ABSTRACTS

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

• Fats and Oils

DENATURATION OF THE PROTEINS OF THE OIL CAKE OF SUNFLOWER SEED DURING THE VARIOUS STAGES OF EXTRACTION. M. Gardev *et al. Maslosap. Prum.* 3(2), 31–37 (1967). The importance of the denaturation of proteins during the various stages of the extraction process in both continuous and batch extractors is studied. Denaturation is estimated by hydrolyzing the protein with pepsin and measuring the quantity of hydrolyzed protein. During the extraction process using batch systems, there is a much higher degree of denaturation than in continuous types. Denaturation is probably due to direct contact with the heating surface during removal of the solvent. Recommendations are made to modify the batch process in order to produce sunflower seed cake with a higher nutritive value. (Rev. Franc. Corps Gras).

METHOD TO DETERMINE THE AMOUNT OF ISOTHIOCYANATE (ITC) AND VINYLTHIOOXAZOLIDONES (VTO) IN SUNFLOWER SEED. II. MODIFICATION OF ENZYME HYDROLYSIS. L. Strecker (Inst. of Ind. Fats and Oils, Varsovic). *Tluszcze jad.* 11(2), 77–81 (1967). The method of Wetter for the enzymatic hydrolysis of thioglucosides macerates the sample for 3 hours at 40C. The same result can be obtained at ambient temperature by macerating for an afternoon. In comparing the amount of VTO and ITC determined after maceration using the method of Wetter and the ambient temperature technique, the following results on three types of sunflowerseed is given: decorticated sunflower seed shows a small amount of VTO and ITC, partially decorticated sunflower seed shows a medium amount of VTO and ITC, while undecorticated sunflower seed shows a large amount of VTO and ITC. All tests were run in triplicate and the maceration carried on for 16 to 20 hours. The variation in temperature is important. It has been found that about 25C is ideal. Variable results are obtained at 40C. Thioglucosides are hydrolyzed well in all sunflower seeds with the exception of these which have not been decorticated. (Rev. Franc. Corps Gras).

STUDIES ON THE MODIFICATIONS OF THE FATTY ACIDS OF RAPESEED OIL DURING INDUSTRIAL HYDROGENATION. A. Jakubowski. *Prace Instytutow* 17(1), 77–122 (1967). It has been found that during the industrial hydrogenation of rapeseed oil, linolenic acid is hydrogenated first. Linolenic acid is converted to the C18:2 isomer. Natural linoleic acid is then hydrogenated to the C18:1 isomer. The formation of saturated acids is low. During the course of hydrogenation, a substantial isomerization of the *cis-trans* double bonds has been observed. After three hours, the *trans* isomers amount to two-thirds of the total quantity of unsaturated bonds. A survey of a diverse group of commercially hydrogenated rapeseed oils has shown a marked difference in the composition of the fatty acids and the amount of *trans* isomer contained in these oils. (Rev. Franc. Corps Gras).

QUANTITATIVE ANALYSIS OF SIMPLE LIPID CLASSES BY THIN-LAYER CHROMATOGRAPHY. V. P. Skipski, J. J. Good, Marion Barclay and R. B. Reggio (Div. of Exptl. Chemotherapy, Sloan-Kettering Inst. for Cancer Res., New York, N. Y.). *Biochem. Biophys. Acta* 152, 10–19 (1968). A quantitative thin-layer chromatographic procedure for the analysis of simple lipid classes ('neutral lipids') is described. They are separated by two-step development on silica gel thin-layer chromatoplates. In the first step the solvent diisopropyl ether-acetic acid (96:4, v/v) was used and in the second step, petroleum ether-diethyl ether-acetic acid (90:10:1, v/v/v). After separation, lipid bands were detected by Rhodamine 6G spray, the silica gel with adhered lipids was scraped off and the lipids were eluted. Triglycerides, diglyceride, free fatty acids and hydrocarbons were eluted with diethyl ether, whereas monoglycerides, free cholesterol and cholesteryl esters were eluted by chloroform-methanol (4:1, v/v). The eluates were filterd through sintered glass ('fine' porosity) funnels. The eluted lipids were analyzed in the following ways: quantity of triglycerides, diglyceride, monoglycerides and hydrocarbons were determined by quantitative infrared spectrophotometry; free fatty acids by titration; and cholesteryl esters and cholesterol by a standard chemical procedure. The average recovery of individual lipid classes was in the range 90.9–102.0%. Applicability of the procedure for quantitative analyses of tissue lipids is demonstrated on lipid extracted from rat livers.

RAPID COLORIMETRIC MICROMETHOD FOR FREE FATTY ACIDS. R. D. MacKenzie, T. R. Blohm, E. M. Auxier and A. C. Luther (Dept. of Biochem., The Wm. S. Merrell Co., Cincinnati, Ohio 45215). *J. Lipid Res.* 8, 589–97 (1967). Free fatty acids (FFA), the uranyl ion, and the basic dye Rhodamine B form colored complexes, which are extractable into toluene or benzene. Fatty acids of different chain lengths above C_{10} and different degrees of unsaturation gave constant molar yield. Complexes in toluene alone are unstable, especially in the light, but a small amount of aqueous uranyl acetate stabilized them sufficiently for determination. At constant uranyl and Rhodamine B concentrations, a plot of optical density vs. FFA concentration yields two straight lines of different slope, i.e., a biphasic standard curve. Phospholipids interfere, and must be removed with zeolite during FFA extraction. Recovery of FFA added to rat plasma was very similar to that with titration. Assay of rat and dog plasma samples under fasting and fed conditions gave good agreement with the titration method. Values of human plasma samples tended to be higher by the colorimetric procedure; a few samples gave significant disagreement. The method compares well with previous methods in sensitivity and accuracy, and offers advantages in speed, simplicity and possibly specificity.

SIMPLE DEVICES FOR THE APPLICATIONS OF SAMPLES AS NARROW STREAKS FOR THIN-LAYER CHROMATOGRAPHY. P. G. Roughan and C. C. Tunnicliffe (Dept. of Chem. and Biochem., Massey Univ., and Plant Physiology Div., Dept. of Scientific and Industrial Res., Palmerston North, New Zealand). *J. Lipid Res.* 8, 511–13 (1967). The construction and use of devices, based on the design of Achaval and Ellefson, for the application of samples as 1–12 cm streaks at the origin of thin-layer chromatograms is described. These devices are simple to make, and rapid and quantitative in their operation.

QUANTITATIVE GAS-LIQUID CHROMATOGRAPHIC ANALYSIS OF ETHANOLAMINE, MONOMETHYL ETHANOLAMINE, AND DIMETHYL ETHANOLAMINE FROM LIPIDS. R. L. Lester and D. C. White (Dept. of Biochem., Univ. of Ky. Medical Center, Lexington, Ky. 40506). *J. Lipid Res.* 8, 565–8 (1967). A method for the separation and quantitative estimation of ethanolamine, dimethyl ethanolamine and monomethyl ethanolamine derived from lipids is described. After acid hydrolysis of the lipids, the bases are extracted from the neutralized hydrolysate with t-butanol and separated by gas-liquid chromatography.

SEPARATION OF TRIGLYCERIDES BY GAS-LIQUID CHROMATOGRAPHY. R. Watts and R. Dils (Dept. of Med. Biochem. and Pharmacol., Univ. of Birmingham, Birmingham, England). *J. Lipid Res.* 9, 40–51 (1968). The parameters affecting the separation and quantification of triglycerides by gas-liquid chromatography have been investigated with the use of QF-1 and SE-30 as stationary phases and a flame ionization detector. The isothermal characteristics of a wide variety of triglycerides (carbon number 6 to 60) on both columns show that log retention time is directly proportional to carbon number and inversely proportional to absolute temperature. Isothermal retention indices of some triglycerides are given, as are column efficiencies (in terms of theoretical plates and ability to separate closely related triglycerides). When various rates of programmed temperature rise are used, retention indices have been found to be less useful than absolute or relative elution temperatures. The elution temperatures of triglycerides of carbon number 6 to 54 have been determined relative to that of trilaurin. Under optimal separation conditions weight and molar correction factors can be obtained.

QUANTITATIVE GAS-LIQUID CHROMATOGRAPHIC ANALYSIS OF RODENT MILK TRIGLYCERIDES. S. Smith, R. Watts, and R. Dils. *Ibid.* 52–7. A comparison has been made of the milk and adipose tissue triglycerides of rabbits and guinea pigs provided with one diet and of rats and mice provided with another. Both intact triglycerides and component fatty acids were analyzed by gas-liquid chromatography. Good correlation of the data obtained by the two techniques was obtained by calculating the average chain length of the fatty acid moieties. Little difference was found in the triglyceride composition of the adipose tissue of the different species. However, wide variation in the triglyceride composition of the milk was found between the species: the average fatty acid chain length in milk was

11.7 for rabbits, 14.2 for rats, 15.3 for mice, and 17.2 for guinea pigs. The corresponding values for adipose tissue were in the range 16.9–17.4 in all animals. The significance of enzymes that synthesize short-chain fatty acids in mammary gland is discussed.

DISTRIBUTION OF LIPIDS IN VARIOUS FRACTIONS OF COW'S MILK. J. Cerbulis (Eastern Reg. Res. Lab., Philadelphia, Pa. 19118). *J. Agr. Food Chem.* 15, 784–9 (1967). The distribution of lipids in various milk fractions (cream, skim milk, casein, whey, and separator slime) was studied. Petroleum ether and chloroform-methanol (2:1) were used successively as solvents. The petroleum ether fraction is referred to as "free" lipid and the chloroform-methanol fraction as "bound" lipid. Neutral lipids were found in both the free and the bound fractions in milk. Phospholipids were found in the bound fraction only. The composition of the glycerides was determined by thin-layer chromatography. The diglyceride and monoglyceride content of the bound neutral lipid fraction was much higher than that of the free neutral lipid fraction. No significant difference in the composition of the phospholipids was observed among the various milk fractions.

DETERIORATION OF FROZEN PAR-FRIED POTATOES UPON HOLDING AFTER THAWING. 1. OBJECTIVE COLOR MEASUREMENTS AND FAT ABSORPTION. R. M. Reeve, F. P. Boyle, B. Feinberg and G. K. Notter (West. Utilization R&D Div., U. S. Dept. of Agr., Albany, Calif.). *Food Technol.* 22(2), 91–93 (1968). Color of French fries from frozen par-fried stock is impaired by prolonged holding at 55 to 35F before finish frying. The par-fries undergo a phenolic type darkening after cooking at a rate 2.5 times greater at 55F than at 35F. This causes both dullness and darkening of the finish-fry color and the deterioration is visibly detectable when the par-fries have been held 2 days at 55, 6 days at 45, or 10 to 12 days at 34F. Holding par-fries in the frozen state or at very low temperature after thaw significantly reduces oil absorption upon finish frying. These findings emphasize the need for judicious institutional handling of frozen par-fried potatoes for the sake of both quality control and economic benefit.

EFFECT OF VARIOUS PHYSICAL TREATMENTS ON CERTAIN ORGANOCHLORINE HYDROCARBON INSECTICIDES FOUND IN MILK FAT. M. Kroger (Dept. Dairy Sci., Penn. State Univ., University Park, Pa.). *J. Dairy Sci.* 51, 196–8 (1968). Series of experiments were carried out to determine whether heat, deodorization, steam deodorization, and freeze-drying contributed to a reduction or caused the elimination of heptachlor epoxide and dieldrin from butteroil. Freeze-drying and mild deodorization treatments were not effective. More severe deodorization reduced the insecticide levels significantly; as did heating at very high temperatures. Steam deodorization at 180–195C and 0.01–0.5 mm Hg for 5 hours completely removed these organochlorine insecticide residues.

THERMODYNAMICS AND SEPARATION EFFICIENCIES FOR GAS-SOLID CHROMATOGRAPHY WITH MODIFIED ALUMINA COLUMNS. G. Hargrove and D. Sawyer (Dept. Chem., Univ. Calif., Riverside, Calif. 92502). *Anal. Chem.* 40, 409–13 (1968). The thermodynamics and separation efficiencies of gas-solid chromatography have been studied for Na_2PO_4– and Na_2SO_4– modified alumina adsorbents. The results indicate that the magnitude of the non-specific interactions are strongly dependent on the amount and type of modifier, whereas the specific interactions are essentially independent of these variables. For either the Na_3PO_4– or the Na_2SO_4– modified adsorbent, the energetics of interaction and the entropy losses on being adsorbed are much greater for molecules having pi-electron systems than for systems having only sigma bonds. The data also establish that Na_3PO_4 reduces the magnitude of the non-specific interactions with alumina to a much greater extent than does Na_2SO_4. With gas-solid adsorbents the stationary phase contributions to band broadening are less than in gas-liquid chromatography, and have a magnitude that is no greater than the gas phase contributions.

ACNE; SURFACE LIPIDS AND SEBUM. B. Idson (Hoffmann-LaRoche Inc.). *Drug Cosmetic Ind.* 101, 1, 42–44, 155–6 (1967). A review.

A NATURAL FAT CONSISTING EXCLUSIVELY OF DISATURATED GLYCERIDES. A. R. S. Kartha (Indian Agr. Res. Inst., New Delhi, India). *Chem. Ind. (London)* 1967, 1326. Seed fats containing C_{16}–C_{18} acids and having S_m values (molar % of saturated acids) below 40 generally melt below 30C and do not contain detectable amounts of trisaturated glycerides (GS_3); those with S_m above 40 generally melt in the range 30–43C and have so far shown a maximum GS_3 content of only 0.3%. Seed fats containing only traces of GS_3 are possible up to a maximum saturated acid content of 66.6%. A specimen of *G. indica* seed fat, having S_m 65.9, has been examined and found to consist almost exclusively of disaturated glycerides: GS_3 0.3, GS_2U 98.7, GSU_2 0.0 and GU_3 1.0% (all molar percentages). The component fatty acids of this fat were, approximately: palmitic 8.2%, stearic 57.6%, oleic 30.9% and linoleic 3.3% (all weight percentages). The fat had m.p. 42C, I.V. 32.5, contained 2.3% unsaponifiable matter and only traces of non-esterifiable acids.

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

FATTY ACID COMPOSITION OF EPHEDRA CAMPYLOP-ODA SEED OIL. R. Kleiman, G. F. Spencer, F. R. Earle and I. A. Wolff (North. Reg. Res. Lab., Peoria, Ill.). *Chem. Ind. (London)* 1967, 1326. Gas-liquid chromatography of methyl esters derived from *Ephedra campylopoda* C. A. Mey (Ephedraceae) seed oil indicated several atypical C_{20} esters. The major unusual component (22%) has been demonstrated to be all-*cis* 5,11,14,17-eicosatetraenoic acid. The oil also contains substantial amounts of $C_{20:3}$ (5,11,14 and 11,14,17) and of $C_{20:2}$ (5,11 and 11,14).

COMPONENT ACIDS OF LUFFA SEED OILS. R. C. Badami and C. D. Daulatabad (Karnatak Univ., Dharwar, India). *J. Sci. Food Agr.* 18, 445–6 (1967). Seed oils of *Luffa acutangula* and *Luffa aegyptiaca* were examined for their component acids by reversed-phase partition column chromatography with the following results: *L. acutangula:* lauric, 0.5%; myristic, 0.7%; palmitic, 12.9%; stearic, 7.8%; arachidic, 0.5%; behenic, 1.0%; hexadecenoic, 4.3%; oleic, 22.1%; and linoleic, 50.2%. *L. aegyptiaca:* lauric, 0.2%; myristic, 1.0%; palmitic, 11.2%; stearic, 9.9%; arachidic, 0.8%; behenic, 1.1%; hexadecenoic, 2.9%; oleic, 24.1%; linoleic, 48.3%; and linolenic, 0.5%. Epoxy oleic acid, reported to be present in the seed oil of *L. acutangula*, was not detected in the sample investigated.

LECITHIN PRODUCT AND METHOD. J. Eichberg. *U.S. 3,359,201.* A lecithin preparation having improved dispersibility consists essentially of about 1% moisture and up to about 40% of a

fatty oil. It is prepared as the vacuum dried reaction product from an aqueous oil-containing lecithin emulsion containing up to about 50% water with from 0.5 to 5% by wt. of acetic anhydride.

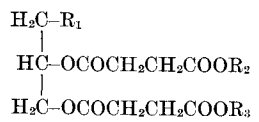
YEAST LEAVENED BAKERY PRODUCTS AND SHORTENING COMPOSITIONS. B. D. Buddemeyer and J. R. Moneymaker (Paniplus Co.). *U.S. 3,360,375.* A shortening composition for use in yeast leavened bakery products contains 0.05 to 20% by wt. of a mono aliphatic ester of adipic acid corresponding to the formula: $ROOC(CH_2)_4COOZ$, where R is a C_{12} to C_{24} alkyl group and Z is a member of the group consisting of hydrogen, sodium, potassium, calcium and magnesium.

THIXOTROPIC SHORTENING. R. D. Dobson (Procter & Gamble Co.). *U.S. 3,360,376.* A method of making an opaque thixotropic shortening having the appearance of a normally plastic shortening at temperatures below 90F when at rest and being pourable at temperatures above 50F when worked, comprises the steps of: (a) blending, at a temperature sufficiently high to eliminate all crystalline material, 85–90% by wt. of a liquid triglyceride base stock with 10–15% by wt. of a hydrogenated triglyceride hardstock having I.V. not exceeding about 12 and having a predominantly *beta* phase crystallization tendency; (b) rapidly cooling the hot liquid mixture, under agitation, to 50–70F to initiate fat crystallization; (c) holding the chilled stock without substantial addition or removal of heat and without agitation until crystallization is substantially complete; (d) converting the crystalline phase of the shortening stock to at least 95% *beta*-phase crystals; (e) heating the transformed stock over a period of a few minutes to 1 hour to a temperature of 115–120F without melting, and (f) cooling the shortening stock to 90–105F over a period of a few minutes to about one hour.

METHOD FOR PRODUCTION OF LOW CALORIE MARGARINE SUBSTITUTE PRODUCTS. J. G. Spitzer and J. J. Kearns. *U.S. 3,360,377.* A method for the production of a low-calorie margarine-substitute composition of good mouth feel and melt down properties comprises the steps of: forming a low-calorie, water-in-oil coarse emulsion containing 0.1 to 0.5% by wt. of an emulsifying agent selected from the group consisting of (a) the combination of a phospholipid and a C_{12}–C_{22} fatty acid, (b) the combination of a phospholipid and a hydroxyester of a C_{12}–C_{22} fatty acid with a polyol such as propylene glycol, glycerol, sorbitan, monosaccharides and oligosaccharides, and (c) hydroxyesters of a C_{12}–C_{22} fatty acid with one of the above mentioned polyols, the dispersed water phase of water droplets consisting of 45–80% by wt. of the total composition; subjecting the coarse emulsion, at a temperature not greater than 113F to appropriate forces to produce a fine emulsion; and converting the fine emulsion from liquid to plastic state by quick chilling to a temperature of at least 52F and with a crystallization rate such that the resulting plastic emulsion is capable of being packaged immediately without causing emulsion breakdown.

LOW CALORIE MARGARINE SUBSTITUTE PRODUCT. J. G. Spitzer and L. I. Osipow. *U.S. 3,360,378.* A stable, low-calorie margarine-substitute composition is claimed, which is substantially free of non-modified proteinaceous matter and is in the form of a water-in-oil emulsion having a flow temperature in the 65–105F range and a penetrometer reading at 40F of 20–250. The composition and the emulsifying system it contains are as described in U.S. 3,360,377.

PROCESS FOR THE IMPROVED WINTERIZATION OF OIL. J. C. Wootton and F. J. Baur (Procter & Gamble Co.). *U.S. 3,360,533.* An improvement is claimed in the process of winterizing edible oil through the steps of chilling a liquid oil to a temperature substantially below 70F, holding the chilled oil at that temperature until crystallization equilibrium has been obtained and separating the resultant mixture of crystals and oil to obtain a crystal fraction and a liquid oil fraction. The improvement consists in adding to the oil a compound having the formula:



where R_1 is an alkanoyloxy group with 12 to 20 C atoms and R_2 and R_3 are C_1 to C_3 alkyl groups. The compound is added at a level of from about 0.05 to about 1.0% by wt. based on the oil to be winterized.

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• Biochemistry and Nutrition

FAT IN MILK REPLACERS, THEIR QUALITY CONTROL AND PERFORMANCE. R. Toullec (Center of Zoological Res., Champanelle (Puy-de-Dome, Fr.). *Rev. Franc. Corps Gras* **14**(8-9), 515–524 (1967). Veal calves normally consume a great amount of fat, which is necessary for rapid growth. Digestive utilization of most fats is high; variation depends especially on the fatty acid composition of the fat. The rumen of the veal calf is not functional. Alimentary fatty acids are not transformed during the digestive process, and therefore have a great influence on the fatty acid composition of lymph lipids and depot fats. Unsaturated fatty acids are not well utilized. Little is known about the influence of short chain fatty acids.

EFFECT OF ENVIRONMENTAL FACTORS ON LACTONE POTENTIAL IN BOVINE MILK FAT. P. S. Dimick and J. L. Harner (Dept. of Dairy Sci., The Pennsylvania State Univ., Univ. Park). *J. Dairy Sci.* **51**, 22–7 (1968). Butteroil from mixed herd milk collected weekly was steam-deodorized and the C-10, C-12, and C-14 aliphatic delta-lactones quantitated. The samples, representing 276 animals, averaging 96.0 ppm of lactone (range 58.6–139.0) and 67.2 ppm of lactone (range 47.7–100.2) while on barn feed and pasture feed, respectively, exhibited a pronounced seasonal trend, being higher in the winter than in the summer. Analyses of weekly milk samples from an individual Holstein during a 310-day lactation indicated dramatic shifts in lactone potential. Following parturition the concentration was 25–30 ppm, which increased to 170–180 ppm at about 150 days. Throughout lactation, lactone concentration showed a negative correlation ($P < 1\%$) with the per cent fat and fat yield. Fatty acid analyses indicated a positive correlation ($P < 1\%$) between lactone content and short-chain fatty acid (4:0–14:1) composition. Analyses of milk from various breeds, on identical feeding regimens, showed a slightly higher lactone potential in Holstein fat. Ketotic animals were characterized by a marked depression in steam volatile compounds, i.e., lactones, carbonyls, and fatty acids. These data, together with other information, strongly imply that the lactone precursors are biological in origin and may be involved in fatty acid synthesis.

EFFECT OF LIPID MATERIALS ON HEAT RESISTANCE OF BACTERIAL SPORES. N. Molin and B. G. Syngg (Swedish Inst. for Food Preserv. Res. (SIK), Göteborg, Sweden). *Appl. Microbiol.* **15**, 1422–1426 (1967). The heat resistance of spores of *Bacillus megaterium, B. subtilis, B. cereus, B. stearothermophilus* and *Clostridium botulinum* type E suspended in phosphate buffer and various lipids were compared. A protective effect was observed in the lipid containing substrates which, to some extent, correlated with the water content of the lipid. It was also observed that the presence of free fatty acids also enhanced the protective effect.

PHOSPHOLIPIDS OF THIOBACILLUS THIOOXIDANS. J. M. Shively and A. A. Benson (Dept. Microbiol., Univ. of Nebraska, Lincoln, Neb. 68508). *J. Bacteriol.* **94**, 1679–1683 (1967). The phospholipids extracted from the cells of *Thiobacillus thiooxidans* and spent media were identified as phosphatidyl ethanolamine, phosphatidyl-N-monomethylethanolamine, phosphatidyl glycerol and diphosphatidyl glycerol. These comprised 97% of the lipid phosphorus. The remaining 3% was accounted for by lysophosphatidyl-N-monomethylethanolamine and lyso phosphatidyl glycerol.

INCORPORATION OF SERINE-^{14}C AND ETHANOLAMINE-^{14}C INTO NITROGEN-CONTAINING PHOSPHATIDES AND EFFECTS OF MEDIUM CONTAINING ETHANOLAMINE ON PHOSPHATIDE BIOSYNTHESIS IN EXCISED TOMATO ROOTS. C. Willemot and W. B. Boll (Dept. Phytotechnie, Faculté d'Agr., Univ. Laval, Ste. Foy, Quebec). *Can. J. Bot.* **45**, 1863–1876 (1967). Serine and ethanolamine were incorporated into the corresponding phosphatides. Phosphatidyl serine was decarboxylated to phosphadidyl ethanolamine which was then methylated to phosphatidyl choline. Choline may also be synthesized by a pathway other than the phosphatide pathway. The replacement of vitamin B_6 by ethanolamine was found to decrease decarboxylation of phosphatidyl serine.

MILK REPLACER FORMULATION. EMULSIFIERS. B. Loiseau (Soc. Melle, Bezons, Fr.). *Rev. Franc. Corps Gras* **14**(8–9), 525–531 (1967). A review of the use and reasons for emulsifiers in calf replacers is given. A qualitative and quantitative test for the specific emulsifier to be used in order to obtain an easily dispensable and stable emulsion is described. Microphotographs demonstrating the differences in a tallow-in-water emulsion (broken, reversed, mixed, stable, and unstable) prepared with and without an emulsifier are shown. Soya lecithin, glycerol monostearate, a mixture of soya lecithin and glycerol monostearate, tallow sucro-glycerides, and mixtures of tallow sucroglycerides and soya lecithin were used as emulsifiers.

LIPID COMPOSITION OF HUMAN SERUM LIPOPROTEINS. V. P. Skipski, M. Barclay, R. K. Barclay, V. A. Fetzer, J. J. Good and F. M. Archibald (Sloan-Kettering Inst. for Cancer Res., New York). *Biochem. J.* **104**, 340–52 (1967). The lipid compositions of low-density lipoproteins, high-density lipoproteins and ultracentrifugal residue of human serum are presented, with emphasis on certain lipoprotein classes and lipid components not previously described. Except for the lipoproteins with the lowest and highest densities, a trend was found for stepwise increase or, respectively, decrease in the relative amounts of the main constituents. High-density lipoprotein-2 and high-density lipoprotein-3 have different amounts of certain lipids; the former has relatively more free cholesterol and sphingomyelin, the latter has more free fatty acids, diglycerides and ceramide monohexosides. All the lipoproteins contain hydrocarbons of the alkane series, the greatest amount (4.4% of total lipid) being in the ultracentrifugal residue. All the lipoproteins eontain ceramide monohexosides, the highest relative amounts being in high-density lipoprotein-3 and in the ultracentrifugal residue. The ultracentrifugal residue contains 55% of the total free fatty acids present in the serum, the remainder being distributed among the other lipoprotein classes. The choline-containing phospholipids (phosphatidylcholine, lysophosphatidylcholine and sphingomyelin) comprise about 90% of the phospholipids in all the lipoprotein classes except low-density lipoprotein-2, which contains about 80% of these phospholipids. The presence of a large amount of lysophosphatidylcholine in the ultracentrifugal residue and the successive decrease of sphingomyelin from low-density lipoprotein-1 to ultracentrifugal residue was confirmed. The low-density lipoprotein-2 and the ultracentrifugal residue are characterized by relatively high contents of the lower glycerides.

CONCENTRATIONS OF GLYCERIDES AND PHOSPHOLIPIDS IN RAT HEART AND GASTROCNEMIUS MUSCLES. R. M. Denton and P. J. Randle (Univ. of Bristol, England). *Biochem. J.* **104**, 416–22 (1967). Methods are described for the extraction of lipid and assay of mono-, di- and triglyceride glycerol and phospholipid phosphorus in rat heart and gastrocnemius muscles. Hearts of normal animals contained: monoglyceride, 0.6; diglyceride, 0.1; triglyceride 12.6 μmoles of glyceride glycerol/g of dry muscle and 171 μg atoms of phospholipid phosphorus/g of dry muscle. Glyceride concentrations in gastrocnemius muscle were similar to heart muscle but phospholipids were lower (64 μg atoms). Alloxan-diabetes increased the concentration of triglyceride in the muscles twofold, the increase being dependent on the availability of growth hormone and cortisol but not on that of dietary lipid. Total glyceride in the heart increased after 48 and 72 hrs. starvation but not after 96 hrs., while no significant changes in phospholipid concentration were observed. The possible contribution of glyceride fatty acid in the heart to respiration during perfusion was calculated from the net loss of glyceride during perfusion, and also from the relative rates of lipolysis and esterification and compared with the oxidation of fatty acids required for the balance of oxygen consumption (oxygen not utilized in the oxidation of glucose or glycogen glucose). In the normal or diabetic heart perfused with glucose and insulin the breakdown of glyceride can account for the balance of oxygen consumption. In the normal heart perfused without substrate the balance of oxygen consumption is not entirely accounted for by the breakdown of glyceride.

MEASUREMENT OF FLOW OF CARBON ATOMS FROM GLUCOSE AND GLYCOGEN GLUCOSE TO GLYCERIDE GLYCEROL AND GLYCEROL IN RAT HEART AND EPIDYMAL ADIPOSE TISSUE. EFFECTS OF INSULIN, ADRENALINE AND ALLOXAN-DIABETES. *Ibid.*, 423–34. Flow of carbon atoms from glucose and glycogen glucose to glyceride glycerol, glyceride fatty acids and glycerol was calculated in the perfused rat heart and incubated epidiymal adipose tissue from the incorporation of ^{14}C from glucose-U-^{14}C and from measurements of the specific activity of L-glycerol-3-phosphate (LG3P), and the effects of insulin, adrenaline and alloxan-diabetes were studied. New methods are described for the measurement of radioactivity in small amounts of metabolites in which use has been made of alterations in charge induced by enzymic conversions to effect resolution by ion-exchange chromatography. In hearts the specific activity of LG3P was less than that of glucose in the medium but similar to that of lactate released during perfusion. Because repeated measurements of the specific activity of LG3P was impracticable, the specific activity of lactate has been used as an indirect measurement of glycerol phosphate specific activity. In fat pads, specific activity of lactate was the same as that of glucose in the medium and thus the specific activity of LG3P was taken to be the same as that of medium glucose. In hearts from alloxan-diabetic rats, despite decreased glucose uptake and LG3P concentration, flow of carbon atoms through LG3P to glyceride glycerol was increased about threefold. In fat pads, flow of carbon atoms through LG3P to glyceride glycerol was increased by insulin (twofold), by adrenaline in the presence of insulin (fivefold) and by diabetes in pads incubated with insulin (1.5-fold). These increases did not correlate with increases in glucose uptake or with the concentration of LG3P. These results are discussed in relation to the control of glyceride synthesis in heart and adipose tissue and to the regulation of glyceride fatty acid oxidation in the perfused rat heart.

CHARACTERIZATION AND METABOLISM OF OVINE FOETAL LIPIDS. T. W. Scott, B. P. Setchell and J. M. Bassett (Ian Clunies Ross Animal Res. Lab., Prospect, Australia). *Biochem. J.* **104**, 1040–7 (1967). Total phospholipid concentrations in liver, kidney and brain of the 140-day ovine foetus were only half of those in comparable maternal tissues. Phosphatidylcholine was the predominant phospholipid in all foetal tissues examined. The most striking difference between foetal and maternal tissues in individual phospholipids was in the heart; foetal heart contained more ethanolamine plasmalogen than choline plasmalogen, whereas in adult tissue this relationship was reversed. Sphingomyelin content of foetal brain was only one-sixth of that of maternal brain tissue. Oleic acid was the predominant acid in the phospholipid extracted from foetal tissues, except in brain where palmitic was slightly higher. In phospholipids from adult tissues there was a higher proportion of linoleic and linolenic acids but a lower porportion of oleic. The fatty acid distribution in the neutral lipids of foetal and maternal tissues was very similar, with oleic acid the predominant component. ^{14}C derived from glucose—U-^{14}C and fructose—U-^{14}C infused into the foetal circulation *in utero* was incorporated into the neutral lipids and phospholipids of heart, liver, kidney, brain and adipose tissue, with a similar pattern of incorporation. Diglyceride accounted for most of the radioactivity in brain, whereas triglyceride had more label in heart, liver, kidney and fat. The specific activity (SA) of phosphatidic acid was higher in liver than in other tissues. The SA of phosphatidylethanolamine was lower than that of phosphatidylcholine in heart, but in other tissues they were about the same. The SA's of phosphatidylinositol and phosphatidic acid in brain were very similar and higher than the other components. The SA of phosphatidylserine was highest in liver and in brown fat.

BLOOD LIPIDS IN MAN. A. Keys (Univ. of Minnesota, Minneapolis). *J. Am. Dietetic Assoc.* **51**, 508–16 (1967). In the diet, the saturated fatty acids with 12 to 17 C atoms in the chain have a strong cholesterol-promoting action. The opposing effect of polyunsaturated fatty acids is about half as great per gram of fatty acid in the diet. Oleic acid, and probably other natural monoenes, can be disregarded with respect to serum cholesterol. The average effects of changes in dietary fats are predictable. Dietary cholesterol also has a predictable effect on the serum level in man, but even substantial variations in dietary cholesterol in ordinary American diets produce only trivial effects. Some complex dietary carbohydrates, notably those in leguminous seeds, have a cholesterol-lowering action, as does also pectin but not fiber or cellulose. The cholesterol responses to the diet are confined to the cholesterol in beta-lipoproteins. Alpha-lipoprotein cholesterol is affected by sex hormones but not by the diet. Serum triglycerides show rapid responses to drastic changes in the amount of total fat in the diet, but true long-time relationships require months of adaptation to be established. Populations habitually subsisting on low-fat diets tend to have low serum triglyceride levels. In surveys on dietetically homogeneous populations, most inter-individual differences in serum lipid levels are not explained by estimates of the contemporary diet. This is the result of the overriding influence of intra-individual variability in both diet and lipid levels, of unavoidable error in quantitative estimation of the relevant nutrients, and of intrinsic differences, perhaps genetic, in metabolism.

FATTY ACIDS IN BLOOD AND TISSUES FOLLOWING PROLONGED FEEDING. M. O. Osborn, J. F. Armstrong, E. H. Denzin, W. B. Ford and G. F. Stoner (Univ. of Iowa, Iowa City). *J. Am. Dietetic Assoc.* **51**, 523–8 (1967). Fatty acids in serum, liver and lung tissues of albino rats fed a human-food diet, a synthetic diet or a commercial pellet rat ration for various periods were determined. Noticeable differences between percentages of fatty acids in the diet and tissues were noted, with biosynthesis of palmitic, myristic, stearic and palmitoleic being indicated in all three tissues. Levels of linoleic in the diet were reflected by levels of both linoleic and arachidonic acid in the tissues, while oleic acid in the tissues followed a pattern similar to, although lower than, the diet. Lung tissues had a higher overall palmitic acid level and a lower content of stearic, linoleic and arachidonic acids than liver tissue or serum. A statistically not significant trend was found for palmitic acid to be higher in all male tissues than in the corresponding female tissues on all three diets. The same occurred for linoleic acid in liver tissues. Age had a greater influence on the fatty acid levels in liver tissue than in serum or lung tissue and in all three tissues diet and age had a greater influence than sex.

RELATIONSHIPS BETWEEN FAT AND MINERAL METABOLISM. E. W. Speckmann and M. F. Brink (Nat. Dairy Council, Chicago). *J. Am. Dietetic Assoc.* **51**, 517–22 (1967). The interrelationship between mineral and fat metabolism is complex and only partially understood. Minerals may act directly on fats or indirectly through their activation of enzymes involved in lipid metabolism. It appears that calcium and fat absorption may be interrelated, with impairment of the absorption of either tending to impair absorption of the other. Calcium has been demonstrated to decrease elevated blood lipids in animal and man. Magnesium is related to cholesterol metabolism and prevents its accumulation in the blood. Cadmium is linearly related to development of hypertension and chromium may inversely influence glucose and lipid metabolism. Manganese, copper, selenium, vanadium and possibly other trace metals also may play integral roles in the metabolism of lipids.

INTERRELATIONSHIPS BETWEEN FATTY ACID BIOSYNTHESIS AND ACYL-LIPID SYNTHESIS IN CHLORELLA VULGARIS. B. W. Nichols, A. T. James and J. Breuer (Unilever Res. Lab., Sharnbrook, England). *Biochem. J.* **104**, 486–96 (1967). Fatty acid synthesis from acetate-2-^{14}C by *Chlorella vulgaris* cells grown and incubated in the dark is limited almost entirely to the production of saturated and monoenoic acids. In light-incubated cells, both saturated and polyunsaturated fatty acids are rapidly synthesized. Two groups of lipids can be distinguished in both dark- and light-incubated cells. The first group, consisting of phosphatidyl-glycerol, monogalactosyl diglyceride, lecithin and neutral glyceride, has a very high turnover rate for certain fatty acids. The second group, consisting of digalactosyl diglyceride, sulpholipid, phosphatidylethanolamine and phosphatidylinositol, has a slow turnover of fatty acids. The lipids with rapid fatty acid turnover may be involved in the sequences of saturated and unsaturated fatty acid synthesis. A classification of lipids is made on the basis of their suggested functions.

THE PHOSPHOLIPID COMPOSITION OF EMBRYONIC CHICK LIVER MICROSOMES. D. B. Ward and J. K. Pollak (Univ. of Sydney, Sydney, Australia). *Biochem. J.* **104**, 861–5 (1967). The phospholipid composition of hepatic microsomal fractions from different developmental stages of embryonic chick was established. The major components were phosphatidylcholine (66%), phosphatidylethanolamine plus phosphatidylserine (21%) and sphingomyelin (9%). There were no significant changes in this composition during embryonic development from 9 to 20 days. On microsomal subfractions it was found that the smooth-microsomal fractions (Ia and Ib) had a significantly higher sphingomyelin content than the rough-microsomal fraction (II). This was compensated for by a lower phosphatidylcholine content in Ia and Ib and a higher one in II. The significance of the differences in phospholipid composition of smooth and rough microsomes is discussed with particular reference to the origin and interrelation of smooth and rough endoplasmic reticulum.

IDENTIFICATION OF THE FECAL METABOLITES OF 17 α-METHYLTESTOSTERONE IN THE DOG. E. H. Mosbach, S. Shefer, and L. L. Abell (Depts. of Biochem. and Med., Columbia Univ. College of Physicians and Surgeons, N. Y. 10027). *J. Lipid Res.* **9**, 93–7 (1968). 17 α-Methyltestosterone-4-^{14}C was fed to two dogs in an experiment to determine tissue localization and metabolic disposition of this hypocholesterolemic steroid. No accumulation of the drug was found in any tissue, although a small amount of radioactivity was detected in the liver and the ileal mucosa of one animal. Most of the administered radioactivity was excreted in urine and feces. The urinary metabolites consisted largely of highly polar compounds which appeared resistant to glucuronidase treatment or solvolysis procedures. Analysis of the fecal metabolites showed the presence of unchanged methyltestosterone, of four isomeric methylandrostanediols, and of labeled unidentified polar compounds. Of the four identified methylandrostanediols, the predominating fecal diols were 17α-methyl-5α-andostane-3β,17β-diol (45–62%) and 17α-methyl-5β-androstane-3α,17β-diol (12–28%); 17α-methyl-5α-androstane-3α-17β-diol and the 5β:3β isomer were found in very small amounts only.

HYPOCHOLESTEROLEMIC ACTIVITY OF 17α-METHYL-5α-ANDROSTANE-3β,17β-DIOL, A METABOLITE OF 17α-METHYLTESTOSTERONE. L. L. Abell and E. H. Mosbach. *Ibid.* 98–102. The hypocholesterolemic activities of 17α-methyltestosterone and its major identified fecal metabolite, 17α-methyl-5α-androstane-3β,17β-diol, were compared in dogs. The dose-response curves indicated that the two compounds had similar effects, although at doses below 1 mg/kg per day the diol appeared to be more active than the parent compound.

TRANSFER OF LOCALLY SYNTHESIZED CHOLESTEROL FROM INTESTINAL WALL TO INTESTINAL LYMPH. J. D. Wilson and R. T. Reinke (Dept. of Internal Med., The Univ. of Texas Southwestern Med. School at Dallas, Dallas, Texas 75235). *J. Lipid Res.* **9**, 85–92 (1968). The cholesterol-fed rat subjected to cannulation of the intestinal lymph duct and injected with acetate-2-^{14}C has been utilized for a study of the mechanism by which cholesterol synthesized in the intestinal wall gains access to the circulation. It has been concluded that locally synthesized cholesterol is excreted bidirectionally, approximately half going into the lymph and half into the lumen. Furthermore, under the conditions of these experiments, little of the luminal cholesterol appears to be reabsorbed, which suggests that direct transfer from wall to lymph is the principal route for the entry of this endogenously derived cholesterol pool into the lymph and ultimately into the blood stream. Finally, it has been demonstrated that bile is required for this transfer of cholesterol from wall to lymph as well as for the absorption of dietary cholesterol.

GANGLIOSIDES IN SUBACUTE SCLEROSING LEUKOENCEPHALITIS: ISOLATION AND FATTY ACID COMPOSITION OF NINE FRACTIONS. R. Ledeen, K. Salsman and Maria Cabrera (The Saul R. Korey Dept. of Neurology and the Dept. of Biochem., Albert Einstein College of Med. of Yeshiva Univ., Bronx, N.Y. 10461). *J. Lipid Res.* **9**, 129–136 (1968). Gangliosides from brain of an 8 yr old boy with subacute sclerosing leukoencephalitis have been studied in terms of pattern and structure. Thin-layer chromatography showed that both gray and white matter have a highly abnormal pattern, with elevation of the relative proportion of four gangliosides corresponding to minor species in normal brain. The total level of lipid-bound sialic acid, however, was not increased, with indicated a compensating loss of other gangliosides. Two of the proliferating species were monosialogangliosides (G_5 and G_6) (Korey nomenclature), and two were disialo types (G_{2A} and G_{3A}). Studies of their carbohydrate structures are described. Nine ganglioside fractions were isolated by preparative TLC in combination with column chromatography, and the fatty acid compositions were determined. Seven contained stearate as the major component, while two (G_{3A} and G_6) had relatively large proportions of oleate and palmitate. Five of the fractions contained two fatty acids of long chain-length and unknown structure.

METABOLISM OF LABELED DIHYDROSPHINGOMYELIN IN VIVO. P. B. Schneider and E. P. Kennedy (Dept. of Biol. Chem., Harvard Med. School, Boston, Mass. 02115). *J. Lipid Res.* **9**, 58–64 (1968). Tritiated dihydrosphingomyelin was injected into rats, and after various time intervals the distribution of radioactivity in various organs and in the blood and urine was determined. The rate of catabolism of the administered dihydrosphingomyelin was relatively rapid, since about one-fifth of the tritium was recovered as body water after 6 hr. The liver appeared to be the principal site of metabolism of injected dihydrosphingomyelin, although other tissues were also labeled. The radioactive lipids were extracted from each organ and fractionated by chromatography. The tritium label was found in diminishing amounts in the sequence dihydrosphingomyelin, dihydroceramide, dihydrosphingosine, which suggests that the catabolism of dihydrosphingomyelin proceeds in that sequence. An extensive incorporation of label into lipids other than sphingolipids was also observed.

HYDROLYSIS OF PRIMARY AND SECONDARY ESTERS OF GLYCEROL BY PANCREATIC JUICE. F. H. Mattson and R. A. Volpenhein (The Procter & Gamble Co., Miami Valley Labs., Cincinnati, Ohio 45239). *J. Lipid Res.* **9**, 79–84 (1968). The relative rates of hydrolysis of the secondary ester in glycerol-1,3-benzylidene-2-oleate and in glycerol-1,3-dihexadecyl ether 2-oleate, and of the primary and secondary esters in triolein were determined. Both unaltered and selectively inactivated rat pancreatic juice were used as sources of enzyme. It was found that rat pancreatic juice contains an enzyme that can hydrolyze fatty acids esterified at the 2-position of a glyceride. This enzyme is not pancreatic lipase. It may be sterol ester hydrolase. Partial glycerides, as well as complete glycerides, can serve as substrates. Pancreatic lipase, if it can hydrolyze the 2-positioned fatty acids of a triglyceride, does so at a very slow rate.

POSITIONAL DISTRIBUTION OF FATTY ACIDS IN GLYCEROPHOSPHATIDES OF BOVINE GRAY MATTER. H. Yabuuchi and J. S. O'Brien (Dept. of Pathology, Univ. of S. Calif. School of Med., Los Angeles, Calif. 90033). *J. Lipid Res.* **9**, 65–7 (1968). Glycerophosphatides were isolated from ox brain gray matter by column chromatography. The fatty acid compositions of ethanolamine glycerophosphatides (EGP), serine glycerophosphatides (SGP), and choline glycerophosphatides (CGP) were determined by gas-liquid chromatography. The positional distribution of fatty acids in these glycerophosphatides were determined by phospholipase A hydrolysis (*Habu habu* venom). C_{20} and C_{22} polyunsaturated acids were confined almost exclusively to the 2-position of these lipids, where they comprised the majority of 2-substituents in EGP and SGP (oleic acid

predominated in this position in CGP). In the 1-position, palmitoyl was the major substituent in CGP, stearoyl in SGP, and stearoyl or the corresponding alk-1-enyl group in EGP.

6-ACYL GALACTOSYL CERAMIDES OF PIG BRAIN: STRUCTURE AND FATTY ACID COMPOSITION. Y. Kishimoto, M. Wajda and N. S. Radin (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor, Michigan 48104). *J. Lipid Res.* **9**, 27–32 (1968). Two glycolipids were isolated from pig brain and were shown to be the fatty acid esters of kerasin and cerebron in which the second fatty acid moiety is attached to the 6-position of the galactose. The point of attachment was shown in two ways: by permethylation and by cleavage with periodate. Methanolysis of the permethylated cerebroside esters yielded 0-methyl sphingosines, methyl esters of non hydroxy or 2-methoxy acids, and methyl 2,3,4-trimethyl galactoside. Cleavage of the cerebron ester with periodate, followed by treatment with sodium borohydride and dilute HCl, yielded ceramide plus 1-monoglyceride. The ester-linked fatty acids were primarily 16:0, 18:0, and 18:1, while the amide-linked fatty acids showed the wide assortment of chain lengths typical of brain cerebrosides. The methylation step, with silver oxide and methyl iodide, yielded two derivatives with the cerebroside esters, but the structural explanation for the difference was not elucidated. The galactose in the cerebron ester was shown to exist in the β-pyranoside form.

CHROMATOGRAPHIC SEPARATION OF PLASMALOGENIC, ALKYL-ACYL, AND DIACYL FORMS OF ETHANOLAMINE GLYCEROPHOSPHATIDES. O. Renkonen (Dept. of Serology and Bacteriology, Univ. of Helsinki, Helsinki, Finland). *J. Lipid Res.* **9**, 34–9 (1968). The plasmalogenic, alkyl-acyl, and diacyl forms of ethanolamine glycerophosphatides were completely separated from each other as methylated dinitrophenyl derivatives by thin-layer chromatography on silica gel G. The relatively high resolving power needed was obtained by multiple unidimensional development with solvents that give very low mobility to the lipids. Under these conditions the plasmalogens moved fastest, the alkyl-acyl lipids were intermediate, and the diacyl lipids were the slowest. The presence of all these forms of lipids in the ethanolamine phosphatides of hen's eggs, ox brain and human blood plasma could be directly demonstrated with the new method.

CONTROL OF LECITHIN BIOSYNTHESIS IN ERYTHROCYTE MEMBRANES. Keizo Waku and W. E. M. Lands (Dept. of Biol. Chem., The Univ. of Michigan, Ann Arbor, Michigan 48104). *J. Lipid Res.* **9**, 12–18 (1968). The detailed relationship between the relative composition of the potential precursor acids, the esterification rates of their CoA thiol ester derivatives, and the relative composition of the fatty acids in the product, lecithin, which was isolated from normal erythrocytes, suggests that in humans the stromal acyltransferases could be the significant enzymatic factor controlling the fatty acid composition at the 2-position of the lecithin in erythrocytes.

DEGRADATION OF GLYCEROPHOSPHATIDES DURING STORAGE OF SALINE-WASHED, SALINE-SUSPENDED RED CELLS AT −20C. P. O. Ways (Williams Res. Labs. and Med. Service, King County Hosp., and Dept. of Med., Univ. of Washington School of Med., Seattle, Washington). *J. Lipid Res.* **8**, 518–21 (1967). When fresh intact red cells were washed and suspended in 0.153 *M* NaCl and then frozen-stored, the glycero-phosphatide levels decreased significantly. Degradation began within 2 weeks. Loss of phospholipid was not observed with hemoglobin-free red cell ghosts or plasma stored as long as 2 and 6 months, respectively.

A SIMPLIFIED PREPARATION OF PHOSPHATIDYL INOSITOL. G. Colacicco and M. M. Rapport (Dept. of Biochem., Albert Einstein College of Med., Yeshiva Univ., Bronx, New York). *J. Lipid Res.* **8**, 513–15 (1967). A method is described for the rapid isolation of phosphatidyl inositol from soybean phosphatides (Asolectin). The product is obtained pure as the crystalline sodium salt.

ADIPOSE TISSUE LINOLEIC ACID AS A CRITERION OF ADHERENCE TO A MODIFIED DIET. S. Dayton, S. Hashimoto and M. L. Pearce (Med. Services of Wadsworth Hosp. and Domiciliary, and Res. Service, Veterans Admin. Center; and Dept. of Med., Univ. of Calif. at Los Angeles School of Med., Los Angeles, Calif.). *J. Lipid Res.* **8**, 508–10 (1967). In elderly, institutionalized men on a diet of high linoleic acid content, there was little correlation after 1 yr between adipose tissue linoleic acid concentration and dining room attendance. The correlation improved thereafter, with a correlation coefficient of +0.81 after 5 yr and ±0.74 after 6 yr.

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• *AOCS Past Presidents Series*

PROCTER THOMPSON, 1953

Procter Thompson became the 44th president of the American Oil Chemists' Society in 1953.

Procter Thompson

"Proc" was born in Astoria, Oregon, in 1888. He attended the University of Missouri where he was granted the degree of Chemical Engineer in 1912.

His first job was with the Forest Products Chemical Company in Memphis in 1912. He moved to Detroit in 1914 with the Solvay Process Co. From Detroit he went with Sears, Roebuck in Chicago in 1915. He became chief chemist of the Brunswick Balke Collender Co. in 1916 and remained there until 1918. In 1919 he was on special assignment to Sears, Roebuck in Chicago, and he moved to Cincinnati in 1920 as a chemical engineer with Procter & Gamble. He later became Associate Director of the Chemical Division and retired in 1956.

Proc's committee activities include: Sampling, 1937–40; Color, 1943–53; 1st Vice President, 1945; Soap Stock Analysis, 1948–64. He states that the most important thing during his administration was the granting of a charter to the Northeastern Section.

Proc and Mrs. Thompson have three children and four grandchildren and live in Cincinnati, Ohio.

New Orleans to Host ASA Convention

The 48th annual convention of the American Soybean Association will be held at the Roosevelt Hotel in New Orleans, La., Aug. 19–21, Chet Randolph, executive vice president, has announced.

Two days of formal sessions at the hotel, with emphasis on international markets and soybean production, will be followed by a field tour to the Port of New Orleans, the world's largest export facility for soybeans, on the third day.

This will be the first time the national convention of soybean producers has been held in New Orleans, and the first in Louisiana since 1933. The Association goes to New Orleans in recognition of the growing importance of the soybean crop to Louisiana and the South. The Louisiana Soybean Association, an affiliate of the national association, was organized in 1967.

• *New Members*

Active

George M. Adams, Biophysicist, U.S. Navy, Naval Medical Research Institute, Bethesda, Md.

Walter D. Alvin, Chief Cosmetic Chemist, Les Parfumes de Dana (Dana Perfumes Corp.), Mountaintop, Pa.

Joseph P. Bain, Manager, Development and Technical Services, Union Camp Corp., Savannah, Ga.

Richard J. Bloomfield, Manager, Quality Control, Emery Industries, Santa Fe Springs, Calif.

Clarence J. Broussard, Chemist, Supervisor in Analytical Services, Carnation Research Laboratories, Van Nuys, Calif.

William E. Cornatzer, Professor and Head of Department Biochemistry, Director, Ireland Research Laboratory, University of North Dakota, Medical School, Grand Forks, N.D.

Hector J. De Muelenaere, Controller, Research Laboratory, Hind Bros. & Co. Ltd., Durban, South Africa.

Robert C. Edmondson, Assistant to Manager of Manufacturing, Swift & Co., Refinery and Margerine Department, Chicago, Ill.

Tom F. Fite, Foreman, Anderson, Clayton & Co., Jacksonville, Ill.

Leonard J. Gigilo, Director of Research, George W. Luft (House of Tangee) Long Island City, N.Y.

Arley L. Goodenkauf, Chemist, Metropolitan Utilities District, Omaha, Neb.

James B. Himes, Administrative Assistant to the Director of Research and Development, The Richardson Company, Melrose Park, Ill.

Hildegard I. Hof, Post-doctoral fellow, University of Illinois, Department of Neurology, Presbyterian-St. Lukes Hospital, Chicago, Ill.

Ching-Tseng Keng, Mill Manager, Malayan Flour Mills Ltd., Lumut, Perak, Malaysia.

Maxwell R. Kleeman, Sales Manager, Union Carbide Corp., New York, N.Y.

Josef-Peter Leiher, Research Chemist, Emery Industries, Inc., Cincinnati, Ohio.

Thomas W. McGinnis, Chemical Engineer, Lever Bros., Research Division, Edgewater, N.J.

Roy E. Martin, Manager, Vegetable Protein Products, Swift & Co., Chicago, Ill.

Harry J. Mersmann, Research Associate, State University at Buffalo New York, Buffalo, N.Y.

Darle L. Nieneker, Technical Service Representative, Jefferson Chemical Co. Inc., Austin, Texas.

Leonard H. Ponder, Research Chemist, American Enka Corporation, Enka, N.C.

Bengt I. Samuelsson, Professor, Department Medical Chemistry, Royal Veterinary College, Stockholm 50, Sweden.

Thomas L. Scott, Chemical Engineer, A. E. Staley Manufacturing Co., Decatur, Ill.

Lauren C. Stenroos, Biochemist, Minneapolis V. A. Hospital, Minneapolis, Minn.

David M. Takahashi, Chemist, Food & Drug Administration, Department of Health, Education and Welfare, San Francisco, Calif.

Frank M. Yatsu, Assistant Professor of Neurology, University of California School of Medicine, San Francisco, Calif.

Individual Associate

Richard Flower, 590 Shenandoah Drive, Port Credit, Ontario, Canada.

Karl W. Klein, Sales Engineer, DeLaval Separator Co., Poughkeepsie, N.Y.

John F. Kraker, Vice President, Polyester Corporation, New York, N.Y.

Active Junior

Ching-kuang Chow, Graduate Student, University of Illinois, Urbana, Ill.

William R. Karski, Graduate Student, Research Assistant, Rutgers University, New Brunswick, N.J.

(Continued from page 239A)

HEPATIC TRIGLYCERIDE SECRETION IN RELATION TO LIPOGENESIS AND FREE FATTY ACID MOBILIZATION IN FASTED AND GLUCOSE-REFED RATS. N. Baker, A. S. Garfinkel and M. C. Schotz (Radioisotope Res., Veterans Adm. Center, Los Angeles, Calif. 90073). *J. Lipid Res.* **9**, 1–7 (1968). Plasma triglyceride concentrations were significantly lowered by a single feeding of glucose to rats that had been fasted for 22 hr. Three feedings of glucose produced a similar effect. In the glucose-refed animals mobilization of free fatty acids from adipose tissue was impaired more rapidly than hepatic lipogenesis was restored from its low fasting level. These effects of glucose were shown by both a 50% fall in plasma free fatty acid concentration and an 84% decrease in free fatty acid release by isolated epididymal fat pads within 30 min after a single refeeding of glucose. Hepatic lipogenesis from either acetate-1-^{14}C or glucose-U-^{14}C was not restored even after glucose had been fed three times at hourly intervals. Triton-induced hypertriglyceridemia was used to measure the hepatic triglyceride secretary rate; it was found that glucose refeeding decreased this rate in all but one of several experiments. This decreased secretion rate was sufficient to account for the nearly complete disappearance of triglyceride in very low density lipoproteins ($d < 1.019$) that occurred within 1 hr after a single glucose intubation.

BILE SALT EVOLUTION. G. A. D. Haslewood (Guy's Hospital Med. School, London S.E. 1, England). *J. Lipid Res.* **8**, 535–50 (1967). Views against the background of known or supposed biosynthetic pathways for cholic and chenodeoxycholic acids in man and laboratory animals, the chemical nature of bile salts in more primitive animals clearly indicates that evolution from C_{27},5α-alcohol sulfates to C_{24},5β-acids has taken place. Stages in this evolution, some of which are intermediates in the biosynthesis of C_{24} bile acids, are described for representatives of all the chief vertebrate groups. "Unique" primary C_{24} bile acids may be considered as hydroxylated chenodeoxycholic acids; the possible taxonomic significance of these is discussed. A closer study of the biochemical mechanisms underlying bile salt differences may be expected to throw new light on the nature of the evolutionary process itself.

PHOSPHATIDYL GLYCEROPHOSPHATE PHOSPHATASE. Y. Chang and E. P. Kennedy (Dept. Biol. Chem., Harvard Med. School, Boston, Mass.). *J. Lipid Res.* **8**, 456–62 (1967). An enzyme (phosphatidyl glycerophosphate phosphatase) that catalyzes the formation of phosphatidyl glycerol from phosphatidyl glycerophosphate has been rendered soluble by treatment of the particulate fraction of *E. coli* with Triton-X-100 in the presence of EDTA, and has been partially purified. The enzyme is specific for phosphatidyl glycerophosphate and does not catalyze the hydrolysis of other simple phosphomonoesters. It required Mg^{++} for activity and is inhibited by sulfhydryl agents. Some other properties of the enzyme are also described.

BIOSYNTHESIS OF PHOSPHATIDYL GLYCEROPHOSPHATE IN ESCHERICHIA COLI. *Ibid.*, 447–55. The enzyme, devoid of phosphatidyl glycerophosphatase activity is specific for L-glycerol 3-phosphate and is completely dependent upon added Mg^{++} or Mn^{++} for activity. It has high affinity for CDP-diglyceride and can be used for the assay of this nucleotide. Other properties of the enzyme are also described.

SEPARATION AND SIZE DETERMINATION OF HUMAN SERUM LIPOPROTEINS BY AGAROSE GEL FILTRATION. S. Margolis (Depts. of Med. and Physiol. Chem., The Johns Hopkins Univ. School of Med., Baltimore, Md.). *J. Lipid Res.* **8**, 501–07 (1967). A method is described for the separation of the three major classes of human serum lipoproteins by gel filtration on columns of 4 and 6% agarose gel. After calibration of the columns, the elution volumes of the lipoproteins were used to calculate the molecular sizes and molecular weights of these macromolecules. The technique was employed to demonstrate aggregation of low density lipoprotein following partial delipidation, partial proteolysis, or mild heat denaturation. Agarose gel filtration shows promise as a useful method for the isolation, purification, and characterization of liproproteins.

FATTY LIVER INDUCED BY INJECTION OF L-TRYPTOPHAN. Yukiko Hirata, T. Kawachi and T. Sugimura (Biochem. Div., National Cancer Center Res. Inst., Tsukiji, Chuo-ku, Tokyo). *Biochim. Biophys. Acta* **144**, 233–41 (1967). L-Tryptophan caused the accumulation of neutral lipids in liver within 2.5 hr. after its intraperitoneal injection into rats. This accumulation of neutral lipids continued for about 24 hr. Peripheral fatty liver was diagnosed histologically by Sudan III staining. The minimal effective dose was 0.5 mg/g of body weight. The level of

cholesterol and phospholipids in liver did not alter. L-tryptophan-induced fatty liver is apparently due to the decreased level of ATP. A possible mechanism of ATP depression by administered L-tryptophan is discussed.

QUANTITATIVE STUDIES ON THE COMPLEXES FORMED BETWEEN AORTIC MUCOPOLYSACCHARIDES AND SERUM LIPOPROTEINS. M. Bihari-Varga and Marta Vegh (Third Dept. of Med., Univ. of Budapest, Budapest, Hungary). *Biochim. Biophys. Acta* **144**, 202–10 (1967). The lipid composition of complexes precipitated on adding aortic mucopolysaccharides to normal and hyperlipaemic serum was found to correspond to that of the S_f 0–20 β-lipoprotein fraction. There was a significant correlation between the amount of complex formed and the concentration of total lipid, total cholesterol, cholesterol ester, free cholesterol and phospholipid, respectively. Titration of mucopolysaccharides with β-lipoprotein, and of β-lipoprotein with mucopolysaccharides gave complexes in which the ratio of the two components remained the same. In complexes precipitated from the saline extracts of atherosclerotic aorta intimas the ratio of the reacting components and the distribution of lipid constituents was of the same order as that in the complexes obtained from serum. No complex formation occurred with extract of normal aortas.

EFFECTS OF PROSTAGLANDIN E_1 ON LIPOLYSIS AND PLASMA FREE FATTY ACIDS IN THE FASTED RAT. F. P. Kupiecki (Metabolic Diseases Res., The Upjohn Co., Kalamazoo, Mich. 49001). *J. Lipid Res.* **8**, 577–80 (1967). Contrary to published reports, prostaglandin E_1 (PGE_1) *in vitro* and *in vivo* inhibited fasting lipolysis in rats. Adipose tissue lipolysis was inhibited when the tissue was incubated in the presence of PGE_1 and when the compound was administered intravenously. A biphasic plasma free fatty acid (FFA) response was obtained in fasted rats after intravenous injection of 80 μg of PGE_1 per kg body weight; plasma FFA concentrations were lowered at 7 min, elevated at 15 min, and at normal concentrations at 30 min. The FFA depression at 7 min was independent of the animal's nutritional state, but the rebound at 15 min did not occur in fed rats. The plasma FFA rebound in fasted rats at 15 min may be a consequence of rapid inactivation of PGE_1, followed by unopposed activity of factors which enhance fasting lipolysis.

PARTITION OF LIPIDS BETWEEN EMULSIFIED OIL AND MICELLAR PHASES OF GLYCERIDE-BILE SALT DISPERSIONS. B. Borgström (Dept. of Phys. Chem., Univ. of Lund, Lund, Sweden). *J. Lipid Res.* **8**, 598–608 (1967). The composition of the emulsified oil and of the micellar phases obtained when a glyceride-fatty acid mixture is dispersed in bile salt solution has been defined. The micellar phase in equilibrium with the emulsified oil phase was obtained by filtration through Millipore filters. The behavior of different lipids in such systems was defined as the partition ratio, micellar/emulsified oil phase (m/o). Partition of fatty acids was found to be strongly dependent on the chain length of the fatty acids and the pH of the dispersion. The curve for partition against pH for oleic acid was interpreted to show a pK_a for oleic acid in bile salt solution of approximately 7. The partition between micellar and oil phases is given for a series of lipids of different polarity. No significant difference in behavior was found for cholesterol and sitosterol. A relationship was found between the partition m/o and filtration rates through a Millipore filter in micellar solution. The lower the partition coefficient the lower was the rate of filtration. The results obtained are discussed in relation to the mechanism of absorption of fat from the small intestine.

EFFECTS OF INSULIN ON GLUCOSE METABOLISM IN ISOLATED HUMAN FAT CELLS. R. B. Goldrick (The Kanematsu Mem. Inst., Sydney Hosp., Macquarie Street, Sydney, Australia). *J. Lipid Res.* **8**, 581–8 (1967). Isolated fat cells were used for the study of *in vitro* effects of insulin on glucose metabolism in human and rat adipose tissue. In human subcutaneous fat cells, effects of insulin could be detected at concentrations of glucose in the medium from 1 to 10 μmoles/ml. Cellular responsiveness was inversely proportional to the glucose level. At a constant concentration of 6 μmoles of glucose per ml, the effects of insulin at various concentrations up to 500 μU/ml were investigated. At the highest concentration, which gave the maximal response, there was a 100% increase in the conversion of glucose-U-^{14}C to glyceride-glycerol and a 40% increase in glucose oxidation. The dose-response curve was steepest between 2 and 20 μU/ml. Rat epididymal fat cells were much more responsive to insulin. Glucose lipogenesis and pentose cycle activity could also be

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• *Names in the News*

Sidney Switzer

The appointment of SIDNEY SWITZER as representative for the French Oil Mill Machinery Company, Piqua, Ohio, in the South and Southwest, has been announced by A. W. FRENCH, JR., President and General Manager of French Oil.

A past president of the International Oil Mill Superintendents Association, Mr. Switzer has been associated with the oil milling industry most of his life. He has served as Superintendent of S. A. Camp Oil Company for 13 years and Ranchers Cotton Oil, Shafter, Calif. for the last three and one-half years.

Mr. Switzer will be permanently located in Dallas and will represent the company for oil mill machinery—both screw press and solvent—and rendering equipment from Mississippi through California in the Cottonseed Belt.

The appointment of P. K. MAHER to Director of the Adsorbents and Inorganic Specialties Research Department of the Davison Chemical Division of W. R. Grace & Co. was announced today by W. P. HETTINGER, Davison Vice-President for Research. In his new post, Dr. Maher will supervise Davison's fundamental and applied studies in adsorption products and processes, molecular sieves, and molecular sieve catalysis, and the technology of fine-particle inorganic materials. Davison's Research Department is located at the W. R. Grace & Co. Washington Research Center in Clarksville, Maryland.

CHARLES BIDDLE, President of International Flavors and Fragrances (US) has announced the following executive changes. H. S. WOLFF has been named Vice-President, Chemical Production, IFF-US. In his new capacity, Mr. Wolff takes on the primary responsibility of coordinating the operations of all exisiting IFF chemical plants throughout the world.

J. H. KANE (1946) has rejoined Archer Daniels Midland Company as manager of the new Industrial Oils Department. The new department will handle all sales of linseed oil, domestic fish oils, sperm whale oil and spermaceti wax. ADM produces blown, bodied, light cold pressed and refined oils, blends and oil specialties for the coatings, chemical, plastics, cosmetics, lubrication, metal working and other industries. The company has established a nationwide organization of agents and distribution centers in all major cities to augment its own sales force.

J. N. LITTLE has joined Waters Associates, Inc. as a Senior Research Chemist in the company's research and development department. He will be responsible for basic research in a newly formed gel permeation chromatography research group. His appointment was announced by K. J. BOMBAUGH, Vice President of Research and Development. Dr. Little received his PhD degree in chemistry from the Massachusetts Institute of Technology. He held fellowships from the National Institute of Health and the National Science Foundation while attending MIT.

The appointment of R. D. GRIEBEL as Manager, Marketing Planning & Sales Services of American Mineral Spirits Company, a Division of Union Oil Company of California, has been announced by H. D. STEWART, JR., Vice President, Marketing & Sales. In his new position, Mr. Griebel is responsible for marketing research, marketing administration, technical service, sales and marketing planning, advertising, and sales training for the Division. He joined AMSCO in November, 1963 as Chief Chemist in charge of the Company's Carteret, New Jersey laboratory.

FDA To Report Inspectional Findings to Management

Manufacturers will get more information on deficiencies found in their plants by Federal inspectors under a program started March 1 by the Food and Drug Administration.

"Significant adverse conditions or practices" reported by FDA inspectors during plant visits are to be forwarded to company officials by certified mail approximately three weeks after an inspection.

The summaries will not "minimize, overstate, or rationalize serious conditions," but relate "the facts with a minimum of qualification."

The program is being initiated n an effort to provide an additional opportunity to firms to correct shortcomings within their plants. Industry spokesmen have told the Agency that inspectors' findings would provide guidance in improving manufacturing practices.

Companies will be told in each letter, however, that the report "is not intended to imply that the FDA will, or will not, recommend any legal or criminal action" on the basis of an inspector's findings.

When food samples are collected in a plant and analyzed for filth, District Offices will send the results along with the letter if they are available in time. If not, the report of the analysis will be sent later.

When other Federal or State agencies are involved, they will also receive copies of letters sent to companies, the FDA said.

• *New Products*

Two new infrared spectrophotometers—the IR-18 and IR-20—have just been introduced by BECKMAN INSTRUMENTS, INC., Fullerton, Calif. The IR-20's wide 4000 to 250 cm^{-1} range extends into the far infrared region and is well suited for both organic and inorganic studies. The lower-priced IR-18 differs from the IR-20 only in its narrower 4000 to 600 cm^{-1} range. Special features include seven slit programs, variable period control, and nine scanning speeds for maximum versatility. Fastest scanning speed is five minutes for the IR-18, six minutes for the IR-20. The double-beam 100% line on both instruments is flat to within ±1%. Percent transmittance accuracy is ±1% in the double-beam mode of operation and ±0.5% in the single-beam mode.

Two new concentration converters have just been introduced by BECKMAN INSTRUMENTS, INC., Fullerton, Calif. Designed primarily for use with fluorometers, colorimeters, and infrared, ultraviolet, and atomic absorption spectrophotometers, the converters automatically calculate concentration, absorbance, or percent transmission. Both converters will accept analog signals from any instrument capable of 100 mv output. One model converts the data to digital form for display or printout. Both models can plot out results on a potentiometric recorder.

NESTER/FAUST MFG. CORP., Newark, Del., has announced the development of an auto annular spinning band distillation system that provides easier operation, even for the uninitiated user, product purity up to 99.95+% and fast equilibration time. The system includes an adiabatic annular distilling column, integrated automatic reflux ratio control, automatic temperature control for pot flask, integrated stroboscope for accurate motor speed adjustment, dual range (0 to 300C) pyrometer for pot and head and a safety deviation alarm device. The still is mounted to a protective support module while all controls are centered on a remote control console. The distillation system obtains very high rectification with estimated plates in the range of 125 to 200.

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demonstrated in rat cells, whereas these activities could not be shown in fat cells from human omental and subcutaneous tissue. The findings for human cells are attributed to changes in cellular activity during preparation.

PLACENTAL TRANSFER OF CHOLESTEROL-4-^{14}C INTO RABBIT AND GUINEA PIG FETUS. W. E. Connor and D. S. Lin (Cardiovascular Res. Labs., Dept. of Int. Med. Univ. of Iowa College of Med., Iowa City, Iowa 52240). *J. Lipid Res.* **8**, 558–64 (1967). A tracer dose of cholesterol-4-^{14}C was given daily in the diet of six pregnant guinea pigs to establish an isotopic steady state. At the time of parturition, maternal and fetal blood and fetal tissues were collected and analyzed for cholesterol content and cholesterol specific activity. A comparison of these specific activities in neonatal and maternal serum indicated that about 22% of the fetal serum cholesterol was transferred from maternal blood. In the newborn, tissues generally had the same cholesterol specific activity as serum. Brain tissue was an exception in having a specific activity only 8.4% of that of serum. Dietary cholesterol did not increase serum cholesterol levels in the newborn but did increase the percentage of fetal cholesterol derived from the maternal circulation. The rapid transfer of cholesterol-4-^{14}C across the placenta was indicated by the appearance of this isotope in the newborn 2 days after its administration to pregnant rabbits. A considerable amount of the cholesterol content of newborn guinea pigs and rabbits originated from the maternal blood.

INCREASE IN CELL LIPID AND CYTOPLASMIC PARTICLES IN MAMMALIAN CELLS CULTURED AT REDUCED pH. C. C. Mackenzie, Julia B. Mackenzie, and O. K. Reiss (Dept. of Biochem., Univ. of Colorado School of Med., and the Webb-Waring Inst. for Med. Res., Denver, Colorado 80220). *J. Lipid Res.* **8**, 642–5 (1967). The hydrogen ion concentration of the medium has been shown to exert a regulatory effect on the lipid content of cultured mammalian cells. Reduction of the pH of the medium from 7.4 to 6.9 causes a significant increase in cell lipid, relative to cell protein, within 2–3 days. Triglycerides are increased twofold and account for 75% of the additional lipid. Polar lipids, on the other hand, remain nearly constant in concentration. Concurrent with the increase in lipid, particles with an average diameter of 1 μ appear in the cytoplasm. Because the density of these particles is low, ultracentrifugation of the cell homogenate separates the particles completely from the other subcellular structures. The amount of lipid in the particle fraction is approximately equal to the increase in total cell lipid. As shown by silicic acid column chromatography, the particle lipid contains about 75% triglycerides, 15% diglycerides plus an unknown substance, and smaller amounts of material in the monoglyceride and sterol ester-hydrocarbon fractions. The quantitative results indicate that the lipid accumulated at low pH is assembled into discrete cytoplasmic particles.

INTERACTION OF PHOSPHOLIPID-METAL COMPLEXES WITH WATER-SOLUBLE WHEAT PROTEIN. J. G. Fullington (Western Reg. Res. Lab., Agr. Res. Service, U. S. Dept. of Agr., Albany, Calif. 94710). *J. Lipid Res.* **8**, 609–14 (1967). Insoluble lipid-protein complexes are formed in the presence of Ni (II), Ca (II), or Mg (II) by specific components of the water-soluble proteins of wheat flour and either triphosphoinositide or phosphatidyl serine. The pattern of protein species bound by the lipid-metal complex is dependent upon the metal and the phospholipid used. A group of proteins, containing carbohydrate, may be solubilized and recovered by washing the precipitate with acidic chloroform-methanol-water. Analyses of reactive and nonreactive protein species have shown no differences which clearly account for their behavior. Methylation of protein increases binding to lipid; acetylation decreases the interaction. Weak interaction has been observed between certain components of flour proteins and phospholipid in the absence of metal ions, but the components differ from those bound in the presence of metal ions. It is suggested that properly oriented groups of the protein molecules are chelating onto available coordination positions of metal ions already bound to phospholipid.

COMPOSITION OF MYELIN FROM PERIPHERAL AND CENTRAL NERVOUS SYSTEMS OF THE SQUIRREL MONKEY. L. A. Horrocks (Lab. of Neurochem., Cleveland Psychiatric Inst., Cleveland, Ohio 44109). *J. Lipid Res.* **8**, 569–76 (1967). Myelin was prepared from the brachial plexus and cervical spinal cord of adult

squirrel monkeys (*Saimiri sciureus*). Brachial plexus myelin contained a larger amount of sphingomyelin and smaller amounts of cholesterol, lipid galactose, ethanolamine phosphoglyceride, choline phosphoglyceride, and alk-1-enyl ether than spinal cord myelin when compared as ratios to total lipid phosphorus. The peripheral nervous system myelin had a higher proportion of protein. All of these differences were statistically significant. Thus peripheral nervous system myelin and central nervous system myelin differ in protein content and lipid composition in this subhuman primate.

SPIN-LABELLED LIPID-PROTEIN COMPLEXES. M. D. Barratt, D. K. Green and D. Chapman (Unilever Res. Lab., The Frythe, Welwyn, Herts, Great Britain). *Biochim. Biophys. Acta* 152, 20–7 (1968). A study of the isooctane-soluble complexes formed between mixtures of phospholipids and some basic proteins has been made using the technique of spin-labelling. The ESR spectra of the spin-labelled proteins (cytochrome c, lysozyme, histone, protamine and poly-L-lysine) were observed for aqueous solutions of the proteins, aqueous dispersions of the lipid-protein complexes and isooctane solutions of the same complexes. An ionic combination of phospholipids and basic proteins was directly confirmed by the results. The freedom of motion of the spin-label molecules with respect to the protein depends on the hydrophobic property of the phospholipid chains, which, because they are not directly involved in the complex formation, take up a conformation dependent upon the solvent. Calculation of the reorientation correlation times of the labelled complexes in isooctane suggests the predominant existence of a complex formed between an individual protein molecule and several phospholipids.

ENZYMATIC HYDROLYSIS OF SPHINGOLIPIDS. VII. HYDROLYSIS OF GANGLIOSIDES BY A NEURAMINIDASE FROM CALF BRAIN. Z. Leibovitz and Shimon Gatt (Dept. of Biochem., The Hebrew Univ.-Hadassah Med. School, Jerusalem (Israel)). *Biochim. Biophys. Acta* 152, 136–43 (1968). A neuraminidase has been partially purified by extracting calf brain acetone powder with Triton X-100. It has an optimal pH at 4.4 and hydrolyzed tri- and disialogangliosides as well as "hematoside." It did not hydrolyze monosialoganglioside, sialyllactose nor a sialic acid-containing glycoprotein. The sialic acid residue of "Tay-Sachs' ganglioside" could be split off only after previous treatment with β-N-acetylhexosaminidase. A pathway for the total degradation of brain gangliosides by the neuraminidase and four other brain enzymes is presented.

• Drying Oils and Paints

HYDROGENATED CASTOR OIL-ORGANIC DIISOCYANATE RHEOLOGICAL AGENT. F. M. Frank. *U.S. 3,360,389*. A composition is claimed, comprising: (a) a hydrogenated castor oil-organic diisocyanate reaction product, the diisocyanate being selected from the group consisting of arylene, polyalkylene, alkylene, alkylidine and cycloalkylene diisocyanates and constituting 2 to 12% by wt. of the reaction product, and (b) an emulsifiable polyethylene wax having molecular wt. 1500 to 6000, acid number from 0 to 50, saponification number from 9 to 25, a penetration hardness from 1 to 6 and a melting point from 208 to 221F, the polyethylene wax being present in an amount up to about 80% by wt. on the total weight of the composition.

PROCESS OF PRODUCING SOLUTIONS OF METAL SOAPS OF EPOXIDIZED FATTY ACIDS IN AN ALKYL PHENOL. A. Szczepanek and G. Koenen (Chem. Fabrik Hoesch K. G.). *U.S. 3,365,403*. A process for producing solutions of metal soaps of epoxidized fatty acids in an alkyl phenol is claimed, comprising the steps of: (a) mixing an epoxy compound obtained by epoxidizing a fatty acid such as oleic, palmitoleic, ricinoleic or linoleic acid, or a lower alcohol ester of any of these acids, or a glycerol ester of the same fatty acids, castor oil or linseed oil; (b) with a soap-forming metal compound selected from the group consisting of oxides, hydroxides, carbonates or salts of an organic acid of alkali metal, alkaline earth metal, cadmium, zinc, lead, nickel, cobalt, manganese, copper, beryllium, tin, cerium and bismuth. The reaction is carried out at a temperature below 100C in an alkyl phenol medium until the metal soap formation is complete, at which point volatile reaction products are distilled off under vacuum.

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• *New Literature*

DREW CHEMICAL CORPORATION is marketing Co-Freez, a pre-emulsified vegetable fat for filled dairy products. Co-Freez has many of the same properties as milk fat and can be used equally well with milk solids non-fat from fluid, condensed skim milk, non-fat dry milk or any combination of these, thus simplifying imitation dairy product formulating. (Dairy Division, Drew Chemical Corporation, 416 Division St., Boonton, N.J. 07005.)

New literature on the Series RD5 Multipoint Recorder is available from BARBER-COLMAN. This potentiometer-type instrument is only 8⅞ in. wide and 10½ in. high. Yet, it makes use of a full 6½ in. chart and handles up to 12 measurement points. Solid state circuitry is used. The measuring circuits are fully shielded and guarded. Common mode and series mode rejection is high. Three different printout configurations are incorporated. A simple screw driver adjustment makes it easy to change from one type of printout to another. (Bulletin 1221.5 DB 3-3. Barber-Colman Company, Industrial Instruments Division, Rockford, Ill. 61101.)

"Microorganisms: Concepts in Qualitation and Quantitation," by Seymour Kirschner, of the GELMAN INSTRUMENT COMPANY, Ann Arbor, Michigan, is a survey and review of the various methodologies in microbiology. Reprints of the paper, originally presented before the 53rd annual meeting of the Chemical Specialties Manufacturers Association, are now available upon request. (Information Department, Gelman Instrument Company, P.O. Box 1448, Ann Arbor, Mich. 48106.)

A new, 6-page technical bulletin on a series of rotameters that operate at pressures up to 5000 psi has been announced by BROOKS ISTRUMENT DIVISION OF EMERSON ELECTRIC CO. Designated the Series 1400 High Pressure Indicating Rotameters, these instruments are intended for services where the advantages of a glass tube rotameter would normally be ruled out because of pressures above the safe operating level for glass. Brooks Series 1400 Rotameters feature an equalizing system that balances the pressure on the tube wall and permits operation in a previously prohibitive pressure range. (Hatfield, Pa.)

• *Fats and Oils Report*

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Conclusion

There are ways in which soybean oil futures can be used by the coconut oil industry for protection and perhaps additional profit. But it should be remembered that this is only a simulated hedge and not a true hedge because: 1) Coconut oil is not deliverable on SBO futures contracts. 2) The two oils are subject to diverse dynamic influences. 3) Coconut oil prices are for California or other points and SBO futures are based on Decatur, Illinois, making this an out-of-position situation. 4) Prices of SBO are largely controlled by governmental actions and the relationship of soybeans and soybean meal prices.

Thus use of SBO futures in this situation must be thought of in terms of one speculative position offsetting another, rather than as true hedges. But, as we have demonstrated, there is a reasonable degree of predictability which can offer reduced risk.

DAVID M. BARTHOLOMEW,
Commodity Analyst
French & Smith Inc.
Merrill Lynch, Pierce

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• Detergents

METHOD FOR PREPARING HOMOGENEOUS DETERGENT SLURRY. E. L. Behrens (Procter & Gamble Co.). *U.S. 3,355,390.* A process for preparing a homogeneous detergent slurry comprises the steps of (1) mixing 25–40% water, 1–20% of an alkylene-oxide-containing nonionic synthetic detergent and 1-50% of the trisodium salt of nitrilotriacetic acid, this last ingredient being added in an amount sufficient to provide an easily pumpable, homogeneous slurry but less than its own solubility in the final slurry, and (2) adding and mixing to form the final slurry 5–60% of an hydratable sodium tripolyphosphate builder salt, in an amount not higher than about five times the weight of the sodium salt of nitrilotriacetic acid. All percentages given are based on the weight of final detergent slurry.

BIODEGRADABLE NONIONIC SURFACTANTS IN THE TEXTILE INDUSTRY. B. B. Rein (Continental Oil Co.). *Am. Dyestuff Rept.* **56**, 909–15 (1967). Comparative data are presented on the performance of biodegradable vs. non-biodegradable nonionic surfactants in the textile industry. Biodegradable nonionics are generally more versatile and less costly in use than their non-biodegradable counterparts.

POLAROGRAPHIC EXAMINATION OF ALKYL NAPHTHALENE SULPHONIC ACIDS (NEKAL BX). G. Sonneck and F. Wolf (Univ. Halle, Halle, Germany). *Tenside* **4**, 386–90 (1967). The quantitative polarographic determination of Nekal BX (alkyl naphthalene sulfonic acid) according to the method of Pasciak was checked. In dimethylformamide solution with 0.1 mol tetraethylammonium iodide as a conducting salt, the Na^+ and the naphthalene ring stages are well defined and proportional to concentration, provided the Nekal BX is salt-free. In the presence of sodium sulfate, the whole of the Na^+ cannot be determined. The extent of the boundary diffusion stream of the naphthalene stage is dependent upon the degree of butylation. The higher this is, the lower will be the boundary diffusion stream.

A METHOD FOR SOILING WHITE ONE-FIBER TEST FABRICS. J. M. Kennedy and E. E. Stout (Cornell Univ., Ithaca, N.Y.). *Am. Dyestuff Rept.* **57**(1), 11–3 (1968). A practical procedure for soiling white one-fiber test fabrics has been developed which is both reproducible and applicable to a number of fibers. The degree of fabric soiling and soil removal was studied by three methods, the Hunter and Photovolt Reflectance Meters and the Munsell Color Chip system. The degree of whiteness recovery on laundering confirms that a soiling and not a staining procedure had been developed.

THE DETERGENT EFFECT OF COMBINATIONS OF ANIONIC AND NONIONIC DETERGENTS ON WOOL. G. Hoff (Chem. Fabrik Stockhausen & Cie., Krefeld, Germany). *Tenside* **4**, 381–6 (1967). Laboratory tests combining different anionic and non-ionic detergents and taking into account the textile material, its type of soiling, the pH of the wash liquor and of the water used, demonstrate to what extent the choice of textile auxiliary can influence the detergent effect. It is shown that, depending on the mixing ratio of anionic and non-ionic detergent components, the two factors which are particularly responsible for any positive or negative synergism which may develop are the type of water and the pH of the wash liquor.

THE USE OF CATIONIC SURFACTANTS IN INDUSTRY. II. A. Chwala (Vienna, Austria). *Tenside* **4**, 390–4 (1967). Textile applications of cationic surfactants are discussed, with particular reference to textile laundering, their use as wetting, dispersing and emulsifying agents, as equalizing agents and retarders, for after-treatment in dyeing, as stripping agents, in textile printing, for brightening, as hydrophobic agents, antistatic agents, as dry cleaning detergents, in the production of viscose fibers and in textile finishing.

SANITIZERS AND CHLORINATED CLEANERS. E. S. Roth, J. S. Thompson and R. R. Keast (FMC Corp.). *Soap Chem. Specialties* **43**, 12, 66–72 (1967). A wide variety of formulations for household and industrial sanitizers and chlorinated cleaners, based on sodium dichloroisocyanurate, are suggested.

OLEFIN SULFONATES IN DETERGENTS. J. W. McCutcheon (J. W. McCutcheon, Inc.). *Soap Chem. Specialties* **43**, 10, 116–9 (1967). A series of recent patents on the use of olefin sulfonates in light and heavy duty detergent compositions is reviewed.

ALKYL ETHER SULFATES IN LIQUID DETERGENTS. F. J. Gohlke and H. Bergerhausen (Farbwerke Hoechst A. G.). *Soap Chem. Specialties* **43**, 10, 47–9 (1967). Performance, processing, dermal and biodegradability properties of alkyl ether sulfates are reviewed, with special reference to their use as surfactants in shampoos and toiletries.

SURFACE ACTIVE AGENTS IN TEXTILE PROCESSES AND THEIR EFFECT ON EFFLUENTS. W. V. Barnes and S. Dobson (Shell Internat. Chem. Co., Ltd., London). *J. Soc. Dyers Colourists* **83**, 312–20 (1967). Various types of surfactants and their uses in textile processing are reviewed. Among the factors which the user must consider in selecting a product for a particular application are the biodegradability of the agent and its subsequent effects on effluents, waste treatment and water pollution. About 95% of all branded surfactant materials available are based on a limited number of chemicals such as EtO condensates of alkylphenols and straight chain alcohols, secondary alkyl sulfates, branched and straight chain alkylbenzene sulfonates and primary alcohol sulfates. Biodegradability of these materials in relation to their chemical structure is discussed. Many nonionic surfactants are biologically hard and furthermore exhibit, at very low concentrations, a synergistic effect on the foaming of surface waters when traces of anionic detergents are present.

DRY-MIXED DETERGENT COMPOSITIONS. R. J. Fuchs (FMC Corp.). *U.S. 3,360,469.* A dry-mixed, built detergent composition which is readily soluble in water under adverse dissolving conditions, contains 20–90% of a granular, compacted sodium tripolyphosphate having a density of 1.0 to 1.25 g/cc and a particle size between 16 and 100 mesh and having uniformly distributed on its surface 2.5 to 7% of water, the balance of the composition being constituted by at least one of the following: 0.5–50% of a water-soluble anionic or nonionic detergent; 0.5–50% of sodium silicate having a molar ratio of Na_2O to SiO_2 between 1:1 and 1:3.2; 0.5–20% of a chlorocyanuric compound; 0.5–50% of chlorinated trisodium phosphate; 0.5–50% of an alkali metal carbonate, and 0.5–60% of an inert inorganic filler.

(Continued on page 250A)

Plan Now for

AOCS 42ND ANNUAL FALL MEETING

New York

Statler Hilton Hotel

Oct. 20–23, 1968

AOCS Member Since 1910, Daniel Picard Dies in Florida

DANIEL PICARD (1910), Emeritus Member of AOCS and member of longest standing in the Society's history, died Feb. 6, 1968, in West Palm Beach, Florida. He was 90 years of age.

Dr. Picard was a member of the Society for 58 years, having joined subsequent to its chartering in 1910 as the Society of Cotton Products Analysts.

He was President of the Picard Testing Laboratories in Birmingham, Ala., until his retirement in 1957. At this time he was elected to Emeritus Membership in the Society.

Although deafness prevented his taking as active a role as his wished in Society activities, the handicap did not prevent his graduating from MIT with honors and subsynthesis); 3) Oils and Fats (technology); 4) Soaps and his superior abilities.

He is survived by his wife, Frances Adams Picard, and one grandson, Leon Charles Picard.

Call for Registration for Ninth ISF Congress

The Ninth Congress of the International Society for Fat Research (ISF) will be held in Rotterdam, The Netherlands, Sept. 16–21, 1968. The technical program will consist of plenary lectures by invited speakers, and about 100 papers to be presented in five sections: 1) Lipids (biochemistry, nutrition); 2) Oils and Fats (analysis, structure, synthesis); 3) Oils and Fats (technology); 4) Soaps and Detergents (physical chemistry, analysis, technology); 5) Chemicals (fatty acid derivatives, detergent raw materials).

Plenary lecturers and their subjects are as follows: H. J. Dutton, "Hydrogenation of Fats"; E. Lederer, "Les Applications de la Spectrométrie de masse à la Détermination de Substances lipidiques complexes d'intérêt biologique"; J. Lyklema, "Thin Liquid Films"; F. Lynen, "Chemical Mechanisms and Biological Regulation of the Biosynthesis of Lipids."

Registration forms and the preliminary program, giving the titles of papers to be presented, detailed information on technical excursions, social functions, ladies' program, etc. may be obtained from the Secretariat IXth ISF Congress, Unilever Research Laboratorium, P.O. Box 114, Vlaardingen, The Netherlands.

All interested persons are welcome to attend the Congress. Those who have not already done so should register by April 15, 1968, or as soon thereafter as possible.

(Continued from page 244A)

DETERGENT COMPOSITION CONTAINING SUBSTITUTED BENZYL ETHER NON-IONIC DETERGENTS. R. J. Day (Monsanto Co.). *U.S. 3,359,205.* A low foam, high detergency composition consists essentially of a mixture of (1) 0.5 to 20% by wt. of a compound having the formula $C_6H_5(OCH_2CH_2)_nOCH_2C_6H_5R$, where R is an organic radical incapable of reacting with ethylene oxide and selected from the group consisting of (a) unsubstituted aromatic radicals as phenyl, benzyl, alpha- and beta-naphthyl, pyridyl, quinonyl and anthryl, (b) substituted aromatic radicals as halo-, nitro-, and alkyl-substituted phenyl, benzyl, alpha- and beta-naphthyl, pyridyl, quinonyl and anthryl, the alkyl substituent being a C_1 to C_{20} group, and (c) unsubstituted C_8–C_{20} aliphatic radicals, n being a number between 21 and 30; and (2) a water-soluble alkali metal detergent builder salt together with a water-soluble, inert, inorganic neutral alkali metal salt.

CHLORINE-STABLE DETERGENT COMPOSITIONS AND PROCESS FOR THE PREPARATION THEREOF. T. M. Kaneko and I. R. Schmolka (Wyandotte Chemicals Co.). *U.S. 3,359,207.* A process is claimed for the preparation of a chlorine-stable detergent composition consisting essentially of 35–80 parts of an alkaline condensed phosphate, 5–15 parts of a hydrated metasilicate, 5–25 parts of an active chlorine-containing compound, 1–10 parts of a nonionic surfactant and 1–15 parts of water, the sum total of surfactant and water being at least 10 parts. The process comprises: (a) adding an aqueous solution of a nonionic surfactant to a mixture of tetrasodium pyrophosphate and other inorganic salts except metasilicate, whereby hydration of the phosphate and simultaneous absorption of the surfactant is accomplished; (b) adding a hydrated sodium metasilicate to the hydrated condensed phosphate with mixing; (c) reducing the size of the mixture resulting from (b) to a desired particle size, and (d) adding an active chlorine-containing compound such as chlorinated trisodium phosphate, chlorinated cyanuric compounds, or 1,3-dichloro-5,5-dimethylhydantoin to the mixture from (c), a dry, free-flowing, granular product being obtained from the process.

LIQUID HEAVY DUTY CLEANER AND DISINFECTANT. E. H. Krusius (FMC Corp.). *U.S. 3,360,476.* A clear germicidal liquid cleaner, having resistance to near-freezing temperatures, consists essentially of 50–60 parts by wt. of water, 3–12 parts alkali metal phosphate, 5–10 parts of an alcohol selected from the group consisting of methanol, ethanol, propanol, isopropanol and ethyl or butyl ether of ethylene glycol, 15–25 parts of a glycol selected from the group consisting of ethylene, propylene, diethylene and dipropylene glycol, 5 parts of pine distillate and 5–10 parts of an alkali metal soap of a fatty acid, with at least about 10% of the alkali metal content contributed by the phosphate and the soap being potassium and the balance sodium.

PROCESS OF PREPARING DETERGENT TABLETS. A. W. Slob (Lever Bros. Co.). *U.S. 3,366,570.* A process for the preparation of a strong, hard surface, rapidly disintegrating and dissolving detergent tablet comprises thoroughly mixing together a powdered detergent composition and 2–40% based on the weight of the detergent of a liquefiable substance selected from the group consisting of the following hydrated inorganic salts: sodium sulfate, sodium carbonate, sodium perborate, sodium borate, aluminum sulfate and potassium aluminum sulfate, anhydrous sodium carbonate, anhydrous sodium hexametaphosphate, sugar and gelatin. The resulting mixture, containing the liquefiable substance uniformly distributed throughout, is heated to a temperature between 40C and 300C for from about 90 seconds to about 6 minutes to liquefy at least the portion of the liquefiable substance at the surface of the tablet-shaped mixture without completely melting the powdered detergent composition. After cooling to solidify the liquefied substance, a strong detergent tablet is formed which disintegrates and dissolves in water in 15–75 seconds and which has a hard agglomerated surface portion and a center portion having a consistency ranging from hard agglomerates to loose powder.

CLEANING COMPOSITIONS COMPRISING ALKYL ACID ORTHOPHOSPHATE SURFACTANTS. R. S. Cooper and A. D. Urfer (Stauffer Chem. Co.). *U.S. 3,366,571.* A cleaning composition is claimed, consisting essentially of sodium tripolyphosphate and didecyl acid orthophosphate surfactant having a ratio of condensed phosphate builder to surfactant from 98:1 to about 1:2 by wt. and yielding a solution pH between 7 and 12 when completely dissolved in a large volume of water.