylglucosyldiglyceride, the latter two glycolipids have not previously been found in nature.

Phospholipids of Azotobacter vinelandii. P. Jurtshuk and B. A. Schlech (Dept. Microbiol., Univ. of Texas, Austin, Texas

(Continued on page 414A)

(Continued from page 411A)

78712). *J. Bacteriol.* **97**, 1507–1508 (1969). Several as yet unidentified phospholipids were found in whole cell extracts of *Azotobacter vinelandii* which were not found in the R_3 electron transport (membrane) cell fraction. Lipid analysis of the whole cell and the R_3 fraction on a dry weight basis showed 6% lipid (96% phospholipid) for whole cell and 16% lipid (93% phospholipid) for the R_3 fraction.

Lipids of Pseudomonas aeruginosa cells grown on hydrocarbons and on trypticase soy broth. P. Edmonds and J. J. Cooney (Dept. of Biology, Univ. of Dayton, Dayton, Ohio 45409). *J. Bacteriol* **98**, 16–22 (1969). The total lipids from *P. aeruginosa* grown on tridecane, JP-4 jet fuel and trypticase soy broth were 7.1 to 8.2% of the dry cell weight (5.0 to 6.4% free lipid and 1.7 to 2.0% bound lipid). No specific differences in lipids or fatty acids were found in cells grown on the different substrates.

Fatty acids and polar lipids of extremely thermophilic filamentous bacterial masses from two Yellowstone hot springs. A. J. Bauman and P. G. Simmonds (Jet Propulsion Lab., Calif. Inst. Technol., Pasadena, Calif. 91103). *J. Bacteriol.* **98**, 528–531 (1969). The fatty acid composition of filamentous bacterial masses from two very hot (80–88C) Yellowstone Park springs is not unusual despite the extreme environment. The fatty acid pattern of this anomalous group of organisms is like that of bacteria but not blue-green algae. The authors speculate that these thermophilic organisms adapt to their high-temperature environment by means of stable lipoprotein membrane systems.

Phospholipids of Nocardia coeliaca. I. Yano, Y. Furukawa and M. Kusunose (Res. Lab. of Biochem., Toneyama Hosp., National Sanitarium, Toyonaka, Osaka, Japan). *J. Bacteriol.* **98**, 124–130 (1969). Phosphatidylcholine (PC) was the most abundant phospholipid (25–40% of the total phospholipids) of *N. coeliaca*. The major fatty acids of the PC fraction were 14-methyl pentadecanoic, C_{15} and C_{17} iso and anteiso and palmitic acids. Other phospholipids found were phosphatidyl ethanolamine (25–30%), phosphatidyl inositol (11–14%) and cardiolipin (7–15%). No phosphatidyl choline was found in 10 other species of *Nocardia* examined.

Simple liquid-liquid partition system for isolation of labeled oleic acid from mixtures with glycerides. P. Belfrage and Martha Vaughan (Molecular Disease Branch, Nat. Heart Inst., NIH, Bethesda 20014). *J. Lipid Res.* **10**, 341–44 (1969). Oleic acid has a partition coefficient, upper phase/lower phase, of 1.9 (22C) in the liquid-liquid partition system consisting of alkaline methanol-water (1:1) and chloroform-heptane (5:4). Tri, di-, and monolein are found almost exclusively in the lower (organic) phase. Oleic acid can be quantitatively removed from mixtures of triglyceride and partial glycerides by means of this partition system under conditions resembling those in a lipase assay.

Tallows for milk replacers: Analytical control during refining; suitability for preservation. P. Fredenucci (Central Lab., Unipol Society, Marseille). *Rev. Franc. Corps Gras* **16**, 113–118 (1969). Refining of tallows is controlled by the usual analyses. The chloroplatinate method for color index determination appears to be the most practical method for quality control. Interpretation of the ultraviolet spectrum of the oils may result in misleading conclusions regarding the degree of oxidation. The Swift Stability Test appears to give the best indication of the stability of the refined oil.

Identification and quantitative analysis of the pigments in vegetable oils. II. Chlorophylls. J. Srour (Ecole Sup. Appl. des Corps Gras, Paris). *Rev. Franc. Corps Gras* **16**, 125–129 (1969). This article is the second half of a review. The first half appeared in *Rev. Franc. Corps Gras* **16**, 25–36 (1969). In the present part methods are described for isolating and identifying chlorophylls by paper and thin-layer chromatography and spectrophotometry. Other methods of analysis are based on conversion of chlorophyll to pheophytin or determination of magnesium. Contents of chlorophylls and pheophytin in olive, rapeseed, soybean and linseed oils are given.

Effect of the browning reaction product from reducing sugar and amino acid on the stabilities of fat and oil. Naohiko Yamaguchi (Food Research Inst., Aichi Pref.). *Yukagaku* **18**, 111–17 (1969). A review with 40 references.

Nature of the taste of lipids. I. Influence of unsaponifible matter contained in thermally oxidized soybean oil. Riichiro Usuki and Tashi Kaneda (Tohoku Univ., Sendai). *Yukagaku* **18**, 252–5 (1969). In order to determine the change in flavor of oils on heating, the heated oil was fractionated and each fraction, after addition to the original oil, was organoleptically evaluated. Commercial soybean oil was blown with air 48 hours at 180C and the unsaponifiable matter (USM), separated from this oil, was added to original soybean oil. As the result of organoleptic judgement of oils containing added USM from original and heated oils, it was observed that the USM separated from heated oil had an effect to the taste of heated oil. An impression of "blooming" or oxidized odor was detected. But the four primary tastes could not be recognized. Moreover, the most active substance in USM was found to be hydrocarbon. The component of hydrocarbons in heated oil was quite different from that of the original oil.

Progress in the chemical reaction of fats. Saburo Komori (Univ. Osaka). *Yukagaku* **18**, 221–34 (1969). A review with 31 references.

Detection and determination of diphenyl-diphenyl ether heat transfer medium in fatty oils. Toru Takagi (Nagoya Univ.). *Yukagaku* **18**, 235–9 (1969). Gas chromatography of unsaponifiable materials can be used for determination of Dowtherm A (D-A) down to the 5 ppm level in 10 g. refined soybean oil. Separation of hydrocarbon fraction from the unsaponifiable materials with thin-layer chromatography followed by gas chromatography is useful for the determination of D-A in fatty oils in concentrations as low as 0.2 ppm. When SE-30 column is used, D-A indicates two peaks for diphenyl and diphenyl ether at column temperature 130 C, and a single peak at column temperature above 190 C. D-A is detected by the retention times and area ratios of diphenyl and diphenyl ether in the gas chromatography.

Oils of basidiomycetes. IV. Oils of Masutake (Polyporus sulphureus) and Kikurage (Auricularia auricula-judae). Hiroko Yokokawa (Tachikawa Coll. of Tokyo). *Yukagaku* **18**, 258–61 (1969). Properties of oils from *Masutake* and *Kikurage*, respectively, are as follows: oil content (dry matter): 0.84%, 1.83%; n^{20}_{D}: 1.4667, 1.4773; unsaponifiable matter in ether extract: 25.6%, 22.4%; iodine no. of oil: 53.9, 117.8. The main sterols of *Masutake* and *Kikurage* were considered to be ergosterol and 22,23-dihydroergosterol.

Ferulates contained in rice bran oil. III. The structure of cyclobranol. Tomio Endo, Osamu Misu and Yanosuke Inaba (Nakataki Pharm. Ind. Co., Tokyo). *Yukagaku* **18**, 255–7 (1969). A new triterpenoid alcohol, $C_{31}H_{52}O$, m.p. 156.5–7.5 C, $[\alpha]_D$ 38.4° was isolated from ferulates in rice bran oil and this was named as cyclobranol. The structure of cyclobranol was deduced 24-methyl-cycloartenol by the spectral evidence and the retention time during gas chromatography.

Isomerization of polyenoic fatty esters to the conjugated esters with potassium tert-butoxide catalyst in the aprotic dipolar solvents. Toru Takagi, Kazuo Fukuzumi and Seiko Nan'ya (Nagoya Univ., Nagoya). *Yukagaku* **18**, 193–9 (1969). Methyl linoleate, methyl linolenate and safflower oil were isomerized rapidly to the conjugated esters with addition of potassium tert-butoxide, and dimethyl sulfoxide or dimethyl formamide at room temperature. The loss of ester group in the conversion was little. The conjugated diene/conjugated triene ratio in the isomerized linolenate was

(Continued on page 416A)

(Continued from page 414A)

approximately 3:1. The isomerization of linoleate gave the *cis,trans* conjugated dienoate chiefly. The isomerization of *cis-*, *trans-* and *trans,trans*-9,12-octadecanoate gave a mixture containing 41–53% *cis,trans-* and 47–59% *trans,trans* conjugated dienoate. At the tert-butoxide concentration of 0.05–0.3 mole, the rate of isomerization of *trans,trans* dienoate is expressed in the following form: rate = K(tert-butoxide)$^{2.5}$ (polyenoic acid ester). However, at higher concentration the rate becomes independent of the base concentration. In the isomerization in the sealed tube at 70C, methyl linoleate mostly changed to the tert-butyl ester of the conjugated acids, and methyl linolenate to a polymerized product, which did not show maximum absorption at 265–270 mμ.

A.O.M. STABILITIES OF MODIFIED WHALE OILS. II. EFFECT OF REFINING, BLEACHING AND DECOLORIZATION. Yoshiro Abe, Hajime Seino, Masatake Hasumi and Atsunori Wakamatsu (Keio Univ., Tokyo). *Yukagaku* 18, 183–7 (1969). Crude whale oil was polymerized at 260C in the presence of activated earth under nitrogen atmosphere, followed by molecular distillation. The distilled oil was refined, bleached and deodorized as usual. The stability test of each oil by the A.O.M. method disclosed that the change of A.O.M. stability was 10.5 hrs. for thermally polymerized oil, 4.0 hrs. for the distilled oil, and 9.0 hrs. for the purified oil as contrasted to 3.3 hrs. of the original whale oil. Unsaponifiable matter recovered from the distillate of soybean oil deodorization was added to purified or hydrogenated whale oils and its antioxidative ability was determined. Unsaponifiable matter had great antioxidative effect in hydrogenated whale oil. The optimum concentration was 0.8%. Then 0.8% of unsaponifiable matter was added to the above mentioned purified distilled oil and it was ascertained that the addition of unsaponifiable matter greatly improved its stability. The A.O.M. stability of purified, distilled oil from thermally polymerized whale oil was over 200 hrs. when it was incorporated with soybean unsaponifiable.

OLIVE CRUSHING AS A UNIT OPERATION. C. Peri (Univ. of Perugia, Perugia, Italy). *Riv. Ital. Sostanze Grasse* 45, 762–6 (1968). A mathematical relationship is presented linking the amount of olive oil obtained during the crushing operation with time.

COMPONENT ACIDS OF BAUHINIA SEED OILS. R. C. Badami and C. D. Daulatabad (Karnatak Univ., Dharwar, India). *J. Sci. Food Agr.* 20, 99–100 (1969). Seed oils of *Bauhinia monandra* and *B. purpurea* were examined for their component acids by reversed-phase partition column chromatography. The following results (wt. %) were obtained for *B. monandra*: myristic 1.4, palmitic 15.1, stearic 9.4, arachidic 0.9, behenic 0.9, oleic 11.5, linoleic 60.8; and for *B. purpurea*: lauric 0.5, myristic 0.5, palmitic 18.5, stearic 17.8, arachidic 1.3, behenic 1.3, oleic 11.1 and linoleic 49.0. Epoxy oleic acid reported to be present in the seed oil of *B. purpurea* was not detected in the sample investigated.

ALKALINE ISOMERIZATION OF LINOLENIC ACID, II. P. Capella and A. Strocchi (Univ. of Bologna, Bologna, Italy). *Riv. Ital. Sostanze Grasse* 45, 767–72 (1968). The mass spectra of the methyl esters of the acids produced during the alkali isomerization of linolenic acid are discussed. These spectra were obtained by a combination of gas chromatography and mass spectrometry data. In particular, it was possible to confirm the presence of a cyclic compound, identified as 9-(2-n-propylcyclohexa-3,5-dienyl)-nonanoate. Possible fragmentation mechanisms for the formation of some important ions are also discussed.

Turn to **page 431A,** *this issue, for*

COMPLETE PROGRAM
AOCS FALL MEETING
LEAMINGTON HOTEL
MINNEAPOLIS, MINN.
OCTOBER 5-8, 1969

• Fatty Acid Derivatives

THE RATE AND MECHANISM OF THE REACTION BETWEEN CETYL ALCOHOL AND SULFAMIC ACID. Bunnosuke Yamaguchi (Meiji Univ., Kawasaki City). *Yukagaku* 18, 188–93 (1969). A simple and reliable method was devised for quantitative determination of the amount of ammonium cetylsulfate produced by the reaction between cetyl alcohol and sulfamic acid. By means of this method reaction rates between cetyl alcohol and sulfamic acid were measured at various temperatures in the presence or absence of catalyst such as amide or organic amine. The acid amides used as catalyst increased the rate of reaction in a distinct degree while there was a slight decrease by use of amines. The results were kinetically analysed and the mechanism of reaction and the effect of catalyst were discussed.

FATTY ACID LACTYLATES. L. I. Osipow, D. Marra and N. Resnansky (Foster D. Snell, Inc.). *Drug Cosmetic Ind.* 104(3), 56–64, 167–8 (1969). The condensation products of stearic acid and lactic acid were originally introduced as dough conditioners for yeast leavened baked goods. Certain of these products now appear suitable as new ingredients in cosmetic formulations. Three sodium salts of fatty acid esters of lactylic acids have been investigated: the capryl, lauroyl and stearoyl derivatives. The first two exhibit broad spectrum antimicrobial activity and the stearoyl derivative shows unusual gelling properties. All three have been found to be dermatologically innocuous and to exhibit no significant eye irritation.

COMPOUNDS AS TEXTILE SOFTENERS. L. F. Elmquist (General Mills, Inc.). *U.S. 3,442,695.* Softened textile materials and a process of softening textiles are claimed, involving the application of quaternary ammonium compounds in which two substituents on the nitrogen are derived from the residual fatty acid monomer left after polymerization of higher fatty acids and the remaining two substituents are lower alkyl groups.

EMULSIFIER FOR USE IN MAKING YEAST-RAISED BAKED GOODS. H. Birnbaum (Star-Kist Foods, Inc.). *U.S. 3,443,965.* An additive for use in yeast-raised products combines monoglycerides of fatty acids having a low iodine value with monoglycerides of fatty acids having high iodine value in combination with diacetyl tartaric acid ester of mono and diglycerides of edible vegetable oils.

MAGNESIUM SILICATE-CATALYZED POLYMERIZATION OF UNSATURATED FATTY ACIDS. D. H. Wheeler (General Mills, Inc.). *U.S. 3,444,220.* A process of polymerizing unsaturated fatty acids useful for preparing polyamides is described, in which a synthetic magnesium silicate catalyst, treated with a nitrogenous compound such as piperidine, pyridine or aniline, is used.

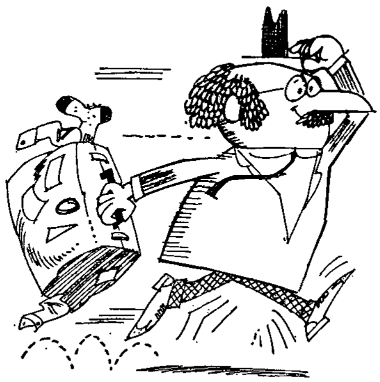
METHOD OF MAKING SYNTHETIC RESINS ANTISTATIC AND ANTISTATIC AGENT COMPOSITIONS THEREFOR. M. Funatsu and Y. Torimae (Kao Soap Co., Ltd.). *U.S. 3,445,396.* An antistatic composition for incorporation in synthetic resins comprises a mixture of two compounds represented by the following formulas: $R_1N(CH_2CH_2OH)_2$ and R_2OH, in which R_1 and R_2 are alkyl or alkenyl groups containing 8–22 C atoms.

COMPOSITIONS CONTAINING TALL OIL PITCH AND EPOXY ETHER RESINS. V. F. D'Agostino (Arizona Chemical Co.). *U.S. 3,445,409.* An epoxy resin composition consists essentially of a heat-cured blend of an epoxy ether resin, an amide of a polymeric fatty acid with an aliphatic polyamine, and a tall oil pitch containing about equal parts of fatty acids, rosin acids and unsaponifiables.

• Biochemistry and Nutrition

PROPERTIES OF A POLAR ^{32}P-PHOSPHOLIPID ISOLATED FROM A PARTICULATE MITOCHONDRIAL ATPASE. R. D. Hill, S. Ford, K. H. Byington, A. Tzagoloff and P. D. Boyer (Dept. of Chem., Univ. of California, Los Angeles, Cal.). *Arch. Biochem. Biophys.* 127, 756–65 (1968). The properties of a ^{32}P-labeled substance formed by incubation of a particulate mitochondrial ATPase with ATP-γ-^{32}P and oligomycin or rutamycin correspond to those of phospholipids. The phosphorylated substance is extractable with polar organic solvents from acid solution under conditions that extract polyphosphoinositides.

(Continued on page 418A)



Meetings

AOCS National Meetings

Oct. 5-8, 1969—Minneapolis, Leamington Hotel.
April 26-30, 1970—New Orleans, Jung Hotel.
Sept. 27-Oct. 1, 1970—Chicago, Conrad Hilton Hotel.

Other Organizations

August 11-13, 1969—49th Annual Convention of the American Soybean Association, the Ocean Forest Hotel, Myrtle Beach, South Carolina.
Aug. 17-24, 1969—3rd NMR Symposium, Physical Chemistry Division and University of Toronto, Toronto, Ontario, Canada.
Aug. 24-26, 1969—National Soybean Processors Association Annual Meeting, Brown Palace Hotel, Denver, Colo.
Aug. 20-27, 1969—12th International Conference on Coordination Chemistry, University of Sydney, Australia.
Aug. 27-29, 1969—Symposium on Multiple Bonding in Inorganic Chemistry, University of Manitoba, Winnipeg, Manitoba, Canada.
Sept. 3-5, 1969—15th Canadian High Polymer Forum, Queen's University, Kingston, Ontario, Canada.
Sept. 7-11, 1969—XIIIth International Conference on the Biochemistry of Lipids, Eugenides Foundation, Athens, Greece.
Sept. 8-9, 1969—Society of Cosmetic Chemists National Seminar, Riverfront Inn, St. Louis, Mo.
Sept. 8-12, 1969—International Symposium on Conformational Analysis, Universite Libre de Bruxelles, Brussels, Belgium.
* Sept. 16-18, 1969—Massachusetts Institute of Technology, Conference on Amino Acid Fortification of Protein Foods, Kresge Auditorium, Cambridge, Mass.
Sept. 23-25, 1969—8th Annual Meeting of ASTM Committee E-19 on Chromatography, Sheraton Hotel, Philadelphia, Pa.
* Oct. 3, 1969—Annual Meeting of the Canadian Committee on Fats and Oils, the Prairie Regional Laboratory of N.R.C., Saskatoon, Canada.
* Oct. 19-22, 1969—19th Canadian Chemical Engineering Conference, The Canadian Society for Chemical Engineering, and 3rd Symposium on Catalysis, Physical Chemistry Division, University of Alberta, Edmonton, Alberta, Canada.
* Oct. 27-30, 1969—Instrument Society of America, 24th International Instrumentation-Automation Conference and Exhibit, Astrohall, Houston, Texas
Nov. 2-7, 1969—Society of Cosmetic Chemists Arden House Conference, Joint Sponsorship with Columbia University College of Pharmacy, Arden House, Harriman, N.Y.
* Dec. 1-5, 1969—32nd Exposition of Chemical Industries, The New York Coliseum, New York, N.Y.
Dec. 2, 1969—Society of Cosmetic Chemists Annual Scientific Meeting and Medal Award Dinner Dance, Americana Hotel, New York City.

*** Additions to previous calendar**

◆

(Continued from page 416A)

The substance is converted to a water soluble derivative by mild alkaline hydrolysis sufficient for deacylation of glycerides. The derivative formed elutes after glycerophosphorylinositol mono- or diphosphate on anion-exchange chromatography. Strong acid hydrolysis of the water-soluble derivative results in the production of four major ^{32}P-containing compounds separable by anion exchange chromatography, none of which elute with inositol polyphosphate fractions. Products from acid or alkaline hydrolysis liberate inorganic orthophosphate upon enzymic digestion or heating near pH 5 as expected for phosphate monoesters. The properties suggest that the phosphorylated compound is a polar phospholipid-like material of unknown structure.

STUDIES ON THE SYNTHESIS OF FATTY ACIDS BY A BEEF HEART MITOCHONDRIAL ENZYME SYSTEM. J. V. Dahlen and J. W. Porter (Dept. of Physiol. Chem., Univ. of Wisconsin, Madison, Wis.). *Arch. Biochem. Biophys.* 127, 207–223 (1968). Studies are reported on an enzyme system located on the outer membrane of beef heart mitochondria which synthesizes fatty acids by the elongation of pre-existing acids (or acyl-CoA compounds). Proof that fatty acid primers (octanoate, palmitate and linoleate) are elongated by the sequential addition of one or more molecules of acetyl-CoA to the carboxyl end of the fatty acid was obtained by GLC and decarboxylation of the biosynthesized fatty acids. Malonyl-CoA was not a substrate for this reaction and no evidence was obtained for the *de novo* synthesis of fatty acids. The elongation reaction requires only an acyl-CoA primer, acetyl-CoA and NADH. The potassium salt of a fatty acid plus ATP and Mg^{++} can substitute for the acyl-CoA. The primer specificity is very broad but the maximum incorporation of acetyl-CoA was observed with octanoic acid as a primer. When linoleic acid was the primer, arachidonic and other polyunsaturated C$_{20}$ acids were produced. The optimum pH of the reaction was 7.8–8.0 in glycylglycine buffer. NADPH inhibited the incorporation of acetyl-CoA into fatty acids.

GLYCOLIPIDS ISOLATED FROM PORCINE INTESTINE. C. Suzuki, A. Makita and Z. Yosizawa. (Tohoku Univ. School of Medicine, Sendai, Japan). *Arch. Biochem. Biophys.* 127, 140–9 (1968). Preparative silicic acid-Hyflo Supercel column chromatography of crude lipid extracts of porcine intestine gave two glycolipid fractions. The larger fraction was separated into hematosides, porcine intestinal glycolipids I and II (PIGL-I & PIGL-II) and sphingomyelin. From the smaller fraction, cerebrosides, ceramide dihexosides, ceramide trihexosides, cerebroside sulfate and globoside I were isolated and further characterized by qualitative and quantitative analysis. On the basis of chromatographic and analytical data, PIGL-I and PIGL-II were shown to be novel glycolipids. It is concluded that the glycolipid composition of porcine intestine is species and organ specific.

ACETYL GROUP TRANSFER IN LIPOGENESIS, I. STUDIES INVOLVING THE DEGRADATION OF FATTY ACIDS BY THE KUHN-ROTH AND RELATED METHODS. R. Rognstad, J. Woronsberg and J. Katz (Cedars-Sinai Medical Center, Los Angeles, Cal.). *Arch. Biochem. Biophys.* 127, 429–36 (1968). A method to test the role of citrate or acetyl carnitine in acetyl group transfer out of the mitochondria was proposed, based on the loss of tritium from T-acetyl CoA in the citrate synthase reaction. The method was based on comparing the T/^{14}C ratios in acetate obtained by the Kuhn-Roth degradation of lactate and fatty acids formed in adipose tissue from glucose-6-^{14}C-6-T. Isotope discrimination against tritium was found in the citrate synthase reaction. The Kuhn-Roth oxidation, when applied to the degradation of tritium-labeled fatty acids, causes labilization of tritium from the terminal methyl end. In addition, a significant fraction of the acetate produced arises from the center of the fatty acid molecule. Various modifications of the Kuhn-Roth procedure did not markedly improve the results. It was concluded that the procedures based on available degradation procedures are so far not adequate to test the acetyl transport question. The Kuhn-Roth degradation of labeled compounds must be used with great caution in the interpretation of isotope-distribution patterns.

II. FATTY ACID SYNTHESIS FROM INTRA- AND EXTRAMITOCHONDRIAL ACETYL CoA. R. Rognstad and J. Katz. *Ibid.*, 437–44. In order to evaluate the role of citrate as an acetyl carrier from the mitochondria to the cytosol a comparative study was made of the pathways of fatty acid synthesis from acetyl CoA, double labeled with ^{14}C and T in the acetyl moiety,

(Continued on page 424A)

• *New Literature*

Berlox, beryllium oxide, laboratory ware are described in Product Bulletin 600 now available from National Beryllia Corporation of Haskell, New Jersey. Berlox laboratory products are ceramic crucibles, trays, tubes, thermocouple insulators and custom formed units constructed of high-purity beryllia (BeO), an exceptionally chemically inert material which has high resistance to chemical attack. Typical exceptional thermal properties and performance is the heating of materials in Berlox crucibles at temperatures as high as 2000 C, which allows special applications as heating with R_f sources in high purity atmospheres and generally for high purity chemical processing of corrosive materials.

United Sensor & Control Corp., Watertown, Mass., announces a new color brochure featuring a wide selection of standard and special purpose precision probes used for measuring temperature, total and static pressure, velocity and flow direction of fluids, gases and liquids. Offerings include: pitot static, kiel, temperature, 2 and 3 dimensional directional, boundary layer, gas sampling, boost venturi, conical; thermocouples; pressure and temperature rakes; manual traverse units and accessories.

The new 1969 Analabs catalog lists 5000 high quality organic chemicals, 1000 pure lipid research standards and 2000 chemicals and accessories for gas chromatography. A free copy may be obtained from: Analabs, Inc., 80 Republic Drive, North Haven, Conn. 06473.

◆

• *Referee Applications . . .*

(Continued from Page 415A)

Please write to Edward R. Hahn, Chairman of the Examination Board, P.O. Box 1177, Columbia, S.C. 29202

Melba V. Rodgers of Texas Testing Laboratories, Inc., P.O. Box 1299, Lubbock, Texas 79408 has applied for a Referee Certificate on Cottonseed, Soybeans, Oil Cake and Meal, Protein Concentrates, Cottonseed Oil, Soybean Oil and other Fatty Oils. Interested parties wishing to comment on this certification should communicate with the Chairman of the Examination Board. Please write to Edward R. Hahn, Chairman of the Examination Board, P.O. Box 1177, Columbia, S.C. 29202

Harley F. Shofner of Texas Testing Laboratories, Inc., P.O. Box 1299, Lubbock, Texas 79408 has applied for a Referee Certificate on Cottonseed, Soybeans, Oil Cake and Meal, Protein Concentrates, Cottonseed Oil, Soybean Oil and other Fatty Oils. Interested parties wishing to comment on this certification should communicate with the Chairman of the Examination Board. Please write to Edward R. Hahn, Chairman of the Examination Board, P.O. Box 1177, Columbia, S.C. 29202

James K. Sikes of Plains Laboratory, P.O. Box 1590, Lubbock, Texas 79408 has applied for a Referee Certificate on Cottonseed, Soybeans, Oil Cake and Meal, Protein Concentrates. Interested parties wishing to comment on this certification should communicate with the Chairman of the Examination Board. Please write to Edward R. Hahn, Chairman of the Examination Board, P.O. Box 1177, Columbia, S.C. 29202

Donald C. Strathdee of Industrial Laboratories, P.O. Box 845, Clarksdale, Miss. 38614 has applied for a Referee Certificate on Oil Cake and Meal, Protein Concentrates. Interested parties wishing to comment on this certification should communicate with the Chairman of the Examination Board. Please write to Edward R. Hahn, Chairman of the Examination Board, P.O. Box 1177, Columbia, S.C. 29202

◆

(Continued from page 418A)

generated in the mitochondria (by pyruvate decarboxylation) and in the cytosol (by the citrate cleavage enzyme). Epididymal fat pad segments were incubated with glucose-6-^{14}C-6-T, a precursor of mitochondrial acetyl CoA, and glutamate-5-^{14}C-4-T, a precursor of extramitochondrial acetyl CoA. In this manner the tritium loss in the conversion of both extra- and intramitochondrial acetyl CoA to fatty acids can be calculated. It was found that conversion of extramitochondrial acetyl CoA to fatty acids involved a 20% lower loss of tritium than in the conversion of intramitochondrial acetyl CoA. The additional loss of tritium in the latter pathway corresponds closely to the loss of tritium in the conversion of T-acetyl CoA to T-citrate in the citrate synthase reaction, suggesting that citrate is involved in the transfer of the acetyl group of acetyl CoA.

Fat intake and unsaturated fatty acids in infants' diets. M. Finzi. *Industrie Alimentari* 7(11), 101–7 (1968). A review is made of current knowledge and theories concerning infants' diets, with special reference to maternal and artificial milk.

The synthesis of 25-hydroxycholecalciferol. A biologically active metabolite of vitamin D_3. J. W. Blunt and H. F. DeLuca (Dept. of Biochem., Univ. of Wis., Madison, Wis. 53706). *Biochemistry* 8, 671–75 (1969). Cholesta-5,7-diene-3β,25-diol has been sythesized by two methods and then converted into 25-hydroxycholecalciferol, which was identical in all respects with the biologically active metabolite of vitamin D_3 previously isolated from porcine plasma.

Synthesis and distribution of cholesterol, and the effect of diet, at the liver endoplasmic reticula and plasma membranes from lean or obese rats. L. C. Fillios, O. Yokono, A. Pronczuk, I. Gobe, T. Satoh and K. Kobayakawa (Boston Univ. Schools of Med. and Grad. Dentistry, and Univ. Hosp., Boston, Mass.). *J. Nutr.* 98, 105–112 (1969). To determine the significance of changes in cholesterol concentrations in various membranous components of liver cells, lean as well as genetically obese rats were fed diets containing cholesterol. Cholesterol was found to accumulate to a greater extent in the smooth vesicles (versus rough vesicles) of the endoplasmic reticulum, and the highest concentrations were in the plasma membrane fraction. These increases included a significant proportion of esterified cholesterol. Using ^{14}C-mevalonate *in vivo* in rats fed a cholesterol-free diet, it was concluded (from the total activities of the isolated labeled cholesterol up to 180 minutes) that in time the total activity of newly synthesized cholesterol shifts from rough vesicles to smooth vesicles and finally to the plasma membrane fraction. However, ^{14}C-cholesterol incorporation *in vivo* revealed a pattern of incorporation that was similar for smooth and rough vesicles in rats fed diets with or without cholesterol. Total activity of the rough was always higher. From the analytical data, esterification perhaps takes place at the level of the smooth vesicles (or cholesterol ester accumulation hastens the transition of rough to smooth). Polysomal profile analyses indicated that cholesterol feeding resulted in a relative decrease in larger aggregates in obese rats.

Hypocholesterolemic activity of N-(ferrocenylmethyl) piperidine. J. W. Barnhart, J. A. Sefranka, and D. E. Bublitz (Human Health Res. and Dev. Lab., The Dow Chem. Co., Zionsville, Ind. 46077). *Proc. Soc. Exp. Biol. Med.* 130, 1161–64 (1969). A ferrocene derivative, N-(ferrocenylmethyl) piperidine possesses marked hypocholesterolemic activity. This activity appears to be due to the ability of this agent to alter the metabolism of 7-dehydrocholesterol. Abnormal quantities of this sterol were found in serum and liver of animals treated with this chemical. In addition, the ferrocene derivative is an effective inhibitor of the reduction of 7-dehydrocholesterol *in vitro*.

Acute changes in liver lipids during myocardial infarction induced by isoproterenol. J. T. Judd and B. C. Wexler (May Inst. for Med. Res. of Jewish Hosp. and Dept. of Pathology, Univ. of Cincinnati, College of Med., Cincinnati, Ohio 45339). *Proc. Soc. Exp. Biol. Med.* 130, 1302–5 (1969). Adult, male Long-Evans rats were challenged with two subcutaneous doses of the potent catecholamine, isoproterenol. Within hours after the first injection myocardial ischemia and necrosis became apparent. On the second day, after the second injection, myocardial necrosis reached a zenith followed by myocardial repair during days 4–7 after the initial injection. During the development of myocardial ischemia and necrosis

(Continued on page 426A)

(Continued from page 424A)

there is dramatic loss of body weight; dissolution of periadrenal, mesenteric, and other adipose tissue depots; hyperlipidemia; and grossly-visible fatty metamorphosis of the liver. During the myocardial repair phase the hyperlipidemia and the condition of fatty liver disappear rapidly. Chemical analysis of the hepatic lipid fractions demonstrate that there is a very considerable and rapid increase in hepatic triglycerides, a less marked and less rapid but significant increase in hepatic cholesterol, and only a modest fluctuation in hepatic phospholipid.

Enzymatic hydrolysis of sphingolipids. VIII. Further purification and properties of rat brain ceramidase. E. Yavin and S. Gatt (Dept. of Biochem., The Hebrew Univ.-Hasassah Med. Sch., Jerusalem, Israel). *Biochemistry* 8, 1692–8 (1969). Rat brain ceramidase, the enzyme that catalyzes both the hydrolysis and synthesis of ceramide (N-acylsphingosine), was purified over 200-fold. Advantage was taken of the fact that the enzyme withstands prolonged treatment with trypsin and chymotrypsin. This treatment digests 80% of the protein and decreases the molecular weight of the enzyme as determined by gel filtration through Bio-Gel but does not impair the enzymatic activity. Evidence is presented that fatty acyl coenzyme A is not a direct substrate for ceramide synthesis. The acyl portion can be utilized only after hydrolysis by an accompanying hydrolase to coenzyme A and a free fatty acid. Trials were made to separate the hydrolytic and synthetic activities by subjecting the enzyme to ammonium sulfate fractionation, sonic irradiation, adjustment to acid pH, heating, treatment with proteolytic enzymes or with SH reagents and chromatography on TEAE-cellulose. None of these procedures resulted in a separation of the two activities from each other. Reaction mixtures were taken to an apparent equilibrium, starting with either ceramide or a mixture of sphingosine and fatty acid. The calculated equilibrium constant, defined as K_{equil} = (sphingosine) × (fatty acid)/(ceramide), depended upon the substrate employed. It was about 10^{-4} M when determined in the direction of ceramide synthesis, but only 5×10^{-6} M when measured in the direction of hydrolysis. The meaning and possible significance of these findings are discussed.

Phospholipase A_2 from Crotalus atrox venom. I. Purification and some properties. Tai-Wing Wu and D. O. Tinker (Dept. of Biochem., Univ. of Toronto, Toronto 5, Can.). *Biochemistry* 8, 1558–68 (1969). Phospholipase A_2 (phosphatide acylhydrolase, EC 3.1.1.4) has been purified from *Crotalus atrox* (Western diamondback rattlesnake) venom using ammonium sulfate fractionation followed by Sephadex G-75 column chromatography. Using rat liver lecithin of known composition of fatty acids at the 1 and 2 positions, the positional specificity of the purified enzyme has been established by the exclusive release of 2-position fatty acids, which are largely unsaturated. The enzyme acts on ovolecithin in ethereal or chloroform solutions or in ultrasonicated aqueous dispersions with complete hydrolysis to lysolecithin plus fatty acids.

Fatty acid composition, distribution, and requirements of two nonsterol-requiring mycoplasmas from complex but defatted growth media. C. V. Henrikson and C. Panos (Dept. of Biochem., Albert Einstein Med. Cntr., N. Div., Phila., Pa.). *Biochemistry* 8, 646–51 (1969). The fatty acid composition, distribution, and requirements of two nonsterol-requiring mycoplasmas, *Mycoplasma sp. KHS* and *Mycoplasma laidlawii B*, grown in complex but exhaustively defatted growth media have been determined by high-resolving capillary gas chromatography. The need for preformed unsaturated fatty acids for growth of these organisms was judged to be minimal or nonexistent when grown under the conditions described. The monoenoic fatty acid synthetic capabilities of these organisms was also shown to be, at best, meager. Addition of various preformed long-chain monoenoic acids of the *cis* configuration to defatted growth media failed to either alter the growth rate, increase the cellular yields, or affect the microscopic morphology of the organisms examined.

Fatty acid interconversions in mycoplasma sp. KHS. C. Panos and C. V. Henrikson. Ibid., 652–8. This study has utilized this organism as a representative member of the sterol-nonrequiring mycoplasmas and has demonstrated its inherent ability to form long-chain monoenoic fatty acids when supplied with appropriate precursors. The use of palmitoleic ($C_{16}\Delta^{9,10}$) and cis-5,6-tetradecenoic acids has revealed that the position of unsaturation within these precursors influences to a considerable degree the subsequent abilities of this mycoplasma to form a particular positional isomeric octadecenoic acid from them. Under the conditions studied, the formation as well as the absorption of *cis*-vaccenic acid ($C_{18}\Delta^{11,12}$) by whole cells was favored over that of its isomer, oleic acid ($C_{18}\Delta^{9,10}$).

Effects of adrenal mitochondrial lipid on the reduced nicotinamide-adenine dinucleotide phosphate supported 11β-hydroxylation of deoxycorticosterone. Interaction of phospholipid with cytochrome P-450. D. G. Williamson and V. J. O'Donnell (Dept. of Biochem. Fac. of Med., Univ. of Br. Columbia, Vancouver 8, B.C., Can.). *Biochemistry* 8, 1289–1300 (1969). The effects of acetone-extracted adrenal mitochondrial lipid on the reduced nicotinamide-adenine dinucleotide phosphate supported 11β-hydroxylation of deoxycorticosterone has been studied with an 11β-hydroxylase prepared from an acetone powder of beef adrenal mitochondria. The mitochondrial lipid was found to enhance the rates of both 11β-hydroxylation and reduced nicotinamide-adenine dinucleotide phosphate oxidation. Mitochondrial lipid stabilized the hemoprotein, preventing decomposition of cytochrome P-450 to cytochrome P-420 during incubation at 37C. The lipid factor producing this stabilization was precipitated from acetone at −20C. Asolectin also stabilized cytochrome P-450. The stabilization of cytochrome P-450 by the adrenal mitochondrial phospholipid results in an enhanced rate of 11β-hydroxylation.

Phospholipid, protein and nucleic acid increases in protoplasm and membrane structures associated with development of extreme freezing resistance in black locust tree cells. D. Siminovitch, B. Rheaume, K. Pomeroy and M. Lepage (Cell Biol. and Food Res. Inst., Canada Dept. Agr., Ottawa, Ontario). *Cryobiology* 5, 202–25 (1969). Increases in polar lipids (principally phospholipids) and lipoproteins without changes in total lipids are shown to occur in the living bark cells of the black locust tree during development of extreme freezing resistance or hardiness in autumn, and it is suggested that a process of membrane replication is occurring as part of the mechanism of resistance. Membrane replication appears to be a vital factor in the hardiness of tree cells but in view of the fact a) that extreme freezing resistance is never achieved without supplementation of the phospholipid changes with whole cytoplasmic augmentation (increase in soluble protein, etc.), b) that graded levels of freezing resistance can be produced according to different degrees of starvation and augmentation of cytoplasm, and c) that some hardening occurs during starch to sugar conversion, it is suggested that normal hardening is a composite of three principal processes which include membrane replication, membrane replication in association with whole protoplasmic augmentation, and starch to sugar conversion.

Hepatotoxicity and plasma cholesterol esterification by rats. M. Sugano, K. Hori and M. Wada (Kyushu Univ. School of Agric., Fukuoka, Japan). *Arch. Biochem. Biophys.* 129, 588–96 (1969). Plasma lecithin: cholesterol acyltransferase activity *in vitro* was measured in rats treated with ethionine or CCl_4, the purpose of the study being to find the effect of liver injury on the one hand, and the relationship of the activity to the plasma lipid concentration and composition on the other hand. The plasma acyltransferase was reduced considerably and the fatty acid specificity was apparently altered by the hepatotoxic reagents tested. The latter phenomenon is most probably ascribable to the decreased concentration and the altered composition of the plasma lipoproteins rather than to changes in the specificity of the enzyme. Thus, when the normal substrate was available in sufficient quantity for esterification, the specificity of the

Turn to page 431A, *this issue, for*

COMPLETE PROGRAM
AOCS FALL MEETING
LEAMINGTON HOTEL
MINNEAPOLIS, MINN.
OCTOBER 5-8, 1969

enzyme appeared to be unchanged. These observations suggested that not only the concentration but also the composition of fatty acid donors would influence the enzyme reaction *in vitro,* and that ethionine and CCl_4 reduce the enzymic activity but may not change the nature of the enzyme.

LIPASE, ESTERASE AND TRIGLYCERIDE IN THE AGEING HUMAN AORTA. A QUANTITATIVE HISTOCHEMICAL AND BIOCHEMICAL STUDY. C. W. M. Adams, O. B. Bayliss, Y. H. Abdulla, F. R. Mahler and M. A. Root (Depts. of Pathology and Med., Guy's Hosp. Med. Sch., London, Great Britain). *J. Atherosclerosis Res.* **9,** 87–102 (1969). Lipase (tributyrinase), esterase (β-naphthyl laurate esterase), cholesterol, phospholipid and triglyceride were estimated in human aortas from the age of 20 years to the 9th decade. Overall activity of lipase and esterase tended to decrease on a wet weight basis with advancing age, but aortic lipase activity in women remained nearly constant up to the end of the 6th decade. When such decreased activity was compared with the reciprocal of the age increase in aortic weight (i.e. inferred surface area), neither enzyme showed this age-dependent tendency to decline. These results suggest that residual medial activity together with intimal augmentation of lipase and esterase in the ageing human aortic wall prevent any substantial accumulation of triglycerides therein.

• Drying Oils and Paints

STUDIES ON THE THERMAL POLYMERIZATION OF METHYL LINOLEATE. II. RATES ON THE THERMAL DIMERIZATION OF METHYL 9-TRANS,11-TRANS-OCTADECADIENOATE AND DIENOPHILIC ACTIVITY OF METHYL OCTADECENOATE. Ttesutaro Hashimoto, Osamu Suzuki and Keizo Tanabe (Gov. Chem. Ind. Research Inst., Tokyo). *Yukagaku* **17,** 506–11 (1968). Rates of thermal dimerization of *trans,trans*-methyl linoleate were determined at 230, 250, 270 and 290C. The activation energy of this reaction was determined to be 22.5 kcal/mol. An attempt was also made to see whether methyl octadecenoate would react with methyl octadecenoate (oleate and elaidate) to form addition compounds. Both the oleate and the elaidate have only slight dienophilic activity.

PROCESS FOR THE CO-OLIGOMERIZATION OF CONJUGATED UNSATURATED FATTY ACIDS OR THEIR ESTERS WITH INDENE AND/OR COUMARONE. J. Baltes, F. Weghorst and O. Wechmann (Brinckman & Mergell G.m.b.H.). *U.S. 3,441,577.* Conjugated unsaturated fatty acids and their esters are co-oligomerized with indene and/or coumarone at a temp. of 40 to 180C in the presence of an acid or Friedel-Crafts catalyst.

COATING COMPOSITIONS COMPRISING AN UNSATURATED GLYCERIDE AND A NON-RUBBERY, UNSATURATED HYDROCARBON POLYMER. H. L. Gerhart, M. Wismer and P. J. Prucnal (PPG Industries, Inc.). *U.S. 3,442,839.* Resinous compositions are described, comprising an unsaturated glyceride oil and an interpolymer of a polyunsaturated hydrocarbon monomer and at least one monoolefin having a single copolymerizable ethylenic group, the interpolymer having an essentially saturated carbon chain containing a substantial proportion of the total carbon atoms in the polymer molecule and being characterized by the fact that it is substantially cured by oxidative mechanism.

• Detergents

SYNTHESIS AND APPLICATION OF POLYALKYLENE GLYCOL DERIVATIVES. II. SYNTHESIS AND SURFACE ACTIVITY OF SODIUM POLYOXYPROPYLATED HIGHER ALCOHOL SULFATES. Masanori Matsuda, Noriyuki Kawamura, Wataru Yano and Wasaburo Kimura (Shizuoka Coll. Technol., Shizuoka). *Yukagaku* **18,** 132–5 (1969). A series of sodium polyoxypropylated lauryl sulfates (PPLS, adducts of 1, 3, 5, 10, 15 and 20 moles of propylene oxide) was synthesized and the change in their surface activities such as surface tension, foaming properties, wetting power and emulsifying power, by the difference in the number of moles of propylene oxide added, was measured and compared to sodium lauryl sulfate (SLS). The surface tension and the cmc values of PPLS are lower than those of SLS. The foaming power and the foam stability of PPLS, excluding the case of 1 mole adduct, are inferior to those of SLS. The wetting, dispersing and emulsifying powers of PPLS having more than 3 moles of propylene oxide were superior to those of SLS. PPLS are excellent surfactants.

METAL-CONTAINING SURFACTANTS. IV. SURFACE ACTIVE PROPERTIES OF A BINARY AQUEOUS SOLUTION OF DODECYL PYRIDINIUM CHLORIDE-METAL (GROUPS IA AND IIA) SOAP (3). Hiroshi Suzuki (Gov. Chem. Ind. Res. Inst., Tokyo). *Yukagaku* **18,** 136–42 (1969). The emulsifying power of DPC (dodecyl pyridinium chloride) for oils was not affected by the addition of small quantity of metal soap (0.01 to 0.011 mole) but remarkably changed when 0.1 to 0.33 mole of the metal soap was added. In case of sodium ricinoleate, the change in optimum oil for DPC was inconspicuous, while it was remarkable with the salts of barium, magnesium etc. and kerosene and liquid paraffin were optimum with a higher degree of emulsification. With the solution having a DPC: metal soap ratio of 0.02:0.004 mole/l., stearate showed particularly excellent emulsifying power, which was not so greatly varied with metals. Laurates were somewhat good but ricinoleate showed inferior emulsifying power being greatly influenced by metals; the salts of barium, magnesium and lithium showed better results than other metals. There is a general tendency that every metal soap showed as a good emulsifying power for kerosene and liquid paraffin but the other oils showed less favorable.

ANALYSIS OF SURFACE ACTIVE AGENTS BY THIN LAYER CHROMATOGRAPHY. Kiyoshi Yamanaka (Nippon Oils & Fats Research Lab., Tokyo). *Yukagaku* **18,** 161–70 (1969). A review with 45 references.

ANALYSIS OF NATURAL SOILS. I. ANALYTICAL SEPARATION OF HUMAN SKIN LIPIDS EXTRACTED FROM UNDERSHIRTS. Nobuta Hayashi and Shigeo Inoue (Kao Soap Co., Tokyo). *Yukagaku* **18,** 176–83 (1969). Extracts from soiled undershirts were obtained by ethyl ether and benzene-ethanol (80:20) extraction. After qualitative analysis of the two extracts carried out by IR spectrometer and thin-layer chromatography, the extract obtained with ethyl ether extraction was quantitatively separated into several lipid groups by column chromatography using dry column and silicic acid treated with isopropanol-KOH, and gas chromatography. The extract with benzene-ethanol was separated into urea, deteriorated materials and other organic compounds. The composition of

(Continued on page 429A)

(Continued from page 427A)

extracts consists of 1.8% hydrocarbon, 9.3% squalene, 2% cholesterol esters and other sterol esters, 18% waxes, 20.1% triglycerides, 2% diglyceride, 2.4% monoglyceride, 26.4% free fatty acid, 0.8% free fatty alcohols, 1.3% sterols, 6.1% deteriorated and unidentified substances.

II. Constitution of fatty acids and fatty alcohols, and the structure of their branched chain materials in human lipids extracted from soiled undershirts. *Ibid.*, 242–8. Fatty acids and fatty alcohols in human skin lipids were investigated by combined gas chromatography-mass spectrometry using monobasic fatty acids and primary alcohols occurring in wool fat as standard materials. Free and combined fatty acids derived from tri-, di-, monoglycerides, waxes and sterol esters consist of straight and branched chain fatty acids, of which constituents are n-C_{12-18} fatty acids, C_{12}, C_{14}, C_{16} and C_{18} iso fatty acids, C_{12}, C_{15} and C_{17} anteiso fatty acid and highly branched chain fatty acids. Free fatty alcohols and combined fatty alcohols derived from waxes consist of straight and branched chain fatty alcohols, which are n-C_{14-25} fatty alcohols, iso-$C_{16,\ 18,\ 20,\ 22,\ 24}$ fatty alcohols, and anteiso-$C_{15,\ 17,\ 19,\ 21,\ 23,\ 25}$ fatty alcohols.

III. Constitution of hydrocarbons and waxes in human skin lipids extracted from soiled undershirts. *Ibid.*, 249–51. Hydrocarbons were separated into straight and branched hydrocarbons which ranged from C_{14} to C_{41} but mainly C_{22-31}. Waxes were separated into straight and branched chain waxes, ranging from C_{24} to C_{42}, mainly C_{35}.

Preparation of α-polyoxyethylene alkylphosphonates. Yoshiki Ohshiro, Hisaya Miki and Toshio Agawa (Osaka Univ.). *Yukagaku* **18**, 199–202 (1969). α-Polyoxyethylene alkylphosphonates were prepared according the following process. $(RO)_2POH + R'CHO = (RO)_2P(:O)CH(R')CHO(C_2H_4O)_nH$ where $R = C_1$–C_{12}; $R' = C_1$–C_{11}. In this reaction, triethylamine or CH_3ONa was used as a catalyst, and the reaction rate was greater for the case of CH_3ONa. In the reaction with acetaldehyde the yield was poor because of low reaction temperature. The reactivities of dioctyl- and dilauryl phosphite to aldehyde were very low, and α-hydroxyalkyl phosphonate was not obtained. Addition reaction of ethylene oxide to α-hydroxyalkyl phosphonates were carried out at 100C with $BF_3{\cdot}OEt_2$ as a catalyst. Surface tension of aqueous solution of α-polyoxyethylene alkylphosphonates were 30–37 dyne/cm. The surfactants were relatively stable in neutral or acidic solution.

Detergency. IX. Gel permeation chromatography of lipids using bio-bead gel. Teruo Tsunoda, Yoichi Oba and Chiharu Kato (Hitachi Central Res. Lab., Tokyo). *Yukagaku* **18**, 143–7 (1969). The elution curves in gel filtration using two kinds of bio-bead gel (S-X2 and S-X8) were measured for tristearin, fatty acid, cholesterol and its ester which were considered to be the main components of organic soils from underwear. Application of elution solvent gave one peak in both of elution curves in gel filtration of the mixed lipid using S-X2 and S-X8. On the other hand, many peaks corresponding to the components contained in liquid mixture were observed in the elution curve obtained by the gel filtration using S-X2 gel and benzene as the elution solvent. The relation between the elution volumes corresponding to peaks in elution curve and molecular weight was discussed.

Textures of paracrystalline phases encountered in the phase diagrams of surfactant-lipid-water systems. F. Lachampt and R. M. Vila (Ecole Sup. des Corps Gras). *Rev. Franc. Corps Gras* **16**, 87–111 (1969). In this review article, the authors discuss the different phases shown by various systems containing these three components. The phases are illustrated with photographs taken through the polarizing microscope and with phase diagrams.

Surface active compositions. R. R. Warren (Union Carbide Corp.). *U.S. 3,440,171.* The formation of a gel upon addition of a straight-chain alkylbenzene sulfonic acid to an aqueous solution of an alkanolamine is prevented by the addition of a water-soluble inorganic salt such as an alkali metal sulfate or chloride.

Bleaching detergents and washing adjuvants. J. Schiefer and M. Dohr (Henkel & Cie. G.m.b.H.). *U.S. 3,441,507.* Coated peroxygen compounds are described, comprising a finely powdered or granular peroxygen compound having a coating thereon, water-insoluble at room temperature, consisting of (1) 50–100% by wt. of a nitrogenous condensation product of a C_8–C_{26} fatty acid and ammonia, alkyl amine or alkylol amine and (2) 0–50% by wt. of an ester of glycerin and a C_8–C_{26} fatty acid or hydroxy fatty acid.

Detergent containing alkoxy hydroxypropylamine oxide. H. F. Drew and R. E. Hall (Procter & Gamble Co.). *U.S. 3,441,508.* Alkoxy hydroxypropyl amine oxides having improved hygroscopicity and thermal stability properties are employed in detergent compositions containing alkaline builders or other synthetic detergents.

Detergent composition. A. W. Campbell (Vego Chemical Corp.). *U.S. 3,441,510.* New detergent compositions especially suitable for cleaning glass consist of aqueous solutions containing 1–5% by wt. of a lower alkyl amide and may include a lower aliphatic alcohol, lower alkyl ether of ethylene glycol or other conventional solvent, as well as wetting agents and dyes soluble in the composition.

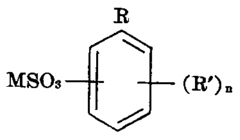
Hydroxyalkylamine oxide detergent compounds. H. F. Drew and R. E. Hall (Procter & Gamble Co.). *U.S. 3,441,611.* Hydroxyalkylamine oxides having improved hygroscopicity and thermal stability properties can be advantageously used in detergent compositions. Similar compositions are described in *U. S. Patent 3,441,612.*

Heavy duty detergent compositions. G. L. O'Connor and D. J. Foster (Union Carbide Corp.). *U.S. 3,442,811.* Improved foam stability is obtained when the ortho-meta-para distribution of a biodegradable alkali metal alkaryl sulfonate detergent is about 35–55/1–20/35–55, respectively. The detergent also contains a sequestering agent, a corrosion inhibitor

(Continued on page 430A)

(Continued from page 429A)

and a soil redeposition inhibitor. The alkyl aryl sulfonate is characterized by the formula:



where M is an alkali metal, R is a C_5–C_{17} straight-chain secondary alkyl group, n is an integer (1 or 2), R′ is an alkyl group having up to 8 C carbon atoms but no more than the number of carbons in R.

Detergent bars. J. D. Barnhurst, G. M. Leigh and J. A. Monick (Colgate-Palmolive Co.). *U.S. 3,442,812.* A detergent bar capable of yielding an acidic lather contains as active detergent components 30–65% by wt. of a non-soap anionic detergent selected from the group consisting of alkane sulfonates, alpha sulfofatty esters and mixtures of alkane sulfonates with a minor proportion of a higher alkyl benzene sulfonate, and at least about 5% by wt. of an amphoteric detergent selected from the group consisting of (1) N-long chain alkyl amino- or iminocarboxylic acids, (2) carboxymethyl dimethyl higher alkyl ammonium inner salts and (3) carboxymethyl dimethyl higher alkyl phosphonium inner salts.

Acetoxy-tertiary alkyl-amine oxides. W. M. Budde, Jr. (Ashland Oil & Refining Co.). *U.S. 3,442,936.* A class of detergent-grade amine oxides are provided by oxidizing an acetylated derivative of a 2-hydroxy (higher) alkyl, di-(lower) alkyl tertiary amine.

Production of detergent alkylate. W. J. Oldham (British Hydrocarbon Chemicals Ltd.). *U.S. 3,442,964.* Detergent alkylates are prepared by the alkylation of aromatic hydrocarbons with C_{10}–C_{16} olefins. The olefins are prepared by dimerizing C_5–C_8 olefins with a catalyst comprised of a synthetic petroleum cracking catalyst and a stable salt of a transition metal.

Production of detergent alkylate and of olefins suitable for preparing such detergent alkylates. W. J. Oldham (British Hydrocarbon Chemicals Ltd.). *U.S. 3,442,965.* Detergent alkylates are prepared by alkylating an aromatic hydrocarbon with a branched chain olefin having 10–16 C atoms. The branched chain olefins are prepared by dimerizing straight chain C_5–C_8 monoolefins with a catalyst comprising a synthetic petroleum cracking catalyst which may also contain an oxide of nickel, cobalt, manganese or chromium.

Detergent compositions. T. B. Hilton and G. J. McEwan (Monsanto Co.). *U.S. 3,444,086.* A built detergent composition is described containing a water soluble alkali metal polyphosphate and a water soluble alkali metal mono-higher alkylbenzene sulfonate, characterized by the alkyl group having n-hexene-1-trimer type structure with 70–85% in the form of methylene groups, having branching on 5–25% of its alpha-carbon atoms and containing an average of 16–20 C atoms.

Detergent compositions. R. D. Eccles, J. E. Yates and T. P. Matson (Continental Oil Co.). *U.S. 3,444,087.* Liquid light-duty and heavy-duty detergent formulations are provided which contain a biodegradable surface active composition composed principally of a mixture of n-alkene and gamma hydroxy n-alkyl sulfonate.

Normal alkenyl-1-sulfonate detergents. W. D. Nielsen (Chevron Res. Co.). *U.S. 3,444,191.* Alkenyl-1-sulfonic acid and alkenyl-1-sulfonates are prepared from C_{12}–C_{22} alpha-olefin mixtures having an average molecular weight of 220–245 and in which 50–75% by wt. is a C_{16}–C_{18} alpha olefin. These materials are wholly biodegradable and are satisfactory replacements for alkylbenzene sulfonate detergent actives.

Surface active agents. L. M. Rue, T. E. Brunelle and W. G. Mizuno (Economics Lab., Inc.). *U.S. 3,444,242.* Surface active agents having a combination of desirable properties including defoaming, good sheeting action, low foaming, caustic stability and biodegradability are prepared by ethoxylating a long chain alcohol with the chain terminated by a benzyl group.

Detergent compositions. F. P. Otto and A. Logothetis (Mobil Oil Corp.). *U.S. 3,445,386.* Lubricant compositions containing polypropenylsuccinimide amides, imidazolines and imidazolidines, in which the polypropenyl group is derived from polypropylene having a molecular weight of 500–3,000, possess improved detergency at high temperatures. The lubricant compositions can optionally contain alkaline earth metal salts of sulfonic acids and phosphosulfurized polyolefins and zinc dialkyl dithiophosphates.

◆