ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: N. E. Bednarcyk, J. E. Covey, J. G. Endres, J. Iavicoli, S. Kawamura, D. A. Leo, F. A. Kummerow, E. G. Perkins, and R. W. Walker

• Fats and Oils

Naturally occurring long-chain β-hydroxyketones. H. H. O. Schmid and Patricia C. Bandi (The Hormel Inst., Univ. of Minnesota, Austin, Minn. 55912). *J. Lipid Res.* **12**, 198–202 (1971). A fraction comprising about 0.7% of the extractable surface lipids of cabbage (*Brassica oleracea*) leaves was isolated and identified as a mixture of isomeric β-hydroxyketones consisting mainly of 14-keto-16-hydroxynonacosane and 15-keto-13-hydroxynonacosane.

Mass spectrometry of the phosphatidylcholines: dipalmitoyl, dioleoyl and stearoyl-oleoyl glycerylphosphorylcholines. R. A. Klein (Inst. of Animal Physiology, Agr. Res. Council, Babraham, Cambridge, Eng.). *J. Lipid Res.* **12**, 123–31 (1971). Mass spectra of the diacyl glycerylphosphorylcholines have been obtained using a direct insertion probe, with a source temperature of 250C at an ionizing potential of 70 ev. Fragmentation patterns are described for dipalmitoyl, dioleoyl and 1-stearoyl-2-oleoyl glycerylphosphorylcholines. Significant differences are observed in the fragmentation patterns, and the fragment ions have been identified by high resolution mass measurements. Ions associated with the hydrocarbon chains, glycerol esters, and phosphorylcholine have been identified, and the presence of metastable transitions have been used as confirmatory evidence for some of the steps involved in the fragmentation sequence. A molecular ion was tentatively identified in the case of dioleoyl glycerylphosphorylcholine. The mass spectrum of 1-stearoyl-2-oleoyl glycerylphosphorylcholine shows an important rearrangement ion at m/e 604 and some evidence for the differential cleavage, or stability, of the stearoyl- and oleoyl-containing fragments. Strong similarities exist between the observed spectra for the diacyl glycerylphosphorylcholines and those for the corresponding glycerides.

Cellulose determination in coconut meal. A. Prevot and C. Bloch (Labs of the Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* **18**, 11–16 (1971). The method of separating the hydrolysis residue was studied in terms of its effect on accuracy and precision. Methods of separation included filtration on asbestos, nylon and carbon felt, and centrifugation followed by filtration on glass wool or alundum crucible. Filtration through nylon was the best method followed by filtration through asbestos. The complete analytical method is given at the end of the article.

The oxidation of salted margarines. E. Sambuc, G. Reymond and M. Naudet (ITERG, Marseille). *Rev. Franc. Corps Gras* **18**, 17–20 (1971). The rate of oxidation, as determined by the Kreis test, was accelerated by the chloride ions and by the acidity of the aqueous phase. Antioxidants, principally BHT and propyl gallate, were effective in controlling the oxidation when used in sufficient quantities.

Comparative study of the specifications of tallows used in milk products. A. Uzzan (ITERG, Paris). *Rev. Franc. Corps Gras* **18**, 21–4 (1971). Tallows used in the rations of young animals should be of excellent quality. Considerable variations in the specifications for this raw material exist among the various European countries. It would be advantageous to make them more uniform.

Gas chromatography of methyl esters of fatty acids containing secondary functional groups. M. Heintz, A. Druilhe, J. Gregoire and D. Lefort (C.N.R.S., 2, rue Dunant, 94-Thiais). *Oleagineux* **25**, 669–78 (1971). Equivalent chain lengths and retention indices were studied with two nonpolar columns (SE-30 and Apiezon L) and one polar column (DEGS). The main chains of the fatty acids contained 16 or 18 carbon atoms, and the secondary functional groups consisted of 1, 2, or 3 double bonds, a triple bond, a 5-membered ring, keto, epoxy, cis, trans, hydroxy- acetoxy, and threo- and erythro-dioxolane. On the nonpolar stationary phase, the equivalent chain lengths and the retention indices did not vary either with temperature or with the percentage of stationary phase. The variations were much greater on the polar column.

Deterioration of oils and fats of hardened coconut oil series. V. Permeability and sorption of water. I. Niiya, T. Maruyama, M. Imamura, T. Makino and T. Matsumoto (Japan Margarine & Shortening Makers Assoc., Nihonbashi Hamacho, Chuo-ku, Tokyo, Japan). *Yukagaku* **19**, 313–18 (1970). Hydrolytic deterioration concerns water permeability and sorption of fats. Permeability through a thin membrane of fat was greater at 15C than at 5C, and greater in hardened palm kernel oil (i) than in hardened coconut oil (ii). Sorption of water decreased in the order of i, ii, and hardened cottonseed oil (iii). While iii could desorb completely, i and ii had difficulty in desorption, showing high hygroscopicity. Specific surface area decreased in order of i, ii, and iii.

VI. Preventing the deterioration by addition of liquid oil or preheating. I. Niiya, Y. Kinoshita, M. Imamura, M. Okada, and J. Matsumoto. *Ibid.*, 397–402. The deterioration of hardened coconut oil stored at low temperature was investigated. Sometimes fully hardened beef tallow is added to obtain a high mp coconut oil, but this accelerates the deterioration. Addition of 5 or 50% liquid soybean oil to such mixtures enabled the prevention of increase in acid value without significant lowering of mp. Observations were made by an electron microscope of the crystal surface of mixed fats. When the oil is solidified by rapid cooling, then heated at 30C, and allowed to stand at 15°, the increase in acid value is extremely small. Thus heat treatment is also useful for preventing the deterioration.

VII. Preventing the deterioration by addition of surfactants. I. Niiya, Y. Kinoshita, M. Imamura, M. Okada and T. Matsumoto. *Ibid.*, 473–81. There were 3 kinds of surfactants in relation to this purpose. (1) Addition of 0.5–2% of monostearin, monopalmitin or monolaurin increased acid value, showing practically no effect in respect to the prevention of deterioration. (2) Addition of 0.5–1% of sorbitan monoacylate ester, polyoxyethylene sorbitan monoacylate ester, or lecithin showed no increase in acid value, when stored at 15C for 6 months. Sucrose acyl ester was less effective. (3) Malate monoglyceride increased acid value. Observations were made by an electron microscope of the crystal surface.

Recent researches on gas chromatography of the components related to fatty oils. Toru Takagi (Nagoya Univ., Nagoya, Japan). *Yukagaku* **19**, 279–87 (1970). The topics reviewed include GLC of fatty acids, glycerides, phosphatides, mixed oils (as adulterants), chlorinated insecticide residues, hydrocarbons, antioxidants and terpenoids.

Differential thermal analysis of edible fats and oils. VII. Detection of adulterants in sesame or olive oil. I. Niiya, T. Maruyama, M. Imamura, and T. Matsumoto (Japan Margarine & Shortening Makers Assoc., Nihonbashi Hamacho, Chuo-ku, Tokyo, Japan). *Yukagaku* **19**, 288–94 (1970). Continuous cooling and heating differential thermal analysis (DTA) from 0C to −100C was examined as a method for determining adulteration of sesame or olive oil with soybean, cottonseed, kapok, rapeseed, peanut or linseed oil. When more than 20% soybean, peanut or linseed oil is added to sesame oil, the former can be identified by the characteristics of the cooling DTA curve. Presence of rapeseed oil (>20%) can be determined by heating and cooling DTA curves. However, cottonseed oil is difficult to detect in sesame oil. Addition of more than 20% of soybean, cottonseed, or peanut oil in olive oil can be detected by cooling and heating DTA curves. Kapok oil (>10%) can be detected, but rapeseed oil is difficult to detect in olive oil.

VI. Studies of hardened oil mixed with vegetable oil by the reflection small-angle scattering X-ray diffraction apparatus. *Ibid.*, 391–6. Hardened soybean oil (*i*) (I.V. 22.8) was mixed with one of vegetable oils—soybean, cottonseed, safflower, corn, rice, and rapeseed oil—in various ratios and the mixtures were studied by the X-ray diffraction apparatus. Open-chain capillary mp of *i* mixed with corn or rice oil showed greater changes with lapse of time than that of *i* mixed with soybean, cottonseed or safflower oil. The mp of *i* mixed with rapeseed oil showed the same tendency with that of *i* mixed with corn or rice oil. The measurement by the X-ray diffraction apparatus showed that *i* mixed with corn or rice oil had larger diffraction intensity that *i* mixed with other oils.

Melting point of edible solid fats. V. Hardened fish oils, whale oil and rapeseed oil. I. Niiya, H. Iizima, M. Imamura, M. Okada and T. Matsumoto (Japan Margarine & Shortening Makers Assoc., Nihonbashi Hamacho, Chuo-ku, Tokyo, Japan). *Yukagaku* **19**, 383–90 (1970). All the 3 hardened fish oils (I.V. 40.8, 52.7 and 69.2) showed approximately the same tendency in the open-capillary mp when left at 0C and 10C, but showed great difference in mp when left at 30C. Open-capillary mp of hardened whale oil (I.V. 59.9) showed little difference when left at 0C or 10C, but a great difference when left at 20C. The hardened rapeseed oil (I.V. 69.9) showed small difference in mp in relation to the temperature of standing. Mixtures of hardened fish oils with coconut oil showed different properties according to the ratio of mixing.

Ferulates in rice-bran oil. VI. Isolation of three new triterpenoids. T. Endo, S. Naito and Y. Inaba (Nakataki Pharm. Ind. Co., Nihonbashi Honcho, Chuo-ku, Tokyo, Japan). *Yukagaku* **19**, 298–302 (1970). Edible rice-bran oil contains at least 7 ferulates in the total amount of 2–3%. By gas chromatography 3 new terpenoids were detected with relative retention times of (cholesterol = 1.00) 2.74 (X), 3.08 (Y) and 3.64 (Z). They were isolated from the residue from extraction of cyclobranol by means of column chromatography, digitonin treatment and repeated recrystallization. X, Y and Z were confirmed to be new saturated triterpenoids by infrared spectra, thin layer chromatography, Liebermann-Burchard reaction and X-ray diffraction patterns. X was $C_{30}H_{52}O_2$, mp 181.5C, Y was $C_{32}H_{56}O_2$, mp 109.0C, and Z was $C_{32}H_{56}O_2$, mp 151.0C.

VII. Chemical structure of three new triterpenoids. T. Endo, and Y. Inaba. *Ibid.*, 302–7. Mass and NMR spectra revealed that the 3 new triterpenoids are tetracyclic triterpene alcohols, which differ only in the side chains at C-20 of cycloartanol; one has OH at C-25, the second has CH_3CH_2O at C-25, and the third has CH_3 and CH_3O at C-24. Thus they are 25-hydroxycycloartanol, 25-ethoxycycloartanol, and 24-methoxycycloartanol.

Oils of Basidiomycetes. VI. Oil of Pleurotus ostreatus. Hiroko Yokokawa (Tachikawa Coll. Tokyo, Akishima, Tokyo, Japan). *Yukagaku* **19**, 496–9 (1970). This mushroom was dried and extracted with ether. The fatty acid composition of the oil thus obtained (2.2% of dry matter) was 14:0 1.1, 16:0 23.0, 16:1 10.4, 18:0 2.1, 18:1 36.2, and 18:2 27.2%, as determined by gas chromatography. The unsaponifiable matter (30.2% of ether extract) contained 20.7% sterols and 18.8% $\Delta^{5,7}$-sterol. The main sterol was assumed to be ergosterol (70%).

Separation of different kinds of glycerides. I. Separation of glycerides by the urea adduct method. Kazushige Maruyama and Chizuo Yonese (Osaka Inst. of Technol., Omiya, Asahiku, Osaka, Japan). *Yukagaku* **19**, 481–6 (1970). Separation of mono-, di-, and triglycerides were examined. It was better to dissolve monolaurin and dilaurin in methanol, and trilaurin in methanol-benzene. The ratio of urea and the appropriate solvent should be 1:10 and 1:20 for mono- and dilaurin, respectively. The fractionation efficiency was in the following order: trilaurin > 1,3-dilaurin > 1,2-dialurin > 1-monolaurin > 2-monolaurin.

Rapid gas chromatography of fatty acids. Masao Suzuki and Jiro Hirano (Nippon Oils & Fats Co., Amagasaki, Hyogo-ken, Japan). *Yukagaku* **19**, 468–73 (1970). Operational conditions were systematically investigated for the gas chromatography of fatty acids by use of in situ methylation of the acids by pyrolysis of their tetramethylammonium salts in the injection port of the gas chromatograph. Add 0.1 *N* tetramethylammonium hydroxide solution (twice the equivalent of fatty acids) to the fatty acids to be analyzed. Adjust pH to 7.5–8.0 by 2% AcOH. Take 3 µl sample into a solid capsule. Dry the capsule. Introduce it into the injection port at an inlet temperature of 280C. Methyl esters are formed by pyrolysis.

Lipids of plankton. III. Unsaponifiable matter of the lipid of Themisto japonica. Minoru Yamada (Hokkaido Univ., Hakodate, Japan). *Yukagaku* **19**, 294–8 (1970). The unsaponifiable matter was yellowish brown liquid (26.2% of the lipid), n_D^{20} 1.4779, I.V. 108.9, and contained 19.35% sterol.

It was separated into several components by alumina column chromatography. It contained 50% fatty alcohols (C_{16}, C_{18}, and C_{20} saturated and C_{18-22} unsaturated), 20% sterols (chiefly cholesterol) and a small amount of glyceryl ether (chiefly chimyl alcohol).

IV. Unsaponifiable matter of the lipid of Calanus plumchrus. Minoru Yamada and Toru Ota. *Ibid.*, 377–82. The unsaponifiable matter was reddish brown liquid (50% of the lipid), n_D^{25} 1.4620, I.V. 98.7, and contained 2.0% sterol. It contained 80% fatty alcohols and 2% pristane. The alcohols consisted of C_{16}, C_{18}, C_{20} saturated and C_{16}, C_{18}, C_{20}, C_{22} unsaturated.

• Fatty Acid Derivatives

Automotive lubricating oil additives. Sadayuki Sakurai (Mitsubishi Monsanto Chem. Co., Yokkaichi, Japan). *Yukagaku* **19**, 369–76 (1970). Reviewed are properties of lubricating oil in relation to the demands from engines, classification of additives, purifying and dispersing agents, prevention of wear in engines, viscosity-increasing agents and additives for gear oil.

Transalkylation reaction of dodecyl alcohol with tertiary amine having hydroxyalkyl groups. Kikuo Takehara, Shigeaki Okajima, Hiroshi Hayama, Toshio Agawa and Saburo Komori (Daiichi Kogyo Seiyaku Co., Shichijo Sembon Minami, Shimo-kyo-ku, Kyoto, Japan). *Yukagaku* **19**, 403–9 (1970). The reaction was studied at 300C for 3 hours under 20 kg/cm² of hydrogen by using copper chromite as a catalyst. The reaction of 2-(diethylamino)-ethanol with dodecyl alcohol gave *N,N'*-diethylpiperazine, *N*-dodecyldiethylamine, and *N*-dodecyl-*N'*-ethylpeperazine. Other aminoalcohols studied were *N*-ethyldiethanolamine, triethanolamine, 2-(diethylamino)-ethyl 2-hydroxyethyl ether, and 3-(diethylamino)-propanol.

• Biochemistry and Nutrition

RELATIONSHIP BETWEEN THE NUTRITIVE VALUE AND THE STRUCTURE OF POLYMERIZED OILS. II. SEPARATION OF TOXIC COMPONENTS IN THE THERMALLY OXIDIZED OILS FOR RATS. T. Ohfuji, and T. Kaneda (Tohoku Univ., Sendai, Japan). *Yukagaku* **19**, 486-9 (1970). It is inadequate to fractionate thermally oxidized oil into fatty acid esters to study the toxic fraction. This paper reports a method for direct fractionation. Thermally oxidized oils prepared by heating linseed and soybean oils at 275C for 12 hours with air bubbling were fractionated by silicic acid column chromatography. Successive elution with 15 and 60% isopropyl ether in hexane and ethyl ether separated the thermally oxidized oil into 3 fractions, the apolar fraction (I) consisting of monomers of glycerides, slightly polar fraction (II), and polar fraction (III) consisting of di- and polymers of glycerides. Feeding expt. with mice showed that I, was almost similar to the fresh oil nutritionally, II was entirely nontoxic and III was toxic.

DIGLUCOSYLDIGLYCERIDE FROM B. CEREUS. K. Saito and K. Mudoyama (Dept. of Biochem., Kansai Med. School, Moriguchi, Osaka). *J. Biochem.* **69**, 83–90 (1971). Diglucosyldiglyceride from *B. cereus* was purified on columns of silicic acid and Florisil. The structure proposed was glucosyl-(1→6)-glucosyl-(1→1)-diglyceride. The crystalline lipase of *Rh. delemar*, which was known to attack the terminal ester linkage of the "synthetic" triglycerides, liberated from the diglucosyldiglyceride mainly the higher members of the constituent fatty acids, i.e., *br*-C_{15}, *br*- and *n*-C_{16} and *br*-C_{17} acids with a formation of diglucoslymonoglyceride. The constituent fatty acids of the diglucosylmonoglyceride, esterified at C-2 position, were mainly *br*-C_{18}, *br*-C_{14} and *br*-C_{15}.

STIMULATION BY PHENOLS OF THE REOXIDATION MICROSOMAL BOUND CYTOCHROME b_5 AND ITS IMPLICATION TO FATTY ACID DESATURATION. N. Oshino and R. Sato (Inst. for Protein Res., Osaka Univ., Osaka). *J. Biochem.* **69**, 169–80 (1971). Various phenols, notably *p*-cresol, and two non-phenolic compounds have been found to stimulate the aerobic reoxidation of cytochrome b_5 reduced by NADH, in rat liver microsomes having a high activity of stearyl CoA desaturation. This stimulation is accompanied by simultaneous increases in the oxidation of NADH and consumption of molecular oxygen. The phenols added also seem to be oxidized. Evidence has been obtained that cytochrome b_5 located in a microsomal vesicle undergoes oxidation independently of that present in the other vesicles during the phenol-stimulated process. As in the similar stimulation of cytochrome b_5 reoxidation by stearyl CoA, the phenol effect is inhibited by cyanide. The magnitude of phenol effect can be correlated with the stearyl CoA desaturation activity of the microsomes; it is negligible in liver microsomes from fasted rats, but can be induced profoundly by refeeding the animals on a high-carbohydrate diet. The phenol effect is also detectable in adipose tissue microsomes, which show a high desaturation activity. It is concluded that the phenols interact with the cyanide-sensitive factor, the terminal enzyme of the microsomal desaturation system, resulting in an increased utilization by oxygen of electrons of reduced cytochrome b_5. Since the phenol effect is depressed by low concentrations of stearyl CoA, the cyanide-sensitive factor seems to react with stearyl CoA in preference to the phenols.

THE ELUTION BEHAVIORS OF ACIDIC PHOSPHOLIPIDS ON COLUMN CHROMATOGRAPHY. T. Shimojo, H. Kanoh and K. Ohno (Dept. of Biochem., Sapporo Medical College, Sapporo). *J. Biochem.* **69**, 255–63 (1971). Elution behavior of acidic phospholipids on silicic acid-, cellulose-, and Sephadex LH-20-column chromatography was investigated with special attention to the cations bound to phospholipids and to their purity. The following results were obtained. The binding cations are not a primary factor determining their elution behavior but rather cause a secondary effect, affecting micelle formation of phospholipids. The difference in the chromatographic elution behavior between different cationic forms of acidic phospholipids seemed to be due to a difference in the stability and polarity of micelles. Na- and K-forms of isolated acidic phospholipids tend to form micelles which are smaller, more polar and, probably, less stable than those of their Ca- or Mg-forms in organic solvents. Acidic phospholipids with mixed cations in tissue extract are apt to form less stable or more polar micelles than those with a single species of cation. The mixed cation form is readily converted to the Ca-form by treatment of tissue extracts with $CaCl_2$.

QUANTITATIVE ISOLATION OF TOTAL GLYCOSPHINGOLIPIDS FROM ANIMAL CELLS. T. Saito and S. Hakomori (Biochem. Lab., Dept. of Pathol., School of Public Health and Community Med., Univ. of Washington, Seattle, Wash. 98105). *J. Lipid Res.* 12, 257–59 (1971). The quantitative isolation of total glycosphingolipids from crude lipid extracts without contamination from other lipid classes is described. The method consists of (a) acetylation of total lipids with pyridine and acetic anhydride, (b) separation of acetylated glycolipids from nonglycolipids on a magnesia-silica gel (Florisil) column and (c) deacetylation of glycolipid in chloroform-methanol-sodium methoxide. This method is useful for determination of microgram quantities of glycolipids derived from less than 1 ml of packed cells.

A SIMPLIFIED ASSAY METHOD FOR GALACTOSYL CERAMIDE β-GALACTOSIDASE. N. S. Radin and R. C. Arora (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor, Mich. 48104). *J. Lipid Res.* 12, 256–57 (1971). In a previously described method for determining the activity of cerebroside galactosidase, the enzyme preparation was incubated with an emulsion of cerebroside which had been labeled in the galactose moiety. The liberated galactose was separated from the emulsion by liquid-liquid partitioning, but the presence of detergent necessitated the use of careful agitation and a backwash in order to reduce the contamination of the aqueous layer with excess emulsified substrate. This problem is eliminated by adding a large amount of lipid to reduce the emulsifying power of the detergent. It may be that other lipid hydrolase assays, based on the same principle, would benefit by this approach. Some additional improvements in the assay system are described.

DE NOVO FATTY ACID SYNTHESIS AND ELONGATION OF FATTY ACIDS BY SUBCELLULAR FRACTION OF LUNG. H. Schiller and K. Bensch (Depts. of Pathology, Yale Univ. School Med., New Haven, Conn. 06510). *J. Lipid Res.* 12, 248–55 (1971). Fatty acid synthesis by subcellular fractions of rabbit lung was studied by measuring the incorporation of either radioactive acteyl coenzyme A or malonyl coenzyme A into long-chain fatty acids. Evidence is presented to support the conclusions that the 95,000 g-supernatant fraction contains the enzymes, i.e., fatty acid synthetase and acetyl coenzyme A carboxylase, necessary for *de novo* fatty acid synthesis and is capable of synthesizing long-chain fatty acids, probably palmitic acid, under the appropriate conditions. The mitochondrial fraction incorporates the short-chain coenzyme A derivatives into fatty acids predominantly by the elongation pathway. It is suggested that the palmitic acid synthesized in vivo by the *de novo* fatty acid synthetic pathway, demonstrated in vitro in rabbit lung, may be a source of the lecithin palmitic acid utilized in the synthesis of pulmonary surfactant.

AN EVALUATION OF FOUR METHODS FOR MEASURING CHOLESTEROL ABSORPTION BY THE INTESTINE IN MAN. E. Quintao, S. M. Grundy, and E. H. Ahrens, Jr. (The Rockefeller Univ., New York 10021). *J. Lipid Res.* 12, 221–32 (1971). Critical comparisons have been made in 12 patients of four methods for measuring cholesterol absorption from the intestine. Methods I-III depend on the use of labeled cholesterol (intravenously or continuous labeling orally) in conjunction with sterol balance measurements; Method IV can be carried out with only a single test dose containing labeled cholesterol plus labeled β-sitosterol. In the latter technique absorption is calculated as the loss of cholesterol relative to β-sitosterol during intestinal transit. Method III (isotopic steady-state method) proved to be undependable because of uncertainties in determining the existence of an isotopic steady state. However, Method IV gave good agreement with Methods I and

II, and it appears to have certain practical as well as theoretical advantages. Although Method IV requires collections of stools for up to 8 days, it is nevertheless the most rapid and the simplest of all the methods for estimating absorption. It can also be used in certain situations, such as in fur-licking animals, when Methods I and II are inadequate. Therefore, this method would seem to be a valuable addition to other isotopic techniques for estimating cholesterol absorption in man.

PHOSPHOLIPIDS OF CLOSTRIDIUM BUTYRICUM. IV. ANALYSIS OF THE POSITIONAL ISOMERS OF MONOUNSATURATED AND CYCLOPROPANE FATTY ACIDS AND ALK-1′-ENYL ETHERS BY CAPILLARY COLUMN CHROMATOGRAPHY. H. Goldfine and C. Panos (Dept. of Microbiol., School of Med., Univ. of Penn., Philadelphia, Penn. 19104). *J. Lipid Res.* 12. 214–20 (1971). The positional isomers of the cyclopropane fatty acids of *C. butyricum* phospholipids have been analyzed by capillary column gas-liquid chromatography. Greater than 95% of the methylenehexadecanoic acids was the 9,10 isomer. On the other hand, 60–70% of the hexadecenoic acid precursors was the Δ^7 isomer, and the remainder was the Δ^9 isomer. Of the methylene-octadecanoic acids, 75–80% was the 11,12 isomer, with the remainder being the 9,10 isomer. There were approximately equal amounts of the Δ^9- and Δ^{11}-octadecenoic acids in the phospholipids. This study reveals a surprisingly strong specificity of the cyclopropane synthetase for the (n-7) series of monoenoic fatty acids. An analysis by capillary column chromatography of the monoenoic and cyclopropane aldehyde dimethylacetals derived from the plasmalogens (1-alk-1′-enyl-2-acyl-glycerophosphatides) of *C. butyricum* revealed the presence of the same positional isomeric mixtures of the 16- and 18-carbon monoenoic residues in approximately the same ratios as were found in the fatty acids. In the formation of the cyclopropane alk-1′-enyl ethers there was also specificity for the (n-7) series, but it was not as strong as that seen in the fatty acids. The ratio of the 7,8 isomer to the 9,10 isomer was higher in the methylenehexadecanals than in the corresponding fatty acids. This paper extends the use of Golay capillary columns to the analysis of the positional isomers of plasmalogen aldehydes as their dimethylacetal derivatives.

(Continued on page 309A)

Glycerine Disappearance in the U.S.

The U.S. Department of Commerce has recently issued "Fats and Oils Production, Consumption and Factory and Warehouse Stocks Summary for 1969." [Series M20K(69)-13] Included in these figures are revisions of glycerine production from 1950 to 1969.

Glycerine Production in the U.S. from 1950 to 1969
(100% Glycerol Basis, in Thousand Pounds)

Year	Jan. 1 Stocks[a]	Crude Production[b]	Imports	Exports	Dec. 31 Stocks[a]	Domestic Disappearance	Excess Production Over Disappearance
1950	48,551	225,512	23,782	7,255	50,300	—240,290	—14,778
1951	50,300	211,348	14,606	4,856	55,727	215,671	— 4,333
1952	55,727	187,902	15,303	8,971	37,716	212,245	—24,343
1953	37,716	214,997	35,378	4,262	59,989	223,840	— 8,843
1954	59,989	207,092	14,433	16,860	42,359	222,294	—15,202
1955	42,359	227,999	26,959	9,680	51,977	235,660	— 7,661
1956	51,977	244,177	18,043	10,233	67,247	236,718	— 7,459
1957	67,247	239,743	26,862	9,509	81,033	243,310	— 3,567
1958	81,000	213,300	17,900	17,300	58,300	236,600	—23,300
1959	41,200	267,700	10,400	21,400	38,100	259,900	7,800
1960	38,100	301,800	14,700	20,000	56,200	278,300	23,500
1961	56,200	279,200	14,800	15,600	69,300	265,500	13,700
1962	69,300	249,300	9,300	13,400	57,500	256,900	7,600
1963	57,500	302,100	2,300	30,700	40,700	290,600	11,500
1964	40,700	328,100	9,400	28,100	61,200	288,900	39,200
1965	61,200	346,500	4,200	52,000	47,500	312,400	34,100
1966	47,500	354,800	4,500	43,400	39,000	324,700	30,100
1967	39,000	366,200	3,500	43,800	51,000	313,900	42,300
1968	51,000	362,600	800	55,800	53,200	305,300	57,300
1969	53,200	348,200	1,600	52,800	62,400	287,800	40,400

[a] Beginning with 1959 includes only producers' stocks.
[b] Synthetic glycerine included on crude basis beginning June 1949.

Source: U.S. Bureau of the Census for stocks, production and foreign trade data.

◆

Canadian Oil Processing Company to Build New Oilseed Extraction Plant

Canadian Vegetable Oil Processing, a division of Canada Packers Limited, has announced plans for the construction of a large addition to its plant at Hamilton for the production of rapeseed oil and rapeseed meal.

Major units for the solvent extraction plant will be engineered and furnished by Blaw-Knox Chemical Plants, Inc., Pittsburgh, Pa.

The addition to the Hamilton plant is expected to be in operation within 12 months. When completed, it will have the capacity to process 20,000 bu/day or approximately 5,000,000 bu/year, increasing the total capacity from 7,000,000 to 12,000,000 bu/year.

G.S. Boulter ('45), President of Canadian Vegetable Oil Processing said that the additional capacity will allow the company to supply rapeseed oil and meal for many uses where manufacturers are at present using products manufactured from imported raw materials.

◆

New Fatty Acid Fractionating System

E.O. Seabold ('42), president of Acme Hardesty Company, Inc. has announced the completion of construction and successful startup of their new Fatty Acid Distillation System in their plant in Philadelphia, Pa. EMI Corporation designed the system, supplied the equipment, prepared detailed drawings and specifications for the installation work, and participated in the startup and performance test operations.

This is a multipurpose system capable of carrying out straight distillation, light ends stripping, or fractionation of fatty acids. It employs liquid phase Dowtherm heating to obtain independent temperature control of multiple users.

◆

Gagnon Named as Honorary Fellow

Paul Edouard Gagnon, has been elected an Honorary Fellow of The Chemical Institute of Canada.

Dr. Gagnon is the senior living Past President of the CIC, having served in the year 1947–48. However his contributions to chemical science and to the chemical profession date back much earlier. His first scientific publications appeared in 1929, and since then a great number of excellent papers on an extraordinary variety of topics have borne his name.

Dr. Gagnon, who was born in Kingsey, Quebec in 1901, is best known for his long connection with Laval University. There he has been a chemistry student, lecturer, assistant professor, professor, head of the department of chemistry, dean of the graduate school, a governor, and head of the department of chemical engineering—an impressive record of service to one educational institution. In addition to his degrees of BA, B.Sc and PhD from Laval, he has degrees from the Sorbonne and the Imperial College, and honorary doctor's degrees from Bathurst, McMaster, and Toronto. Other honors include: Emeritus Member of the Professional Institute of the Public Service of Canada (1969), Emeritus Professor of the Faculty of Science of Laval University (1970), and Fellow of The Chemical Society for life (1970).

During the war years his talents were employed in many capacities by various governmental bodies. After the war he served as a member of the National Research Council (1945–51), on the Atomic Energy Control Board (1946–1960), on the Defense Research Board (1946–1952) and the Fisheries Research Board (1956–1960). He has represented Canada at several scientific conferences, and from 1960–62 he served in Vienna with the International Atomic Energy Agency. Returning to Canada he went to Ottawa in 1962 where he worked until 1966 with the NRC's Canadian Journals of Research. From 1965–68 he was a member of the Canadian Government Committee of the Canadian Pavilion at Expo 67.

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(Continued from page 304A)

Reduction in adipocyte ATP by lipolytic agents: relation to intracellular free fatty acid accumulation. A. Angel, K. S. Desai and M. L. Halperin (Dept. of Med., Univ. of Toronto, Toronto 181, Canada). *J. Lipid Res.* 12, 203–13 (1971). Epinephrine, norepinephrine, ACTH and dibutyryl 3′,5′-cyclic AMP reduced adipocyte ATP levels during 60 min incubation; glucose displayed a protective effect. The reduction in adipocyte ATP levels could not be attributed solely to: a direct hormone effect, deficiency in metabolic substrate, activation of adenyl cyclase with ATP consumption, loss of adenine nucleotide from the cell or loss of cells during incubation, lipolytic rate per se, or extracellular accumulation of FFA or glycerol. To determine whether intracellular FFA accumulation was a causative factor, intracellular FFA levels were measured during hormone-stimulated lipolysis. This was accomplished by using sucrose-U-^{14}C as a marker for the extracellular space to correct for contamination of cells by extracellular albumin-bound FFA. These experiments showed that the fall in adipocyte ATP correlated with FFA saturation of medium albumin and progressive accumulation of FFA within the adipocyte. Furthermore, the proctective effect of glucose noted above was associated with a marked reduction in intracellular FFA as compared to the extracellular FFA pool.

Glycosphingolipids in the spleen of developing rats. T. T. Kuske and A. Rosenberg (Med. Service, Francis Delafield Hosp. and Dept. of Med., Columbia Univ. College of Physicians and Surgeons, New York, N.Y. 10032). *J. Lipid Res.* 12, 173–78 (1971). Splenic cholesterol and glucosyl, lactosyl, trihexosyl and sialyl lactosyl ceramides were studied in developing normal rats from birth to 96 days of age. Total lipid, extracted from pooled organs for each age group in the study, were subjected to mild alkaline hydrolysis and separated into purified glycolipid fractions in high yield, by a series of silicic acid column and thin-layer chromatographic procedures. Enzymatic and colorimetric methods were applied to quantitative analysis of each splenic glycosphingolipid fraction and the fatty acids were analyzed by gas-liquid chromatography. Glycosphingolipid content in the total spleen increased over the period of the study. The most rapid increase occurred during the third and fourth weeks. There was also a 2.5 fold change in the concentration (per gram of tissue) of glucosyl and sialyl lactosyl ceramides, the principal glycosphingolipids of rat spleen. In contrast, cholesterol concentration increased only slightly. A precisely equimolar ratio of glucosyl and sialyl lactosyl ceramide was observed throughout all stages of splenic development. Fatty acid compositions of these two lipid fractions were always significantly different.

Reduction and esterification of cholesterol and sitosterol by homogenates of feces. R. S. Rosenfeld and L. Hellman (Inst. for Steroid Res. and Dept. of Oncology, Montefiore Hosp. and Med. Cen., New York, N.Y. 10467). *J. Lipid Res.* 12, 192–97 (1971). Mixtures of cholesterol-1,2^{3}H and sitosterol-4^{14}C have been incubated with suspensions of feces in order to compare the behavior of the phytosterol with transformations known to take place with cholesterol under these conditions. Within the limitations of the study, both labeled sterols were esterified to the same extent, and reduction of the Δ^5 double bond to the saturated analogue proceeded equally in both substances. After correcting for procedural losses, the recoveries of ^{3}H and ^{14}C from the incubations were always less than the controls; this strongly indicates destruction of sterol by feces microorganisms.

The isolation of lipoproteins from human plasma by ultracentrifugation in zonal rotors. H. G. Wilcox, D. C. Davis and M. Heimberg (Dept. of Pharmacol., Vanderbilt Univ. School of Med., Nashville, Tenn. 37203). *J. Lipid Res.* 12, 160–72 (1971). The major classes of lipoproteins were isolated from human plasma by ultracentrifugation in continuous density gradients using the Ti-14 and Ti-15 zonal rotors. Chylomicrons + VLDL, LDL, and HDL were separated from each other and from the more dense residual proteins (albumin fraction) of plasma by rate-zonal flotation in NaBr gradients in the density range 1.0–1.4. The chylomicron-VLDL fraction was subfractionated into consituent chylomicrons and VLDL by zonal ultracentrifugation in NaBr gradients in the density range 1.0–1.1. Plasma lipoproteins were analyzed for composition of lipids and content of protein, for electrophoretic mobility on paper, and for antigenic determinants by immunolectrophoresis and immunodiffusion. Flotation constants (S_f) of the LDL and HDL were calculated from measurements made in the analytical ultracentrifuge. Lipoproteins isolated from plasma by zonal ultracentrifugation were identical by these criteria to lipoproteins isolated by the usual procedure of sequential ultracentrifugation in solvents of increasing density.

Surface pressure—surface area characteristics of a series of autoxidation products of cholesterol. Aida M. Kamel, A. Felmeister and N. D. Weiner (College of Pharmacy, Rutgers Univ., Newark, N.J. 07104). *J. Lipid Res.* 12, 155–59 (1971). The π-A characteristics of seven known oxidation products of cholesterol were determined. In all cases, the oxidation products yielded films which were more expanded than the film of cholesterol. Shifts in the position of the functional polar groups or the double bond within the sterol molecule results in marked changes in the π-A curves. Furthermore, replacement of the 3-hydroxy group by a keto group results in a significant decrease in the collapse pressure of the films. Mixed films of each of the oxidation products with dipalmitoyl glycerylphosphorylcholine, egg lecithin and cholesterol showed marked condensation effects. However, the data suggest that if air oxidation of cholesterol did occur at a biological membrane containing cholesterol and phospholipids, the permeability characteristics and other properties of the membrane might not be altered significantly.

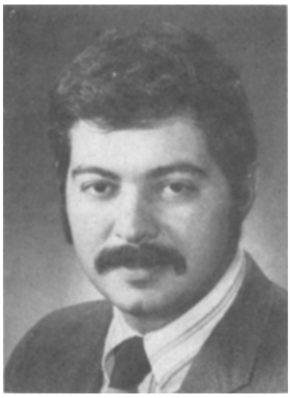
Effect of hemoglobin concentration on the oxidation of linoleic acid. Y. Nakamura and T. Nishida (Burnsides Res. Lab., Univ. of Illinois, Urbana, Ill. 61801). *J. Lipid Res.* 12, 149–54 (1971). The inhibitory effect of high concentrations of hemoglobin on the oxidation of linoleic acid was related to the ability of hemoglobin to associate with the fatty acid. Ultracentrifugation of the mixture of hemoglobin and potassium linoleate revealed that approximately 880 moles of linoleic acid could associate with 1 mole of hemoglobin. High concentrations of hemoglobin apparently reduced the amount of free linoleic acid accessible to the heme group, thus preventing the oxidation of the fatty acid. With low hemoglobin concentrations, at which the oxidation began immediately after the addition of the catalyst, the amount of free linoleic acid was considerably greater than that of bound linoleic acid.

• *Names in the News . . .*

(Continued from page 285A)

Michael J. Hein ('58) has been promoted to vice president, production development, of Capital City Products Co. in Columbus, Ohio. Hein, who joined the company in 1957 as a chemical engineer, will be responsible for feasibility studies of product markets and their methods of production.

M.J. Hein



A.J. Del Vecchio

The appointment of A.J. Del Vecchio ('68) to the technical staff of the C.J. Patterson Company, Kansas City, Mo., was announced by L.F. Marnett, Vice President and Technical Director. Del Vecchio will be in charge of a new section of the technical group responsible for both fundamental and applications-oriented research in certain areas of food technology. Prior to joining the Patterson Company, Del Vecchio had broad experience with Atlas Chemical Industries, Inc. in the areas of research and product development.

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Composition of human cerebrospinal fluid cerebroside. Y. Nagai and J. N. Kanfer (Neurology Res. and J. P. Kennedy, Jr. Mem. Lab., Mass. General Hosp., Boston, Mass. 02114). *J. Lipid Res.* 12, 143–48 (1971). A technique was developed to isolate sufficient material for compositional analysis of cerebroside from pooled human cerebrospinal fluid. The carbohydrate moiety was principally galactose. The sphinogosine base and fatty acid compositions were found to be similar to that of brain cerebroside. The presence of a contaminant in commercial silica gel which chromatographed like the trimethylsilyl derivative of glucose is described.

The apparent transfer of fatty acid from phosphatidylcholine to phosphatidylethanolamine in human erythrocytes. S. B. Shohet (Div. of Hematology, Children's Hosp. Med. Cen., and Dept. of Pediatrics, Harvard Med. School, Boston, Mass. 02115). *J. Lipid Res.* 12, 139–42 (1971). In previous studies an apparent transfer of ^{14}C-labeled fatty acid from phosphatidylcholine to phosphatidylethanolamine was observed in prelabeled human erythrocytes reincubated in fresh serum. These data could have been explained by direct fatty acid transfer from phosphatidylcholine to phosphatidylethanolamine or by an apparent transfer simulated by either demethylation of labeled phosphatidylcholine to phosphatidylethanolamine or base-exchange of phosphatidylcholine with ethanolamine. To explore these possibilities, RBC containing phosphatidylcholine doubly labeled with palmitic acid-9,10-^{3}H and with choline-1,2-^{14}C were prepared. Upon reincubation in fresh serum, incorporation of ^{3}H (fatty acid) into phosphatidylethanolamine was observed without incorporation of ^{14}C (choline). In similar experiments in which RBC labeled fatty acid alone were used, ^{14}C-ethanolamine added to the incubation was not incorporated into the isolated phosphatidylethanolamine which again showed incorporation of the fatty acid-^{3}H. The data indicate that direct transfer of fatty acid from phosphatidylcholine to phosphatidylethanolamine can occur in human erythrocytes incubated in fresh serum.

The synthesis of higher glycerides via the monoglyceride pathway in hamster adipose tissue. F. M. Schultz and J. M. Johnston (Dept. of Biochem., The Univ. of Texas (Southwestern) Med. School, Dallas, Texas 75235). *J. Lipid Res.* 12, 132–38 (1971). The monoglyceride pathway for the synthesis of triglycerides has been investigated employing subcellular fractions and whole cell preparations of white and brown adipose tissue. Conclusive evidence has been obtained for the monoglyceride pathway in these tissues by employing the 2-monoether analogue of 2-monoolein as the substrate. The monoglyceride and α-glycerophosphate pathways were primarily found in the microsomal fraction. In these in vitro systems the activity of the monoglyceride pathway compared with the α-glycerophosphate pathway was of the same order of magnitude in whole cell preparations and was approximately one-half the activity of the α-glycerophosphate pathway when the microsomal fraction was employed.

Isolation and identification of bound, mono-unsaturated fatty acids in lipids on the surface of human skin. T. Shinohara (Lab. of Biochem., Medico-Legal Section, Nat'l Res. Inst. of Police Science, Tokyo). *J. Biochem.* 68, 125–28 (1970). The chemical structures of the mono-unsaturated fatty acids in the saponifiable fraction of lipids from the skin surface after separation of free fatty acids were investigated. From the results, it is concluded that the 14:1 and the 16:1 acids are 6-tetradecenoic and 6-hexadecenoic acids, and the 18:1 is mainly composed of 9-, and 8-octadecenoic acids. These monoenoic fatty acids are probably cis-isomers, like most naturally occurring fatty acids.

Effect of high cholesterol and choline on hepatic phospholipid partition in rats. B. Banerjee, D. Roychoudhury and C. H. Chakrabarti (Univ. Dept. of Biochem., Nagpur, India). *Indian J. Nutr. Dietetics* 7, 10–12 (1970). The effect of high cholesterol and choline diets on hepatic phospholipid partition in albino rats was studied. Animals receiving high cholesterol diet for 12 weeks showed a depletion of phospholipid in liver. A lowering of lecithin with a concomitant increase of phosphatidyl serine, phosphatidyl ethanolamine and ethanolamine plasmalogen fraction was observed. Animals receiving high doses of choline along with high cholesterol diet showed more or less normal levels of total phospholipid, lecithin, phosphatidyl serine, phosphatidyl ethanolamine and ethanolamine plasmalogen.

Effects of dietary cholesterol on the regulation of total body cholesterol in man. E. Quintao, S. M. Grundy and E. H. Ahrens, Jr. (The Rockefeller Univ., New York, N.Y. 10021). *J. Lipid Res.* 12, 233–47 (1971). Studies on the interaction of cholesterol absorption, synthesis, and excretion were carried out in eight patients using sterol balance techniques. Absorption of dietary cholesterol was found to increase with intake; up to 1 g of cholesterol was absorbed in patients fed as much as 3 g per day. In most patients, increased absorption of cholesterol evoked two compensatory mechanisms: (a) increased reexcretion of cholesterol (but not of bile acids), and (b) decrease in total body synthesis. However, the amount of suppression in synthesis was extremely variable from one patient to another; one patient had no decrease in synthesis despite a large increment in absorption of dietary cholesterol, and two patients showed a complete suppression of synthesis. In the majority of cases the accumulation of cholesterol in body pools was small because of adequate compensation by reexcretion plus reduced synthesis, but in few patients large accumulations occurred on high cholesterol diets when absorption exceeded the compensatory mechanisms. These accumulations were not necessarily reflected in plasma cholesterol levels; these increased only slightly or not at all.

Temperature control of phospholipid biosynthesis in Escherichia coli. M. Sinensky (Conant Labs., Harvard Univ., Cambridge, Mass. 02138). *J. Bacteriol.* 106, 449–55 (1971). The higher the growth temperature of *E. coli* cultures the greater is the proportion of saturated fatty acids in the bacterial phospholipids. When fatty acids are exogenously supplied to *E. coli,* higher growth temperatures will likewise increase the relative incorporation of saturated fatty acids into phospholipids. One of the steps in the utilization of fatty acids for phospholipid biosynthesis is, therefore, temperature controlled. The temperature effect observed in vivo with mixtures of ^{3}H-oleate and ^{14}C-palmitate is demonstrable in vitro by using mixtures of the coenzyme A derivative of these fatty acids for the acylation of α-glycerolphosphate to lysophosphatidic and phosphatidic acids. In *E. coli* extracts,

• *New Books . . .*

(Continued from page 283A)

Carbon Monoxide in Organic Synthesis, Jurgen Falbe, Translated by C.R. Adams (Springer-Verlag New York, Heidelberg, Berlin, 219 p., 1970).

This monograph deals with important reactions of carbon monoxide. Four chapters review: hydroformylation (oxo reaction), carbonylation with metal carbonyls (Reppe reactions), carbonylation with acid catalysts (Koch reactions), and ring closures with carbon monoxide. The author has succeeded in describing in detail published information on a very important area of industrial chemistry. The field of carbon monoxide chemistry has been extensively developed in Germany. Since much of this information is described in German patents, this book is particularly useful to American researchers who have little access to foreign patent literature. The German edition of this book which appeared in 1967 was translated, updated and revised in a concise and very readable style by C.R. Adams, Shell Development Co., Emeryville, California.

Each chapter reviews theoretical and practical aspects of organic syntheses with carbon monoxide. Particularly useful descriptions of industrial process operations are provided in the chapters on hydroformylation and carbonylations. Brief summaries of industrial applications and economics are also included. Theoretical discussions of mechanisms are mostly descriptive and do not indicate some of the important problems which need further research. Over 1000 references are provided at the end of the book. Many citations are as late as 1969.

Oil chemists will find in this book several areas of catalytic chemistry which have remained largely untouched for development of useful fatty acid derivatives. Many potentially fruitful areas for further research are suggested. Although highly specialized, this book is recommended to the industrially-oriented fatty acid chemist.

Edwin Frankel
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the relative rates of trans-acylation of palmityl and oleyl coenzyme A vary as a function of incubation temperature in a manner which mimics the temperature control observed in vivo. The phosphatidic acid synthesized in vivo shows a striking enrichment of oleate at the β position analogous to the positional specificity observed in phospholipids synthesized in vivo.

• Drying Oils and Paints

Low molecular compounds in heated linseed oil fatty acid esters. Yoichiro Totani and Noboru Matsuo (Seikei Univ., Musashino, Tokyo, Japan). *Yukagaku* 19, 307–12 (1970). Linseed oil fatty acid ethyl esters were heated at 190, 230, and 270C for 25 hours in a stream of nitrogen. The volatile components were *n*-cotane, *n*-nonane, *n*-decane, *n*-undecane, *n*-tridecane, valeraldehyde, caproaldehyde, pelargonaldehyde, capraldehyde and lauraldehyde, as analysed by gas chromatography. Injection into rats showed that small amounts of the volatile compounds were not toxic.

Aluminum silicate, a synthetic extender for paints. H. V. Shah (Hansa Chemicals, C/32–35 Industrial Estate, Bhavnagar). *Paintindia* 20(12), 23–4 (1970). Aluminum silicate offers advantages on a cost-performance basis in various paint formulations.

Lecithin. Anon. *Peint. Pig. Vernis*, 46, 1049–52 (1970). The structure, preparation and properties of lecithin are reviewed, including its applications in the paint industry as pigment dispersing agent, etc. (World Surface Coatings Abs. No. 345)

n-Heptanoic acid. Anon. *Peint Pig. Vernis*, 46, 1053–4 (1970). Preparation and properties of *n*-heptanoic acid and its derivatives are reviewed. Applications in ester-type plasticisers, alkyd formulation, plastics stabilisers, etc. are noted. (World Surface Coatings Abs. No. 345)

Upgrading of sardine oil for alkyd resins. P. H. Gedam, M. A. Sivasamban and J. S. Aggarwal. *Paint Manuf.* 40 No. 10, 36–8 (1970). A directed interesterification procedure removes the saturated fatty acids from sardine oil. Upgraded oil has been employed to prepare alkyd resins of long and medium oil lengths. Drying time, scratch hardness, adhesion and chemical resistance of their films have been compared with the corresponding properties of resins obtained from other oils. Upgraded oil gave quick-drying and hard films having good resistance to water and acid. Higher values of adhesion have been noted for upgraded sardine oil alkyds. Medium oil length alkyds from all oils are generally superior to the corresponding long oil length alkyds. (World Surface Coatings Abs. No. 345)

• Detergents

Electrokinetic potential of oil droplets dispersed in the aqueous solutions of long chain electrolytes. Lalita Kundu (Dept. of Chem., Vidyasagar College for Women, Calcutta-6, India) and B. N. Gosh. *J. Indian Chem. Soc.* 47, 913–19 (1970). The electrophoretic mobility of oil droplets has been measured under conditions in which the concentration of the long chain electrolyte in the aqueous phase is varied while the ionic strength is kept constant. Using these data the values of zeta-potential have been evaluated with a view to ascertain its dependence on the number of stabilizing ions adsorbed per unit area of the interface and hence on the concentration of the long chain electrolyte in the aqueous phase.

Machine dishwashing composition and process. P. M. Sabatelli (W. R. Grace & Co.). *U.S. 3,535,258.* Food soils are washed from cooking and eating utensils with a low foaming aqueous solution of a washing composition comprising from 10 to 50 parts alkali metal hydroxide, 5 to 30 parts tetraalkali metal pyrophosphate, 5 to 30 parts alkali metal tripolyphosphate, 0.1 to 5 parts of a water-soluble polyacrylate and 0.1 to 5 parts alkali metal nitrite. With this composition, particularly in dishwashing machines, food soils are more efficiently removed from cooking and eating utensils with less spotting and greater clarity to glassware and dishes.

Process for stamping soap tablets and the like. B. C. Moses (Lever Bros. Co.). *U.S. 3,535,414.* A process for stamping capacity soap tablets without extrusion of material from between a pair of dies which close lip-to-lip, in which a billet of soap which is oversized only in the longitudinal direction is positioned between mating die halves to overhang at both ends of the die halves, the ends of the billet are trimmed to correspond in contour with the contours of the end of said die halves, and the trimmed billet is deformed and shaped to form a capacity tablet with substantially no extrusion of material from between the die halves.

Skin moisturizing concentrate containing lanolin derivatives. J. F. Millar and Irene B. Ackers (Charles E. Frosst & Co.). *U.S. 3,535,427.* A transparent homogeneous, liquid concentrate to be added to bath water is made up of mineral oil (the major ingredient); and acetylated lanolin alcohol or acetylated lanolin, or liquid lanolin; isopropyl myristate or isopropyl palmitate or hexadecyl stearate; sorbitan sesquioleate; polyoxyethylene (5) sorbitan monooleate; and perfume blend.

Trends in the world-wide situation for the development of synthetic detergent intermediates over the next decade. N. B. Pinnington (Shell Internat. Chem. Co. Ltd., London). *Rev. Franc. Corps Gras* 18, 5–9 (1971). Biologically hard alkylate based on propylene tetramer will be replaced progressively by straight chain linear alkyl benzene. Synthetic detergent alcohols will take a growing share of the intermediate market, for a number of reasons. Alpha olefin sulfonates, synthetic fatty acids, and possibly normal paraffin sulfonates in selected applications are potential large volume intermediates for the future.

Detergency. IX. Washing of natural sebum. Yoshiaki Komeda, Junryo Mino, Shigeo Inoue and Takeo Shishido (Kao Soap Co., Bunka, Sumida-ku, Tokyo, Japan). *Yukagaku* 19, 324–7 (1970). Washing of fabrics soiled with natural sebum which had been extracted from soiled undershirts with ethyl ether decreased in the order, cotton ≧ wool > polyester > polypropylene. Washability was compared among fatty alcohols, waxes, hydrocarbons, free fatty acids, glycerides, steroids and squaline. The degree of washability differed according to the kind of fabrics.

XI. Microscopic observations of removal processes of model oily soil and natural sebum. Yoshiaki Komeda and Junryo Mino. *Ibid.*, 410–19. With respect to cotton, oleic acid adhering to the fiber filament was immediately removed after contacting to the detergent solution, but was gradually removed with formation of droplets and myelinic figures from twisted yarn. Liquid paraffin adhering on cotton twisted yarn was partly removed with formation of droplets only. It was different in case of wool.

XII. The effect of contact angle, viscosity, and interfacial tension of oily soils on detergency. Yoshiaki Komeda and Junryo Mino. *Ibid.*, 420–5. The degree of change of contact angle of oily soil with the kind of polymer films and oily soils decreased in the following order: triolein > olive oil > oleic acid > squalene > liquid paraffin > tetradecane for oily soils; and polypropylene > cellulose > nylon ≒ treated polypropylene for polymers. The detergency of the mixed soil of liquid paraffin and *n*-octadecane depends on the viscosity and the interfacial tension of the mixed soil, but that of the mixed soil of liquid paraffin and oleic acid cannot be explained only by the viscosity and the interfacial tension of the mixed soil.

XIII. The hydrophilic or oleophilic nature of surfactants, soils and fabrics in detersive systems. Yoshiaki Komeda and Junryo Mino. *Ibid.*, 492–6. In case of washing by the detergent mainly formulated with linear alkylbenzene sulfonate, the detergency depends on water hardness. This dependency is comparatively small for hydrophilic fabrics such as cotton and nylon, but is great for oleophilic fabrics such as wool. The water hardness corresponding to maximum detergency depends on the polarity of the soils adhering on fabrics; it increases with increse of the polarity of the soil. In case of washing by the detergent mainly formulated with nonionic surfactants, the detergency depends only slightly on the HLB of surfactants for the hydrophilic fabrics, but greatly for the oleophilic fabrics.

Solubilization of water in nonaqueous solutions of dodecylammonium carboxylates. Kijiro Konno, Seiichi Kobayashi and Ayao Kitahara (Sci. Univ. Tokyo, Kagurazaka, Shinjuku-ku, Tokyo, Japan). *Yukagaku* 19, 489–92 (1970).

(Continued on page 313A)

Soybean Official Calls for Near-Doubling of USDA Soybean Research Funds

R.W. Judd, managing director of the National Soybean Crop Improvement Council, testified that more than $1.6 million in additional USDA funds will be needed for soybean production research during the 1972 fiscal year. Judd told Congressional subcommittees that $1,640,000 in added USDA research funds will be needed "to improve the genetic potential of America's soybean crop." Current USDA soybean production research budget is $1,798,000. "We must shift from defense—protecting the same yield that we have had for 20 years—to offense. . . . A major research effort is needed to improve soybean varieties, find more efficient methods of harvesting, and provide farmers with a more profitable soybean crop."

"Farmers are producing soybeans with nearly the same production information that they had years ago. No one can now tell the 50-bushel-an-acre producer how to improve his yields. We need more scientists to get that information."

Why the needed boost in soybean research funds? Judd says it is vital to provide world markets with the soybeans and products they demand. "Increased acres may no longer bail us out," he points out. "After ten consecutive years of soybean acre increases, demand for soybeans and products still exceeds supply. Higher per-acre yields are becoming more critical!"

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ABSTRACTS: DETERGENTS

(Continued from page 311A)

Measurements were made of the vapor pressure of water solubilized by dodecylammonium propionate, butyrate, valerate, and caproate and of the temperature dependence of the vapor pressure. The heat of solubilization (I) was smaller than the heat of condensation of water (II) in the initial stage of solubilization. I increased and exceeded II with addition of water. The solvent dependence of I by dodecylammonium butyrate was observed in the initial stage of solubilization. The change of I with the amount of water added was explained with reference to the result of NMR measurement of the CCl_4 soln. and water-solubilizing soln. of dodecylammonium butyrate.

THE STATUS OF SULFONATION REACTION IN DETERGENT INDUSTRY. Akira Mori and Masuzo Nagauama (Lion Fat & Oil Co., Hirai, Edogawa-ku, Tokyo, Japan). *Yukagaku* 19, 458–67 (1970). A review with 67 references of the sulfonation of aromatic compounds and of olefins, sulfation of alcohols, sulfonation of fatty acids and of paraffins, sulfonation of unsaturated compounds with H_2SO_3, and new apparatus for sulfonation.

PERACID TYPE POLYMERS. VII. Toru Takagi (Nagoya Univ., Nagoya, Japan). *Yukagaku* 19, 499–501 (1970). The carboxylic acid type ion-exchange resin, Amberlite IRC-84, showed little bead damage on conversion to the peracid type resin with H_2O_2-sulfonic acid reagent. Soaking of beads in alkali solution split their surface even at room temperature, which caused severe damage of beads thereafter. The particle size of beads showed no significant influence on the rate of epoxidation of α-oleins.

METAL-CONTAINING SURFACTANTS. VII. SURFACE ACTIVE PROPERTIES OF BINARY AQUEOUS SOLUTIONS OF DODECYLPYRIDINIUM CHLORIDE AND METALLIC SOAPS OF GROUPS Ib, IIb, VIIa, AND VIII. Hiroshi Suzuki (Government Chem. Ind. Res. Inst. Tokyo, Shibuya-ku, Tokyo, Japan). *Yukagaku* 19, 328–36 (1970). Metallic soaps studied are Mn, Zn, Cd, and Co laurates and ricinoleates and Cu ricinoleate. The molar mixing ratio of dodecylpyridinium chloride to metallic soap was 5 or 10:1. The properties studied were solubility, surface activity, contact angle, electric conductance, wetting, foaming and emulsifying properties, rust-prevention, and antibacterial action.

DETERMINATION OF SODIUM CARBOXYMETHYL CELLULOSE IN HOUSEHOLD DETERGENTS BY ANTHRONE-NAPHTHALENEDIOL METHOD. Toshio Nagai and Tsuneo Nihongi (Lion Fat & Oil Co., Hirai, Edogawaku, Tokyo). *Yukagaku* 19, 318–23 (1970). Household detergents contain ordinarily about 1% Na CMC. The anthrone method of H. C. Black (*Anal. Chem.* 23, 1794 (1951)) and naphthalenediol method of R. W. Eyler (*Ibid.* 19, 26 (1947)) were combined. Both the concentration and the degree of substitution with carboxymethyl could be determined.

ALPHA-OLEFIN SULFONATES. COMMERCIAL PRODUCTION AND PERFORMANCE. Shin-ichi Tomiyama (Lion Fat & Oil Co., Yokoami, Sumida-ku, Tokyo, Japan). *Yukagaku* 19, 359–68 (1970). Instead of using linear alkyl sulfonates to prevent water pollution by alkylbenzene sulfonates, the author suggests surfactants based on α-olefin sufonates. This review describes the sulfonation of α-olefins and properties of α-olefin sulfonates including their utility as surfactants and their resistance to hydrolysis.

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Armour Industrial Chemical to Increase English Amines Production Capacity

Armour Industrial Chemical Company today announced a major expansion of facilities in England for the production of its fatty amine derivatives. An investment of $2.4 million will permit an increase of approximately 40% in the capacity of its wholly-owned English subsidiary, Armour Hess Chemicals Limited. Armour Industrial Chemical Company is a part of Akzona Incorporated.

J.H. Gardner, president of AICC, said that the new facilities in Littleborough are scheduled to go on-stream by mid-1972.

The basic technologies which will be utilized by Armour Hess were pioneered by Armour Chemical. The products are based upon a wide spectrum of fats and oils which are split into fatty acids and glycerine.

The AICC president said that initially much of the new amine production will be exported to world markets currently supplied by the company's United States and Canadian plants. This will make available additional capacity to serve the expanding North America markets.

Armour Chemical's fatty amine products find a wide variety of applications as additives, processing aids and intermediates. Its markets include almost all of the major industrial categories. The company holds more than 2000 patents and produces every significant type of amine derivative.

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Glycerine Production Statistics

According to the U.S. Department of Commerce, production of crude glycerine (including synthetic) for March 1971 totalled 30.6 million pounds, up 6.3 million pounds from February (revised), and up 1.7 million pounds from March 1970.

At the end of March, producers' stocks of crude and refined glycerine totalled 50.2 million pounds, up 2.2 million pounds from February (revised), and down 4.9 million pounds from the end of March 1970.

The February 1971 crude and refined glycerine production and stocks figures were revised as follows, in thousands of pounds, 100% basis: production, crude, from 24,605 to 24,317; production, refined, from 25,755 to 25,757; stocks, crude, from 20,187 to 21,059; stocks, refined, from 27,107 to 26,969. These revisions have raised the total stocks level from 47,294,000 to 48,028,000 pounds and lowered domestic disappearance from 23,206,000 to 22,184,000 pounds.

Exports of crude and refined glycerine for March 1971 were reported at 4,941,732 pounds, 100% basis.

Source: Glycerine Producers' Association, 475 Park Avenue South at 32nd Street, New York, N.Y. 10016.

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• *Obituaries*

Wilhelm Depmer ('58), Consulting Engineer, Hamburg, West Germany, died last April.