ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, S.F. Herb, F.A. Kummerow, Biserka Matijasevic and E.G. Perkins

• Fats and Oils

EFFECTS OF SEVERAL FOLIAR FUNGICIDES ON THE FATTY ACID COMPOSITION AND STABILITY OF PEANUT OIL. R.E. Worthington and D.H. Smith (Dept. of Food Sci. and Plant Pathol., Univ. of Georgia College of Agr. Exp. Sta., Experiment, Ga. 30212). *J. Agr. Food Chem.* 21, 619–21 (1973). Foliar fungicides applied to peanuts for the control of Cercospora leafspot during one and/or two growing seasons caused small but statistically significant ($p = 0.01$) changes in fatty acid composition of peanut oil. Levels of linoleic acid were higher (*ca* 1 to 2%) in oil obtained from Argentine and Florunner varieties and lower (*ca* 0.5 to 1%) in Florigiant variety plots treated with fungicide compared with control samples. Treatment effects on oil stability (autoxidation induction period) were small but occasionally statistically significant. Treatment effects on oil stability and fatty acid composition were in all cases, however, no larger than normal year to year fluctuations.

CHARACTERIZATION OF A BLOOD GROUP B GLYCOLIPID, ACCUMULATING IN THE PANCREAS OF A PATIENT WITH FABRY'S DISEASE. J.R. Wherrett (Dept. of Med. (Neurology), Univ. of Toronto, Toronto 5, Canada) and Sen-Itiroh Hakomori. *J. Biol. Chem.* 248, 3046–51 (1973). An accumulation of a ceramide hexasaccharide was found in the pancreas of a patient with Fabry's disease, in addition to the accumulation of ceramide trihexoside and ceramide digalactoside. The ceramide hexasaccharide was isolated and identified as a blood group B-active glycolipid with the following structure: Galα1 → 3Galβ1 → 3(and 1 → 4)GlcNAcβ1 → 3Galβ1 → 4Glc → Cer

2
↑
Fuc

The proportion of two structures, one containing Gal1 → 3GlcNAc and one containing Gal1 → 4GlcNAc, is 4:1.

MEASUREMENT AND SPECTRAL CHARACTERISTICS OF FLUORESCENT PIGMENTS IN TISSUES OF RATS AS A FUNCTION OF DIETARY POLYUNSATURATED FATS AND VITAMIN E. K. Reddy, B. Fletcher, Ardelle Tappel and A. Tappel (Dept. of Food Sci. and Technol., Univ. of California, Davis, Cal. 95616). *J. Nutr.* 103, 908–15 (1973). The effect of dietary polyunsaturated fats and vitamin E on accumulation in rats of fluorescent ceroid and lipofuscin-like pigments was studied by fluorescence measurements of tissue lipid extracts. Rats fed 10% lard and 1% cod-liver oil diets without added vitamin E for 4 months accumulated twice the fluorescent pigments as those fed the same diet but supplemented with 45 mg vitamin E per kilogram diet. Accumulation of pigments in adipose of rats fed 15.7% corn oil or cod-liver oil diets was inversely proportional to the dietary vitamin E concentration; the adipose of animals fed cod-liver oil had approximately three times the fluorescence of adipose from animals fed corn oil. Bone marrow, heart and spleen of rats fed vitamin E-deficient cod-liver oil diets accumulated more fluorescent pigment than vitamin E-supplemented rats. The fluorescent pigments had excitation maxima at 360 to 390 nm and fluorescence maxima at 430 to 470 nm. Weight gain was proportional to dietary vitamin E, especially that of rats fed cod-liver oil diets. The data suggest that tissue extraction and fluorescence quantitation can be used successfully as an index of fluorescent ceroid and lipofuscin-like pigment accumulation.

VIRUS-INDUCED CHOLESTEROL CRYSTALS. C.G. Fabricant, L. Krook and J.H. Gillespie (New York State Vet. College, Cornell Univ., Ithaca, N.Y.). *Science* 181, 566–7 (1973). One of the crystal types induced in cell cultures by a new feline herpes-virus was identified as cholesterol by crystal structure, polarized light microscopy and mass spectroscopy.

APPLICATION OF LASER SELF-BEAT SPECTROSCOPIC TECHNIQUE TO THE STUDY OF SOLUTIONS OF HUMAN PLASMA LOW-DENSITY LIPOPROTEINS. R.W. DeBlois, E.E. Uzgiris, S.K. Devi and A.M. Gotto, Jr. (General Electric Res. and Dev. Center, Schenectady, N.Y. 12301). *Biochemistry* 12, 2645–9 (1973). The technique of self-beat or homodyne spectroscopy has been applied to the determination of the translational diffusion constant of human plasma low-density lipoproteins (LDL). Both power spectrum and autocorrelation methods give equivalent results, but with conventional equipment the power spectrum measurement takes on the order of hours while autocorrelation is accomplished in minutes. The effects of concentration of LDL, scattering angle of the light, pH of the solution and buffer concentration were investigated. The diffusion constant obtained, $D_{25,w} = 2.14 \pm 0.09 \times 10^{-2}$ cm^2/sec, was in good general accord with conventional measures. The equivalent spherical diameter, obtained from the Stokes-Einstein relationship, 229 ± 10 Å was within a broad band of values given by other techniques.

USE OF CHLOROMETHYLSILYL ETHER DERIVATIVES FOR THE DETERMINATION OF HYDROXYLATED STEROIDS BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY. J.R. Chapman and E. Bailey (AEI Scientific Apparatus Ltd., Barton Dock Rd., Urmston, Manchester, England). *Anal. Chem.* 45, 1636–41 (1973). Halomethyldimethylsilyl ethers, particularly chloromethyldimethylsilyl (CDMS) ethers, are valuable new derivatives for the determination of hydroxylated steroids by combined gas chromatography-mass spectrometry (GC-MS) techniques. The mass spectra of the CDMS ethers are particularly useful in distinguishing steroids that differ in the stereochemistry of the 3-hydroxyl group or of the A/B ring junction. Further distinction of compounds, such as the di-CDMS ethers of pregnanediols, that differ only in the stereochemistry of the 20-hydroxyl group is possible on the basis of retention data. The mass spectra of most CDMS ethers also show relatively intense peaks at high mass, particularly the $M^+ - CH_2Cl$ peak. Because of this, these derivatives are ideally suited to the quantitative determination of hydroxylated steroids at low levels by single and multiple peak monitoring techniques. Examples of the determination of dehydroepiandrosterone and testosterone in plasma extracts by single peak monitoring are presented.

AN ISOLATION AND CLEANUP PROCEDURE FOR LOW LEVELS OF ORGANOCHLORINE PESTICIDE RESIDUES IN FATS AND OILS. M.L.

Porter and J.A. Burke (Div. of Chem. & Physics, FDA, Washington, D.C. 20204). *J. Assn. Off. Anal. Chem.* 56, 733–38 (1973). An isolation and cleanup procedure is described for levels of about 0.005 parts per million organochlorine residues in fats and oils, prior to analysis by electron capture gas-liquid chromatography. The fat or oil is distributed on a column of unactivated Florisil and the residues are partitioned into an eluant of 10% water in acetonitrile. Florisil column chromatography with an elution solvent system comprised of mixtures of methylene chloride, acetonitrile and hexane is used for the final cleanup. Extracts prepared in this manner are sufficiently free of fatty extractives to permit injection of the equivalent of 50–60 milligrams of fat sample for GLC. The procedure should be especially useful in determination of low levels of organochlorine pesticide residues in the fat of certain dietary composites.

EFFECT OF POSTMORTEM AGING ON CHICKEN MUSCLE LIPIDS. J.D. Hay, R.W. Currie and F.H. Wolfe (Dept. of Food Sci., Univ. of Alberta, Edmonton, Canada). *J. Food Sci.* 38, 696–9 (1973). Neutral lipids of fresh chicken breast muscles are shown to be triglycerides, sterols and sterol esters with only traces of mono- and diglycerides and free fatty acids. Phospholipids include measurable quantities of phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl inositol, phosphatidyl serine, sphingomyelin, diphosphatidyl glycerol, lysophosphatidyl choline and lysophosphatidyl ethanolamine. Fatty acid analyses of several of the lipid fractions are also included. Decreases in phosphatidyl choline and phosphatidyl ethanolamine coupled with increases in lysophosphatidyl choline, lysophosphatidyl ethanolamine and free fatty acids after 48 hours postmortem in the cold indicate phospholipase A activity concurrent with other postmortem changes. The significance of the results is discussed.

FACTORS RELATING TO COMPLETENESS OF SOLVENT EXTRACTION OF DIELDRIN FROM MILK. C.Y.W. Ang and L.R. Dugan Jr. (Dept. of Food Sci. and Human Nutr., Michigan State Univ., East Lansing, Mich. 48823). *J. Assn. Off. Anal. Chem.* 56, 718–20 (1973). Milk containing added dieldrin was separated into 2 lipid fractions by differential solvent extraction. Fraction 1 was extracted with nonpolar hydrocarbon solvents and Fraction 2 with the same solvent system after mixing with sodium oxalate and ethanol. Three solvent systems were compared. Dieldrin concentrations in Fraction 1 of all 3 solvent systems were much higher than in Fraction 2 on a fat basis. Less than 50% of the dieldrin was recovered in Fraction 1, probably because of low recovery of hydrocarbon solvents from fluid milk or factors that depressed the separation of solvents from milk. Factors possibly involved were the adsorption of solvents and pesticide to the hydrophobic groups of membrane proteins and/or serum proteins or the penetration of solvents and pesticide into the fat globules of milk.

CHEMICAL COMPOSITION OF ALLEPPY CARDAMOM OIL BY GAS CHROMATOGRAPHY. A.K.S. Baruah, S.D. Bhagat and B.K. Saikia (Regional Res. Lab., Jorhat, Assam, India). *Analyst* 98, 168–71 (1973). An isothermal gas-chromatographic technique used to investigate the chemical composition of cardamom oil is described. A total of twenty-one components were detected by this method. Most of the peaks, representing 98.1% of the oil, have been identified.

WHICH LIPID SYSTEMS FOR ASEPTICALLY PROCESSED FOODS? A.V. Petricca (Aseptically Processed Foods, Glidden-Durkee Div., SCM Corp., Joyce Res. Ctr., Strongsville, Ohio). *Food Eng.* 45(5), 96–9 (1973). A review article written to help food processors adapt lipid systems in existing or totally new products to the requirements of aseptic processing.

GLYCOLIPIDS: KEY TO PROTEIN-ENRICHED BREAD. Y. Pomeranz (National Barley and Malt Lab., ARS, USDA, Madison, Wis.) and K.F. Finney. *Food Eng.* 45(5), 134–42 (1973). The protein level in bread may be increased 70% without impairing consumer acceptance by the addition of glycolipids. The use of these materials entails practically no changes in dough formulation, production schedules or equipment.

GAS CHROMATOGRAPHIC DETERMINATION OF BROMINATED SESAME OIL IN ORANGE DRINKS: COLLABORATIVE STUDY. H.B.S. Conacher (Res. Labs., Health Protection Branch, Ottawa, Ontario, Canada K1A OL2). *J. Assn. Off. Anal. Chem.* 56, 602–6 (1973). A gas-liquid chromatographic method for the determination of brominated vegetable oils in soft drinks was collaboratively studied, using a commercial orange drink spiked with known amounts of brominated sesame oil. Initial results based on calculations involving total peak area measurements were considered erroneously high, since drink components co-eluted with the C_{16} and C_{18} methyl esters, especially at low levels of brominated oil. A modified calculation, based only on brominated ester content, showed recovery values (6 collaborators) of 94.6, 95.3, and 96.0% for drinks containing 3.10, 5.22, and 10.66 milligrams per 10 fluid ounces, respectively, with corresponding standard deviation values of 0.40, 0.46, and 0.64. The method with the modified calculation incorporated has been adopted as official first action.

COLLABORATIVE STUDY OF THE FOSS MILKO-TESTER METHOD FOR MEASURING FAT IN MILK. W.F. Shipe and G.F. Senyk (Dept. of Food Sci., Cornell Univ., Ithaca, N.Y. 14850). *J. Assn. Off. Anal. Chem.* 56, 538–40 (1973). In a third collaborative study, the Milko-tester was compared with the Babcock method in 9 laboratories. In addition, 3 laboratories analyzed the samples by an ether extraction method. The standard deviations for these methods were +0.018, +0.032, and +0.044%, respectively. These deviations are based on triplicate determinations on 5 samples by each of the laboratories. The average values for all samples were 3.99, 3.96 and 3.88% for the Milko-tester, Babcock, and ether extraction methods, respectively. The standard deviation of differences between the Milko-tester and Babcock for all 9 laboratories was +0.077%.

COMPARISON OF TWO EXTRACTION PROCEDURES FOR THE DETERMINATION OF CHOLESTEROL IN DAIRY PRODUCTS. D.E. LaCroix, R.M. Feeley, N.P. Wong and J.A. Alford (Dairy Prod. Lab., Eastern Mkt. Nutr. Res. Div., ARS, USDA, Beltsville, Md. 20705). *J. Assn. Off. Anal. Chem.* 55, 972–4 (1972). Both the Roese-Gottlieb (R-G) and silicic acid methods have been used for the extraction of lipids from dairy products. However, the silicic acid method is widely used for the extraction of fatty acids for determination by GLC. Since it would be advantageous to use this extract for cholesterol determinations, a comparison of the extraction procedures for dairy products was carried out to determine if they gave equivalent values. Cholesterol values were determined by GLC of both extracts. Twenty samples of 6 dairy foods having milk-fat contents

ranging from 3 to 38% were compared. In every instance the R-G extracts had higher values for cholesterol. The R-G or similar multiple solvent extract methods should be used for all dairy products and any other food product in which part of the cholesterol may be bound to a lipoprotein or otherwise not free in the fat.

EXTRACTION OF LIPID-PROTEIN COMPLEXES FROM EGG YOLK. J.G. Navarro, F. Borie and J. Saavedera (Dept. Quimico, Facultad de Quimica y Farmacia, Universidad de Chile, Casilla 233-Santiago, Chile). *J. Assn. Off. Anal. Chem.* 55, 975–8 (1972). A residual lipid which is not removed by solvent extraction was detected and determined after enzymatic hydrolysis of defatted egg yolk protein. Free fatty acids were found to be the type of lipid bonded to the egg yolk protein. The mode of attachment of these fatty acids to the egg yolk protein is suggested and the composition of the fatty acids is reported.

GAS CHROMATOGRAPHIC DETERMINATION OF PROPIONIC, SORBIC AND BENZOIC ACID IN RYE BREAD AND MARGARINE. A. Graveland (Inst. Cereals, Flour and Bread TNO, Wageningen, The Netherlands). *J. Assn. Off. Anal. Chem.* 55, 1024–6 (1972). A rapid and accurate method is presented for the GLC determination of propionic and sorbic acids in bakery products and benzoic acid in margarine. The acids are extracted with ether containing orthophosphoric acid, to which valeric acid is added as internal standard. The extract is injected directly into the gas chromatograph. Glass columns (2 meters × 2.0 millimeters inside diameter) containing 5% Carbowax 20M-terephthalic acid coated on Chromosorb W(AW-DMCS) are used for analysis. The simplicity and convenience of the method make it suitable for routine determinations.

FISH PRESERVATION. I. STUDIES ON CHANGES DURING FROZEN STORAGE OF OIL SARDINES. L.N. Srikar and G.G. Hiremath (College of Fisheries, Univ. of Agr. Sciences, Mangalore, India). *J. Food Sci. Technol. (India)* 9, 191–3 (1972). The effect of various glazes i.e. (1) butylated hydroxy anisole, butylated hydroxy toluene mixture; (2) mono-sodium glutamate; and (3) ascorbate and citrate mixture in suppressing rancidity during frozen storage of oil-sardine was studied. No significant difference in the effect of antioxidants was found. However the storage life was extended if the fish was frozen in blocks after filling the air space with glazing solution. There was an increase in peroxide value (PV) and free fatty acids (FFA) during storage and the rate of increase of PV was more than that of FFA. An inverse relation existed between PV and salt soluble nitrogen and FFA and salt soluble nitrogen.

INFLUENCE OF MIXING REGIME OF OIL AND WATER ON THE DEGREE OF ELIMINATION OF PHOSPHATIDES. S.N. Volotovskaja et al. (VNIIZ). *Maslozir. Prom.* 1973(1), 16–18. Degumming of sunflowerseed oil using intensive mixing with water has been examinated. The quantity of water is 1% on the oil, temperature 45–50C, and contact time 20 minutes. Separation is made after 2 hours by decantation at 45C. The experiments were done in Visnevskij apparatus equipped with a special agitator (2,800 rpm). The same oil was also degummed by the conventional technique. Residual phosphorus in the oil degummed with intensive mixing was equivelent to 0.011–0.015% P_2O_5; in oil degummed by conventional method it was 0.020–0.030%. (Rev. Franc. Corps Gras)

COTTONSEED PHOSPHOLIPIDS: IV—ISOLATION AND CHARACTERISATION OF COTTONSEED LECITHIN. A.S. El-Nockrashy and Y. El-Shattery (Lab. for Fats and Oils, National Res. Center, Dokki, Le Caire). *Rev. Franc. Corps Gras* 20, 217–20 (1973). Lecithin (LE) has been isolated from mixed cottonseed phospholipids by column chromatography (yields 33.9 and 35.8% respectively). GLC analysis of the fatty acid methyl esters revealed saturated-unsaturated fatty acid ratios of 1:2.01 and 1:1.86 respectively. Palmitic acid constitutes 90% of the total saturated fatty acids, and linoleic acid makes up more than 80% of the total unsaturated. The nitrogen-phosphorus ratios are 1/1 and 1/0.9 for the two species, respectively. Gossypol present in the isolated LE accounts for less than 10% of the gossypol present in the mixed phospholipids. IR spectrum of isolated LE gives bands reported for LE.

SOYBEAN CULTURE IN FRANCE: PERSPECTIVES. E. Chone (Development Service of CETIOM, Paris). *Rev. Franc. Corps Gras* 20, 211–5 (1973). A study which has been done in this field by CETIOM in 1966 is reviewed. The results of this study induced the French administration to introduce soya in the EEC's regulation 136. This study comprises a varietal experimentation and an extensive research on three cultural techniques: inoculation, irrigation and weed control. Large scale culture is described in Sud-West of France. Perspectives of development of soybean in France show that probably 130,000 hectares would be cultivated and about 280,000 tons of soybean produced.

STUDY OF OXIDIZED ACIDS OCCURRING IN FATS AND OILS. IV.—EXAMPLES OF APPLICATION OF THE THIN-LAYER CHROMATOGRAPHY METHOD FOR OXIDIZED ESTERS. J. Graille and M. Naudet (National Lab. of Oils and Fats—ITERG, Univ. of Provence, Marseille, France). *Rev. Franc. Corps Gras* 20, 203–9 (1973). Oxidized acids are present in practically all crude or refined oils; their determination is very important. Oxidized esters isolated from peanut, rapeseed, soybean, sunflower, corn and palm oils and tallow were studied. Chromatoplates of these oxidized esters show that the R_x of the different components is constant, independent of the kind of fat, its origin and its state of refining. The comparison of chromatoplates for oxidized esters isolated from the fatty acids obtained by saponification, chemical hydrolysis or enzymatic hydrolysis, shows that the separation of the oxidized esters into their constituants depends on the method of obtaining the fatty acids. Hydrolysis by non-specific lipase did not alter the natural repartition; saponification and chemical hydrolysis did.

CONCENTRATION OF THE UNSAPONIFIABLE MATTER IN OILS. H. Kallel and C. Paquot (CNRS-2, 94320 Thiais, France). *Rev. Franc. Corps Gras* 20, 147–51 (1973). The unsaponifiable matter of some oils contains important components and many methods for the isolation have been applied. In this paper, the concentration of unsaponifiable matter by solvent extraction from Tunisian virgin olive oil is described. The treated oil contains 0.75% unsaponifiable matter, determined by extraction with hexane. The concentration of unsaponifiable matter was done using the benzene/methanol system (27/75–v/v). The parameters for this technique are discussed. By decreasing the temperature to −30C, it is possible to obtain an extract 9 times richer in unsaponifiable matter than treated oil.

OXIDIZED FATTY ACID FORMATION DURING STORAGE. M. Naudet and S. Biasini (National Lab. of Oils and Fats—ITERG, Univ. of Provence, Marseille, France). *Rev. Franc. Corps Gras* 20, 143–5 (1973). For many reasons, oxidized fatty acids are almost inevitably present in crude vegetable oils. Data about the content of oxidized fatty acids in some crude vegetable oils are given in the paper; the content ranges from 0.20 to 2.75g on 100g of total fatty acids. They are largely formed during the storage of the seeds (peanut, rapeseed, soybean or sunflower) by the action of their own lipoxygenases.

The elimination of oxidized fatty acids during the refining processes is only partial and most are found in refined product. If edible oils with only a small amount of oxidized acids are wanted, the presence of these acids in crude oil must be avoided. For that, it is absolutely necessary to know when they are formed and the causes of their formations.

GLYCERIDIC STRUCTURE OF CANBRA OIL. J.P. Sergiel (Station for Res. of Food Qual., INRA, Dijon, France). *Rev. Franc. Corps Gras* 20, 137–41 (1973). Structure of Canbra oil triglycerides has been studied by fractionation on silica gel/Ag NO_3 TLC and hydrolysis by pancreatic lipase. The oleic acid content is 61% and its distribution in the different positions of triglycerides varies according to the degree of unsaturation of the triglycerides. Linoleic and linolenic acids are preferentially esterified in the internal position, whereas erucic and gadoleic acids are esterified in external positions. Canbra oil contains principally triunsaturated triglycerides (38.4%) with triolein predominating (28%) and the tetraunsaturated dioleolinoleic triglyceride, dioleolinolinin (21%).

DETERMINATION OF TRACE QUANTITIES OF METALS IN OILS BY ATOMIC ABSORPTION (GRAPHITE FURNACE). A. Prevot and M. Gente (Inst. for Fats and Oils, Paris, France). *Rev. Franc. Corps Gras* 20, 95–98 (1973). Determination of small quantities of metals in oils is very important; especially important are iron and copper, which initiate oxidation, nickel that originates from hydrogenation, calcium and magnesium derived from phospholipids and sodium remaining after neutralization. For metal determination, atomic absorption is recommended, especially when atomization is done in a graphite furnace. In this way, sensitivity is increased compared with classical atomic absorption.

DETERMINATION OF THE WAX CONTENT IN SUNFLOWER SEEDS, HULLS AND OIL. DEVELOPMENT OF A MODIFIED EXTRACTION METHOD. Biserka Ostric-Matijasevic and J. Turkulov (Faculty of Technol., Univ. of Novi Sad, Novi Sad, Yugoslavia). *Rev. Franc. Corps Gras* 20, 5–10 (1973). This method is a modification of Zolocewskij and Sterlin's method which consists of selective extraction by means of different solvents. The modified method is more rapid and accurate. A new extractor is used and described. Extraction is done at low temperature and the waxes are isolated without traces of other components (triglycerides, phosphatides, FFA, etc.). The wax content in sunflowerseeds is 0.09–0.11%; in hulls 0.33–0.43%; in crude oil 0.04–0.08% and in the solid phase after winterization 3.3–3.7%.

LIPOXYGENASE ACTION DURING BREAD MAKING. OXIDATION OF ESSENTIAL FREE FATTY ACIDS, CAROTENOIDS AND TOCOPHEROLS; HEXANAL FORMATION. R. Drapron (Biochem. and Physicochemistry Station for Cereals of INRA–CERDIA, 91305 Massy, France). *Rev. Franc. Corps Gras* 20, 83–87 (1973). In breadmaking, during the high speed mixing of wheat flour containing soy bean flour, an almost complete disappearance of free linolenic acid is observed, whereas the content of saturated fatty acids and oleic acid remains constant. Complete destruction of carotenoids and of the major part of tocopherols is also observed, while the content of vitamins B_1 and B_2 doesn't change. The disappearance of essential fatty acids and vitamins is explained by their oxidation by lipoxygenase. The linoleic acid hydroperoxide formed is destroyed to yield hexanal which is responsible, in part, for the bread flavor alteration.

ANALYTICAL PROBLEMS IN THE FIELD OF FATS AND OILS. J.P. Wolff (Superior School for Fats and Oils Application, Wolff Labs., Paris, France). *Rev. Franc. Corps Gras* 20, 79–82 (1973). The applications of modern analytical methods for the fats industry are reviewed as well as the positive and the negative aspects of some of them. In some cases the accuracy of the analysis makes control problems by detecting "pollution" technically quite normal when an oilmill produces different simultaneously oils. The following example is shown: it is easy to determine 0.2% of erucic acid in the mixture of fatty acids; if this is found in peanut oil, we cannot consider this oil pure. But if peanut and rapeseed oils were treated in the same factory this "pollution" nearly is unavoidable.

STEROL DISTRIBUTION DURING DEODORIZATION IN VEGETABLE OILS. M. Naudet, M. Rakotovao and G. Cecchi (National Lab. for Fats and Oils—ITERG, Univ. of Provence, Marseille, France). *Rev. Franc. Corps Gras* 20, 27–31 (1973). Sterols obtained in distillates during deodorization are free sterols but they represent only a small fraction of the total sterols of the treated oil. The quantitative composition of the sterol fraction of this distillate is significantly different from those of total sterols. The differences observed can not be explained by molecular weight differences alone, sterol-triglycerides molecular association must be taken in consideration.

ULTRAVIOLET SPECTROPHOTOMETRY, A METHOD FOR MEASURING THE STATE OF OXIDATION OF UNSATURATED LIPIDS. N. Yanishlieva and A. Popov (Inst. Organic Chem., Acad. of Science of Bulgaria, Sofia, Bulgaria). *Rev. Franc. Corps Gras* 20, 11–26 (1973). The content of the conjugated diene is used as a criterion for measuring the degree of oxidation of unsaturated lipids. The experiments have been done with oleate and linoleate as model substances and sunflower seed and olive oil as natural substances. The diene content is estimated by the UV absorption at 232 nm ($E^{232}_{0.2\%}$). The different factors which influence this absorption were studied: degree of unsaturation, oxidation degree (hydroperoxides, parasitic absorption, etc.). The authors have prepared a table of $E^{232}_{0.2\%}$ values for evaluating the degree of oxidation, taking into account both the unsaturation (expressed in % of linoleate) and the peroxide value.

DIETARY POLYUNSATURATES AND SERUM ALPHA-TOCOPHEROL IN ADULTS. M.M. Christiansen and E.B. Wilcox (Dept. Nutrition and Food Sciences, Utah State Univ.). *J. Am. Dietetic Assoc.* 63, 138–42 (1973). The effects of diets with and without an increased amount of polyunsaturated fatty acids on serum alpha-tocopherol concentration and on susceptibility of erythrocytes to peroxide hemolysis was measured in 20 normal subjects. For 24 weeks, half of the subjects ate a self-selected modified diet which had a polyunsaturated:saturated fatty acid ratio of 1.0 or greater, compared with 0.45 for the controls. Dietary tocopherol:fatty acid ratios (E:PUFA) were calculated. Tocopherol levels in sera from the same individual showed wide variation from week to week. However, mean tocopherol values were within normal limits and were approximately the same for men and women. Serum tocopherol levels did not appear to be directly influenced by the E:PUFA ratio, but were related to dietary tocopherol. The high polyunsaturated fat diet did not cause a decrease in serum tocopherol levels under the conditions of the study, rather a slight increase. Other measures of vitamin E status, *i.e.*, creatine:creatinine ratio and erythrocyte hemolysis, emphasized that no deficiency of tocopherol was evident in the tissues. An increased susceptibility of red blood cells to hemolysis by hydrogen peroxide was not found in the experimental group. The use of increased amounts of highly unsaturated fats as readily available vegetable oils contributed substantial amounts of tocopherol to the diets.

PREPARATION OF A LACTIC SPREAD. C.J. Cox and J.J. Hepburn (Lever Bros.). *U.S. 3,749,583.* The process uses the steps of incubating under microaerophilic conditions with thermobacteria an aqueous dispersion containing 0.5–25% protein, 15–70% fat, and a dry matter content of 20–75%, to obtain a pH of 4.8–5.4. The incubated mixture is pasteurized, cooled, and worked to form a plastic mass.

CATALYST FOR SELECTIVE HYDROGENATION OF POLYUNSATURATED VEGETABLE OILS. S. Koritala (U.S. Sec'y of Agriculture). *U.S. 3,749,681.* There is described a catalyst which will effectively reduce the linolenic acid moiety of polyunsaturated vegetable oils. A procedure for the preparation of the highly active catalyst by chemisorption of copper ammonium complex on silica gel is described. The catalyst has excellent reuse properties.

OXIDATION PROCESS FOR THE PRODUCTION OF FATTY ACIDS. K.P. Kammann, Jr. (Emery Industries, Inc.). *U.S. 3,749,745.* Primary and secondary long chain *n*-alkylbenzenes are oxidized

in the presence of a catalyst at atmospheric pressure to produce fatty acids. The process gives an improved distribution of desirable high molecular weight fatty acids. When primary *n*-alkylbenzenes are used, the process is highly selective to acids of specific chain lengths to the near exclusion of low molecular weight, less desirable, fatty acids.

SHORTENING FOR HIGHLY AERATED CREAMY FROSTINGS. P. Seiden (Procter & Gamble). *U.S. 3,751,265.* The shortening comprises: (a) a liquid glyceride such as partially hydrogenated soybean oil, (b) propylene glycol monostearate, (c) partial esters of polyglycerol and (d) polyoxyethylene sorbitan tristearate.

EXTRACTION OF UNSAPONIFIABLE FRACTIONS FROM NATURAL FATS. A. Rancurel (Laboratoires Pharmascience). *U.S. 3,751,442.*

CLEAR COOKING AND SALAD OILS HAVING HYPOCHOLESTEROLEMIC PROPERTIES. B.A. Erickson (Procter & Gamble). *U.S. 3,751,569.* The oil is prepared by adding 0.5–10% (free sterol equivalent) of plant sterol monocarboxylic acid ester to clear, liquid base oil.

PROCESS FOR ANTIOXIDATION AGAINST LIPID. S. Maruyama and T. Wakayama (Kongo Yakuhin Kabushiki Kaisha). *U.S. 3,752,832.* Tocopherol and unsaponifiable matter from rice oil are combined to produce an antioxidant effect in lipids.

CO-OXIDATION PROCESS FOR THE PRODUCTION OF SYNTHETIC FATTY ACIDS. E.P. Kammann, Jr. (Emery Industries, Inc.). *U.S. 3,754,010.* Aliphatic monocarboxylic acids are obtained by the autoxidation of paraffin/olefin mixtures in the presence of a catalyst at atmospheric pressure. The process provided efficient oxidation of both the paraffin and the olefin at low temperatures while maintaining acceptable reaction rates and gives an improved distribution to a narrow range of preferred synthetic fatty acids.

PLICATIC ACID ESTERS. J. Howard and T.D. McIntosh (Rayonier Inc., Olympic Res. Div.). *U.S. 3,754,937.* The use of alkyl and aryl esters of plicatic as antioxidants for fats and oils is disclosed.

PREPARATION OF FATTY ACID ESTER MIXTURES ENRICHED IN UNSATURATES. J.P. Hutchins (Procter & Gamble). *U.S. 3,755,385.* The process comprises transesterifying natural fats and oils with a lower alcohol and selectively extracting the unsaturated fatty acid esters with a two phase solvent system comprising a hydrocarbon and gamma-butyrolactone.

METHOD OF SEPARATING FATTY ACIDS. T.L. Blaney (Procter & Gamble). *U.S. 3,755,389.* A process for separating saturated fatty acids (predominantly palmitic and stearic) from unsaturated fatty acids (predominantly oleic) comprises the steps of dissolving the fatty acids in methyl formate, cooling the solution to 30F, and separating the crystallized fatty acids from the solution.

PROCESS FOR CONTINUOUSLY SEPARATING GLYCERIDES. A. Viarengo and R. Pasculli. *U.S. 3,755,390.* The process comprises providing a very dilute mixture of glycerides and solvent, cooling and filtering it, and separating the crystallized glycerides from the solvent. An apparatus for accomplishing the separation is also described.

• Fatty Acid Derivatives

REACTIONS OF ISOPROPENYL STEARATE WITH DIETHYL MALONATE, ACETOACETIC ESTER AND RELATED KETO ESTERS. ENOL ESTERS. XVII. E.S. Rothman, G.G. Moore and S.S. Hecht (Eastern Regional Res. Lab., Philadelphia, Pa. 19118). *J. Org. Chem.* 38, 2540–3 (1973). The major product from the acid-catalyzed reaction of isopropenyl stearate with diethyl malonate is identified as the α-pyrone, 6-ethoxy-3-hexadecyl-4-stearoyloxy-2H-pyran-2-one. Alcoholysis of the 6-alkoxy α-pyrone proceeds unusually easily without requiring catalysis. Acetoacetic ester and 3-oxoglutarate esters react analogously with isopropenyl stearate to form α-pyrones.

(Continued on page 497A)

Call for Nominations Award in Lipid Chemistry

Sponsored by Applied Science Laboratories

In April 1964 the Governing Board of the American Oil Chemists' Society established an Award in Lipid Chemistry under the sponsorship of the Applied Science Laboratories Inc., State College, Pa. Previous awards were presented as follows: Erich Baer, August 1964; Ernest Klenk, October 1965; H.E. Carter, October 1966; Sune Bergstrom, October 1967; Daniel Swern, October 1968; H.J. Dutton, October 1969; E.P. Kennedy, September 1970; E.S. Lutton, October 1971; A.T. James, September 1972; and F.D. Gunstone, September 1973.

The award consists of $2500 accompanied by an appropriate certificate. It is now planned that the 11th award will be presented at the AOCS Fall Meeting in Philadelphia, September 29-October 3, 1974.

Canvassing Committee Appointees

Policies and procedures governing the selection of award winners have been set by the AOCS Governing Board. An Award Nomination Canvassing Committee has been appointed. Members are: C.D. Evans, Chairman; C.W. Williams; D.L. Berner; G. Fuller; and R.J. Buswell. The function of this committee is to solicit nominations for the 11th award. Selection of the award winner will be made by the Award Committee whose membership will remain anonymous.

Rules

The rules prescribe that nominees shall have been responsible for the accomplishment of original research in lipid chemistry and must have presented the results thereof through publication of technical papers of high quality. Preference will be given to individuals who are actively associated with research in lipid chemistry and who have made fundamental discoveries that affect a large segment of the lipid field. For award purposes, the term "lipid chemistry" is considered to embrace all aspects of the chemistry and biochemistry of fatty acids, of naturally occurring and synthetic compounds and derivatives of fatty acids, and of compounds that are related to fatty acids metabolically, or occur naturally in close association with fatty acids or derivatives thereof. The award will be made without regard for national *origin, race, color, creed or sex.*

Letters of nomination together with supporting documents must be submitted in octuplicate to C.D. Evans, Northern Regional Research Center, 1815 N. University, Peoria, Ill. 61604 before the deadline of April 1, 1974. The supporting documents shall consist of professional biographical data, including a summary of the nominee's research accomplishments, a list of his publications, the degrees he holds, together with the names of the granting institutions, and the positions held during his professional career. There is no requirement that either the nominator or the nominee be a member of the American Oil Chemists' Society. In addition, letters from at least three other scientists supporting the nomination must be submitted in octuplicate.

Remember the DEADLINE, April 1, 1974

• Abstracts. . .

(Continued from page 496A)

EFFECT OF OZONATION MEDIUM, AND DECOMPOSITION CONDITIONS ON THE YIELDS OF OZONOLYSIS REACTIONS. M. Naudet and A. Pelloquin (National Lab. of Oils and Fats—ITERG, Univ. of Provence, Marseille, France). *Rev. Franc. Corps Gras* 20, 89–94 (1973). With the use, during ozonation, of a polar hydrated solvent which cannot react with the substrate or the reaction products, the formation of secondary products—principally parasitic esters—during preparative ozonolysis, may be greatly reduced. The maximum amount of water which may be used is that compatible with a total solubilization of the substrate.

STABILITY OF SULFATED OILS AFTER HYDROLYSIS. J. Pore and C. Chasseboeuf (Society of Houghton Products, 92-Puteaux, France). *Rev. Franc. Corps Gras* 20, 153–7 (1973). To determine their stability, sulfated oils derived from foots, caster oil and spermaceti were hydrolyzed in acid medium at various temperatures and pH values. The combined SO_3 was determined by Epton's method and the variation of this content was used as a criterion of degree of hydrolysis. It was found that this hydrolysis is very slow. The poor stability of certain oils is not due to hydrolysis but to a separation of aqueous and oily phases during storage or uses.

DEHYDROGENATION OF FATTY ACIDS TO THE CORRESPONDING α,β-UNSATURATED DERIVATIVES. G. Cainelli, G. Cardillo and A. Umani Ronchi. *J. Chem. Soc. Chem. Comm.* 1973, No. 3, 94–5. The α-anions of linear fatty acids can be dehydrogenated with 2,3-dichloro-5,6-dicyanobenzoquinone to give exclusively the (*E*)-α,β-unsatd. derivatives. (World Surface Coatings Abs. No. 372)

INCORPORATION OF NON-WHEAT FLOURS OR STARCHES INTO BAKED GOODS. C.C. Tsen and W.J. Hoover (Kansas State Univ. Research Found.). *U.S. 3,752,675*. There is disclosed a method for incorporating non-wheat grain or tuber flours or starches into wheat flour-based bread, baked, or fried goods doughs at levels which would deleteriously affect the quality of the end products. The method comprises introduction of 0.1–3% of an additive selected from the group of sodium salts of acyl lactylates of C_{14}–C_{22} fatty acids, and the condensation product of 10–95 parts of ethylene oxide and 90–5 parts of a partial glycerol ester of C_{10}–C_{24} fatty acid containing at least 10% monoglyceride. The supplemental flour or starch may be added at levels as high as 40% of the wheat flour by use of 0.5% of the additive. A protein source material may also be added to supplement the wheat protein in the dough so long as the additive is present.

MULTIFUNCTIONAL EMULSIFICATION AGENTS. B.D. Buddemeyer. *U.S. 3,752,770*. There are disclosed powdered, free flowing, relatively non-hygroscopic emulsification compositions for improving the physical properties and quality of food products, and especially carbohydrate containing food products, confections, and prepared mixes. The compositions contain (a) 20–80 parts of at least one of the aliphatic polyol esters of C_{10}–C_{24} fatty acids, glyceryl lactopalmitate, glyceryl lactostearate, succinylated monoglycerides, and acetylated tartaric acid esters of mono- and diglycerides; (b) 80–20 parts of at least one polyoxyethylene derivative of any of the polyol esters of fatty acids and having a total of 5–100 moles of ethylene oxide per mole of polyol ester; and (c) a hydrogenated triglyceride to the extent of 20–80% of the composition.

PHOSPHATIDE SEPARATION. R. Aneja and J.S. Chadha (Lever Bros.). *U.S. 3,752,833*. N-acyl phosphatides, *e.g.*, N-acetylcephalin, are separated from phosphatides without an acylatable amino group, such as lecithin, by lowering the pH to less than 3.5 under aqueous conditions and then solvent fractionating with acetone or methyl acetate.

SELECTIVE REACTION OF FATTY ACIDS AND THEIR SEPARATION. B.F. Ward (Westvaco Corp.). *U.S. 3,753,968*. A process for making a dicarboxylic acid having 21 carbon atoms from fatty acids is accomplished by reacting the linoleic acid portion of a fatty acid mixture with up to 26% of fatty acids of acrylic acid and with 0.01–0.05% of other fatty acids in the presence of iodine catalyst at 200–270C. The fatty acid-dicarboxylic acid mixture is then separated by distillation into an oleic-type fatty acid and a C_{21} dicarboxylic acid. This process is especially applicable to separating tall oil fatty acids.

Laubscher promoted to president of Woodson-Tenent

American Biomedical Corporation recently announced the promotion of James Laubscher to president of Woodson-Tenent Laboratories, Memphis, Tenn. He has been with Woodson-Tenent as vice president for two and one-half years.

Laubscher received his M.S. degree in agricultural chemistry from the University of Arizona in 1968. He has had advanced studies in pesticide residue, chemistry, and business management. ■

• Biochemistry and Nutrition

EFFECT OF CO_2 CONCENTRATION OF PHOSPHOLIPID METABOLISM IN THE ISOLATED PERFUSED RAT LUNG. W.J. Longmore, C.M. Niethe, D.J. Sprinkle and R.I. Godinez (Dept. of Biochem., St. Louis Univ. Schl. of Med., St. Louis, Mo. 63104). *J. Lipid Res.* 14, 145–51 (1973). Studies have been carried out on the incorporation of [U-^{14}C]glucose, [2-^{14}C]pyruvate, [2-^{14}C]acetate, and [1-^{14}C]palmitate into the phospholipids of the isolated perfused rat lung in the presence of either 6 or 45 mM total CO_2 concentration in the perfusion medium. Incorporation of [U-^{14}C]glucose into total phospholipid and into the phosphatidylcholine fraction was increased 10–53% over the 2-hr perfusion period in lungs perfused with medium containing 45 as compared with 6 mM CO_2. The incorporation of [2-^{14}C] acetate, [2-^{14}C]pyruvate and [1-^{14}C]palmitate was not affected by the change in medium CO_2 concentration. Increased incorporation of [U-^{14}C]glucose combined with a shift toward greater incorporation into the fatty acids of the phosphatidylcholine fraction produced a maximum increase of 90% in [U-^{14}C]glucose incorporation into the fatty acids of phosphatidylcholine after 2 hr of perfusion in the presence of medium containing 45 mM CO_2 as compared with 6 mM CO_2. The increase in medium CO_2 concentration produced as much as a 150% increase in [U-^{14}C]glucose incorporation into palmitate derived from the phosphatidylcholine fraction. The results provide evidence that glucose functions as an important precursor of palmitate in the phosphatidylcholine fraction of lung phospholipids and that the CO_2 concentration of the perfusion medium affects the incorporation of glucose into palmitate.

USE OF THE ISOLATED PERFUSED RAT LUNG IN STUDIES ON LUNG LIPID METABOLISM. R.I. Godinez and W.J. Longmore (Dept. of Biochem., St. Louis Univ. Schl. of Med., St. Louis, Mo. 63104). *J. Lipid Res.* 14, 138–44 (1973). A procedure for the use of the isolated perfused rat lung in studies on metabolic regulation has been developed. The procedure, reasonably uncomplicated, yet physiological, maintains the lung so that edema is not observed. The phospholipid content remains normal, and incorporation of [1-^{14}C]palmitate, [2-^{14}C]acetate and [U-^{14}C]glucose is linear with time for a minimum of 2 hr. The incorporation of [1-^{14}C]palmitate and [2-^{14}C]acetate into the total lung phospholipid fraction and into the phosphatidylcholine and phosphatidylethanolamine fractions has been studied. Increasing the concentration of palmitate in the medium from 0.14 to 0.51 mM increased by 60% the incorporation of [1-^{14}C]palmitate into the total lung phospholipid fraction at 2 hr. When the palmitate concentration of the medium was 0.14 mM, addition of 0.11 and 0.79 mM oleate to the medium decreased [1-^{14}C]palmitate incorporation into the total lung phospholipid fraction at 2 hr by 37 and 49%, respectively. The results suggest that the incorporation of exogenous fatty acids, present in the medium perfusing the lung, into lung phospholipids may depend upon the fatty acid composition of the medium. Known specific acyltransferase activities may be responsible for the ordered incorporation of available fatty acids into lung phospholipids.

N-HEXYL-O-GLUCOSYL SPHINGOSINE, AN INHIBITOR OF GLUCOSYL CERAMIDE β-GLUCOSIDASE. J.S. Erickson and N.S. Radin (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor, Mich. 48104). *J. Lipid Res.* 14, 133–7 (1973). A synthetic

analog of glucocerebroside, N-hexyl-O-glucosyl sphingosine, was found to inhibit the glucosidase in rat spleen that hydrolyzes glucocerebroside. At a concentration of 1 μM, the analog inhibited the enzyme by 48%. The mode of action appeared to be competitive, probably aided by tight binding of the amine group to a carboxyl group near the enzyme's active site. Increasing or decreasing the chain length of the n-alkyl group attached to the nitrogen atom lead to decreased effectiveness. The inhibitory effect was maximal at pH 7.0, but it was still considerable at the enzyme's optimal pH, 5.0. It is suggested that the compound may be useful for inducing an animal model of Gaucher's disease.

ALTERATIONS IN LIPID COMPOSITION OF PLASMA LIPOPROTEINS DURING DEPOSITION OF EGG YOLK. D.A. Gornall and A. Kuksis (Dept. of Biochem. and Banting and Best Dept. of Med. Res., Univ. of Toronto, Toronto, Canada). *J. Lipid Res.* 14, 197–205 (1973). The profiles of total lipids and of the molecular species of individual lipid classes were compared among corresponding lipoproteins of plasma and yolk of the laying hen. A close qualitative correspondence was found in the makeup of the molecular species of glycerophospholipids and triglycerides of the very low density lipoproteins and the high density lipoproteins of plasma and yolk. There was a lower proportion of the trienoic triglycerides and of the dienoic glycerophospholipids in the egg yolk than in the plasma lipoproteins, and the greatest differences (20–30%) were noted between the high density lipoproteins. It was also observed that the plasma high density lipoproteins lost their cholesteryl esters upon entering the yolk. On the basis of these and comparable analyses of the plasma lipoproteins of the nonlaying hen, it is concluded that the laying hen synthesizes specific lipoproteins for deposition in the yolk, and these are carried in plasma and selectively transferred to the developing ovum without significant equilibration with the other plasma lipoproteins.

EFFECT OF DIETARY FAT ON PANCREATIC LIPASE LEVELS IN THE RAT. L.I. Gidez (Depts. of Biochem. and Med., Albert Einstein College of Med., Yeshiva Univ., Bronx, N.Y. 10461). *J. Lipid Res.* 14, 169–77 (1973). The effect of dietary fat on levels of lipase and other enzymes in rat pancreas has been studied. It was possible to raise levels of lipase in animals by supplementing their commercial chow diet with added fat or by raising the level of fat in semipurified diets from 4% to 22%. Pancreatic amylase levels decreased in rats fed the high fat diets, whereas levels of chymotrypsinogen and trypsinogen were unaffected. The type of carbohydrate in the semipurified diets made no difference. Thus, the levels of enzymes in rats fed dextrose-containing diets or cornstarch-containing diets were similar. On the basis of the present data, and results of others, it would appear that levels of pancreatic lipase are increased when the fat content of the diet is raised from about 5% to 15–22%, but that little or no additional increase in lipase levels can be attained by any further increase in the amount of dietary fat.

CELLULAR AND ENZYMATIC CHANGES IN PORCINE ADIPOSE TISSUE DURING GROWTH. D.B. Anderson and R.G. Kauffman (Dept. of Meat and Animal Sci., Univ. of Wisc., Madison, Wisc. 53706). *J. Lipid Res.* 14, 160–8 (1973). Experiments were designed to define some of the cellular and metabolic changes in various areas of porcine adipose tissue during growth and to establish a relationship between these changes and the accumulation of fat in the domestic pig. 35 Male castrate pigs were killed at various ages from late fetal to 6.5 months. The following determinations were made on each animal: total carcass fat, adipose cell size and number by fixation of adipose tissue with osmium tetroxide, and the activities of acetyl CoA carboxylase, citrate cleavage enzyme, glucose-6-phosphate dehydrogenase, 6-phosphogluconate dehydrogenase and malic enzyme from perirenal adipose tissue and each of the three layers of subcutaneous backfat. Carcass adipose tissue expanded by a combination of adipocyte hyperplasia and hypertrophy up to 5 months, after which adipose expansion was accomplished by cellular hypertrophy only, with no significant increase in cell number. The activities of the selected lipogenic enzymes (expressed on an adipose cell basis) increased markedly at weaning and again during the rapid increase in percentage of body fat between 3.5 and 5 months. Enzyme activities reached a peak at 5 months, after which activities decreased to values approaching mature levels.

KINETIC DEPENDENCE OF PHOSPHOLIPASE A_2 ACTIVITY ON THE DETERGENT TRITON X-100. E.A. Dennis (Dept. of Chem., Univ. of California at San Diego, La Jolla, Cal. 92037). *J. Lipid Res.* 14, 152–9 (1973). A kinetic analysis is presented for the dependence of one form of phospholipase A_2 from cobra (*Naja naja*) venom on the presence of the nonionic detergent Triton X-100 for its activity towards egg phosphatidylcholine and synthetic dipalmitoyl glycerophosphorylcholine as substrates. An automatic recording pH-stat apparatus was employed in order to continuously monitor enzyme activity. The results obtained in this study are interpreted in terms of a change in the physical state of the phospholipid when Triton X-100 micelles convert phospholipid bilayers into mixed Triton X-100-phospholipid micelles; this is consistent with the requirement of this enzyme for substrates which are in micellar form rather than either monomers or bilayers. An apparent inhibition of phospholipase A_2 activity at high concentrations of Triton X-100 is described and discussed in terms of the micellar nature of the substrate.

SELECTIVE MEASUREMENT OF TWO DIFFERENT TRIGLYCERIDE LIPASE ACTIVITIES IN RAT POSTHEPARIN PLASMA. R.M. Krauss, H.G. Windmueller, R.I. Levy and D.S. Fredrickson (Molecular Disease Branch, Natl. Heart and Lung Inst., and Lab. of Nutr. and Endocrinology, Natl. Inst. of Arthritis, Metabolism and Digestive Diseases, Natl. Insts. of Health, Bethesda, Md. 20014). *J. Lipid Res.* 14, 286–95 (1973). Conclusive evidence has been obtained for the presence of both hepatic and extrahepatic triglyceride lipase activities (TGLA) in rat postheparin plasma, and an assay has been devised for their selective measurement. Heparin-released TGLA in plasma from the intact rat, like TGLA in post-heparin hepatic perfusate, was relatively resistant to inactivation by salt and protamine. Postheparin TGLA obtained from the supradiaphragmatic portion of the rat, where any hepatic contribution was eliminated, was nearly completely inactivated by salt and protamine. Utilizing the different sensitivities to protamine inactivation of extrahepatic and hepatic TGLA, assay conditions were selected to achieve simultaneously the maximal reduction of extrahepatic TGLA with preservation of hepatic TGLA. This assay was validated using postheparin plasma from partially hepatectomized rats. The protamine-inactivated activity was independent of the amount of liver removed, whereas protamine-resistant activity was directly proportional to the amount of liver remaining. In the intact rat, liver appeared to be the major source of heparin-released TGLA measured at pH 8.6 with triolein substrate. It was further shown that both hepatic and extrahepatic lipases catalyzed hydrolysis of triglyceride-rich lipoproteins.

EPINEPHRINE BINDING AND THE SELECTIVE RESTORATION OF ADENYLATE CYCLASE ACTIVITY IN FAT-FED RATS. R.R. Gorman, H.M. Tepperman and J. Tepperman (Dept. of Pharmacol., State Univ. of N.Y., Upstate Med. Center, Syracuse, N.Y. 13210). *J. Lipid Res.* 14, 279–85 (1973). Fat feeding results in a progressive loss of epinephrine- and glucagon-stimulated adenylate cyclase activity in adipocyte plasma membrane sacs (ghosts). Basal and NaF-stimulated adenylate cyclase activities in fat-fed animals are not significantly different from those in preparations obtained from chow-fed rats. The high fat diet increases the mean adipocyte diameter rapidly, but increased cell size, at least in the case of epinephrine stimulation, is not responsible for the decreased hormone-stimulated

• Meetings. . .

(Continued from page 473A)

June 4-8, 1974—International Rapeseed Conference, Giessen, West Germany. Contact: Sekretariat des Internationalen Rapskongresses, D-44, Münster, Germany, Diepenbrockstrasse 32.

Jul. 22–24, 1974—Sixth International Sunflower Conference, Bucharest, Romania. Contact: Ion Trifu, Academy of Agricultural and Forestry Sciences, Blvd. Marasti 61, Bucharest 1, Romania.

Sept. 8-12, 1974—Sixth International Congress of Essential Oils, San Francisco, Calif. Contact: Sixth International Congress of Essential Oils, 60 E. 42nd., New York, N.Y. 10017.

Oct. 7-9, 1974—21st Canadian Spectroscopy Symposium, Ottawa, Can. Contact: J.L. Dalton, secretary, 21st Canadian Spectroscopy Symposium, Department of Energy, Mines and Resources, Mines Branch, 555 Booth St., Ottawa, Ont., K1A 0G1, Can. ■

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computerized *F* tests. Of six patients with decay curves followed for less than 50 wk, a two-exponential curve fit was better in five and a three-exponential curve fit in one. In the 13 patients who exhibited three-exponential curve fits, the third exponential appeared after 13–43 wk of observation (average, 25 wk). In 12 patients of this group who were followed for 50 wk or more, turnover rates and exchangeable masses of cholesterol were measured at maximum lengths of the curves (50–66 wk), and these parameters were then compared with measurements made with curves successively shortened down to 10–12 wk.

OCCURRENCE OF THE ENZYMES EFFECTING THE CONVERSION OF ACETYL CoA TO SQUALENE IN HOMOGENATES OF HOG AORTA. L.L. Slakey, G.C. Ness, N. Qureshi and J.W. Porter (Lipid Metabolism Lab., Veterans Admin. Hosp., and Dept. Physiological Chem., Univ. of Wisconsin, Madison, Wisc. 53706). *J. Lipid Res.* 14, 485–94 (1973). Homogenates and subcellular fractions of the intima-media of hog aorta have been prepared and examined for the presence of the enzymes catalyzing the conversion of acetyl CoA to squalene. Enzyme activities effecting the conversion of acetyl CoA to 3-hydroxy-3-methylglutarate (HMG); HMG CoA to mevalonic acid; mevalonic acid to 5-phosphomevalonic acid, 5-pyrophosphomevalonic acid, and isopentenyl pyrophosphate; isopentenyl pyrophosphate to farnesyl pyrophosphate; and farnesyl pyrophosphate to squalene have been demonstrated in these homogenates. The overall conversion of mevalonate to squalene has also been demonstrated with recombined fractions of hog aorta homogenates. Data are also presented that suggest that phosphatases present in the crude homogenates act to cleave farnesyl pyrophosphate to farnesol, and phospho- and pyrophosphomevalonate to mevalonate.

COMPARISON OF THE METABOLIC BEHAVIOR IN VITRO OF THE APOPROTEINS OF RAT SERUM HIGH DENSITY LIPOPROTEIN$_2$ AND HIGH DENSITY LIPOPROTEIN$_3$. B. Rubenstein and D. Rubinstein (Dept. of Biochem., McGill Univ., Montreal, Canada). *J. Lipid Res.* 14, 357–63 (1973). Rat serum high density lipoproteins were divided into two fractions, HDL_2 (d 1.063–1.12) and HDL_3 (d 1.12–1.21). These fractions were compared on the basis of (a) the pattern of the apolipoprotein peptides obtained on polyacrylamide gel electrophoresis in 7 M urea, (b) the exchange of some of the peptides with those in very low density lipoproteins (VLDL), and (c) the incorporation by perfused rat liver of [^{3}H]leucine into the peptides of the HDL_2 and HDL_3 secreted into the perfusate. Among the peptide bands of HDL_3, one is absent and another present only in trace amounts in HDL_2. After electrophoresis on polyacrylamide gel for 24 hr, a major peptide band of HDL_2 is split into three distinct areas, whereas it remains as a single area in HDL_3. Both HDL_2 and HDL_3 exchange prelabeled protein with VLDL. However, the exchange is much more limited in HDL_3, even though it contains most of the protein found in circulating rat HDL. Analysis of the individual peptides, separated by polyacrylamide gel electrophoresis after incubation with VLDL, reveals that in HDL_3 the exchange is limited to two peptides, whereas a third, although present in both subfractions of rat HDL, exchanges only when found in HDL_2.

STUDIES ON THE COMPARTMENTATION OF LIPID IN ADIPOSE CELLS. II. CHOLESTEROL ACCUMULATION AND DISTRIBUTION IN ADIPOSE TISSUE COMPONENTS. J. Farkas, A. Angel and M.I. Avigan (Dept. of Med. and Inst. of Med. Sci., Univ. of Toronto, Canada). *J. Lipid Res.* 14, 344–56 (1973). Adipose tissue was shown to contain 0.6–1.6 mg of cholesterol per gram wet weight. When expressed per unit of protein or organ mass, fat tissue contains more cholesterol than most other organs or membranes. The cholesterol content of fat tissue increased with the age and weight of the rat. Over 95% of adipose tissue sterols was cholesterol, and most of it was free. In young (150–165 g) rats two-thirds of fat tissue cholesterol was in collagenase-derived adipocytes while in older rats (450–480 g) 90% of fat tissue cholesterol was in adipocytes and the remainder was in stromal-vascular elements. Age-related differences in subcellular cholesterol distribution were also observed. The cholesterol/phospholipid molar ratios of purified plasma membrane fractions from small and large fat cells were identical (0.22–0.25), thus resembling muscle and liver membranes. 7.5 Days after intravenous administration of [4-^{14}C]cholesterol the specific activity of adipose cholesterol exceeded that of plasma cholesterol. At 28 days the specific activity of adipose and muscle cholesterol exceeded that of plasma three- to fivefold. The $t_{0.5}$ disappearance of adipose tissue cholesterol was approximately 27 days, which is consistent with its function as a slowly turning over storage pool. Thus, fat tissue is a major cholesterol storage organ. This may well account for the marked expansion of the slowly exchangeable cholesterol pool (pool B) observed in obesity.

PHOSPHOLIPASE B ACTIVITY OF A PURIFIED PHOSPHOLIPASE A FROM VIPERA PALESTINAE VENOM. J. Shiloah, C. Klibansky, A. de Vries and A. Berger (Rogoff-Wellcome Med. Res. Inst., Tel Aviv Univ. and Beilinson Med. Center, Petah Tikva, and The Weizmann Inst. of Sci., Rehovoth, Israel). *J. Lipid Res.* 14, 267–78 (1973). Phospholipase was isolated (in two fractions) from *V. palestinae* venom and it was shown to possess phospholipase A and B activity. Each of the two purified enzyme fractions was homogeneous as judged by electrophoresis on acrylamide gel and by immunodiffusion and immunoelectrophoresis, and both had essentially equal activities. The ratio of the specific activity, at various purification stages, to the specific activity of the whole venom was the same for A activity (substrate lecithin) as for B activity (substrate lysolecithin). The enzyme has a molecular weight of 16,000, six S-S bridges and no free thiol groups. At pH 7, dimerization was observed in the ultracentrifuge. A dissociation constant of about 10^{-5} M was estimated. The amino acid composition for both fractions (140 amino acid residues) was found to be essentially the same. The A activity had a pH optimum at 9; B activity was low at this pH but increased steadily beyond pH 10.5.

DETERMINANTS OF INTESTINAL MUCOSAL UPTAKE OF SHORT- AND MEDIUM-CHAIN FATTY ACIDS AND ALCOHOLS. V.L. Sallee and J.M. Dietschy (Gastrointestinal-Liver Sect., Dept. of Internal Med., Univ. of Texas Southwestern Med. Schl. at Dallas, Dallas, Tex. 75235). *J. Lipid Res.* 14, 475–84 (1973). Uptake rates across the jejunal brush border have been measured for water-soluble fatty acids and alcohols and analyzed to determine the relative roles of the unstirred water layer and the lipid cell membrane as determinants of the intestinal absorptive process. Initial studies involving measurement of time courses of electrical transients developed across the intestine exposed to poorly permeant solute molecules showed no anomalous discrimination of probe molecules of different size or charge. This finding suggests that the diffusion barrier in the intestine can be considered as an unstirred water layer. Next, uptake rates of fatty acid were found to be linear with respect to concentration of the test solute, demonstrated no competitive inhibition or contralateral stimulation, had low temperature dependency, and were insensitive to metabolic inhibition, indicating that uptake proceeds by passive diffusion. Passive permeability coefficients, *P, varied from 22 ± 1.4 to 395 ± 0.2 nmoles/min/100 mg/mM for the saturated fatty acids 2:0 through 12:0 and from 119 ± 3.3 to 581 ± 45.2 for the saturated alcohols 6:0 through 10:0. Vigorous stirring of the bulk buffer solution enhanced *P values in direct proportion to chain length while the presence of bile acid micelles depressed apparent permeability coefficients in proportion to fatty acid chain length.

DIGLYCERIDE KINASE IN HUMAN PLATELETS. F.L. Call, II, and M. Rupert (Dept. of Med., State Univ. of New York, Syracuse, N.Y. 13210). *J. Lipid Res.* 14, 466–74 (1973). Human platelets contain diglyceride kinase, an enzyme that catalyzes the phosphorylation of diacylglycerol by adenosine 5′-triphosphate to yield phosphatidic acid. The majority of the platelet enzyme is particulate-bound, and membrane fractions of platelet homogenates have a higher specific activity than granule fractions. Both deoxycholate and magnesium are necessary for optimal enzyme activity. The K_m of the enzyme for adenosine 5′-triphosphate is 1.3 mM, and the apparent K_m for diacylglycerol is 0.4 mM. The pH optimum is 6.6–

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28. Abbot, G.G., F.D. Gunstone and S.D. Hoyes, Ibid. 4:351 (1970).
29. Abbot, G.G., and F.D. Gunstone, Ibid. 7:279 (1971).
30. Abbot, G.G., and F.D. Gunstone, Ibid. 7:290, 303 (1971).
31. Gunstone, F.D., and B.S. Perera, Ibid. 11:43 (1973).
32. Gunstone, F.D., and R.P. Inglis, Ibid. 10:73 (1973).
33. Gunstone, F.D., and R.P. Inglis, Ibid. 10:89 (1973).
34. Gunstone, F.D., and R.P. Inglis, Ibid. 10:105 (1973).

[Received September 17, 1973]

in subjects with coronary artery disease who had normal lipid profiles. The marked diurnal increases in fibrinolytic activity observed in the young normal subjects were significantly reduced in a large percent of the older normal subjects and in most of the subjects with coronary artery disease or type IV hyperlipoproteinemia. Although not conclusive, these findings were compatible with the hypothesis that an impairment in the responsiveness of the fibrinolytic system may be related to the development of coronary artery disease.

THE EARLY STIMULATION OF PHOSPHOLIPID METABOLISM BY 12-O-TETRADECANOYL-PHORBOL-13-ACETATE AND ITS SPECIFICITY FOR TUMOR PROMOTION. L.R. Rohrschneider and R.K. Boutwell (McArdle Lab. for Cancer Res., Univ. of Wisc. Med. Center, Madison, Wisc. 53706). *Cancer Res.* 33, 1945–52 (1973). We have examined the relationship to tumor formation of the stimulated phospholipid metabolism produced in mouse skin by a single application of the tumor-promoting phorbol ester, 12-O-tetradecanoyl-phorbol-13-acetate (TPA). The TPA-induced stimulation of ^{32}P incorporation into mouse skin phospholipids was first characterized and then compared with the altered incorporation of ^{32}P produced by the application of either acetic acid, β-propiolactone or 7,12-dimethylbenz[a] anthracene at 2 dose levels. The results indicated that only the tumor promoter, TPA, was able to stimulate the early synthesis of phosphatidylethanolamine and phosphatidylcholine. This specificity was further emphasized by the demonstration that only TPA stimulated the incorporation of choline-^{14}C into phosphatidylethanolamine. The finding that mouse skin papillomas (initiated with 7,12 dimethylbenz[a]anthracene and promoted with croton oil) contained more phosphatidylcholine than the tissue of origin suggested that membrane alterations and the stimulated synthesis of phosphatidylcholine are important factors in tumor formation.

PARTIAL RESOLUTION OF THE ENZYMES CATALYZING OXIDATIVE PHOSPHORYLATION. XXVIII. THE RECONSTITUTION OF THE FIRST SITE OF ENERGY CONSERVATION. C.I. Regan and E. Racker (Sect. of Biochem. and Molecular Biol., Cornell Univ., Ithaca, N.Y. 14850). *J. Biol. Chem.* 248, 2563–9 (1973). The ability to phosphorylate ADP during oxidation of NADH by ubiquinone-1 was restored to the NADH-ubiquinone reductase complex by combining the latter with phospholipids and a hydrophobic protein fraction derived from bovine heart mitochondria. Phosphorylation was abolished by rotenone, uncoupling agents or rutamycin. The efficiency of ATP formation was high as 0.5 mole per mole of NADH oxidized under optimal conditions. Reconstitution of phosphorylation had an absolute requirement for phosphatidylethanolamine and a partial requirement for phosphatidylcholine, a molar ratio of approximately 4:1 being optimal. A much more marked requirement for phosphatidylcholine was observed in the presence of low concentrations of cardiolipin (0.05 to 1.5% of the total phospholipid).

BIOSYNTHESIS OF PRELYCOPERSENE PYROPHOSPHATE AND LYCOPERSENE BY SQUALENE SYNTHETASE. A.A. Qureshi, F.J. Barnes, E.J. Semmler and J.W. Porter (Lipid Metabolism Lab., Veterans Administration Hosp., and the Dept. of Physiological Chem., Univ. of Wisconsin, Madison, Wisc. 53706). *J. Biol. Chem.* 248, 2755–67 (1973). The conversion of [4,8,12,16-^{14}C]geranylgeranyl pyrophosphate to prelycopersene pyrophosphate and lycopersene by purified bakers' yeast squalene synthetase is reported. The identification of the products of this reaction has been achieved through co-chromatography with authentic samples on thin-layer plates and gas-liquid chromatography with authentic samples of either the original compound or a derivative. Further proof of the identities of these compounds has been obtained from their mass fragmentation patterns. The conversion of prelycopersene pyrophosphate to lycopersene occurs in the presence of NADPH and appears to be analogous to the conversion of presqualene pyrophosphate to squalene.

THE ASSOCIATION BETWEEN PHOSPHATIDYLINOSITOL PHOSPHODIESTERASE ACTIVITY AND A SPECIFIC SUBUNIT OF MICROTUBULAR PROTEIN IN RAT BRAIN. P.J. Quinn (Dept. of Biochem., Univ. of Oxford, Oxford OX1 3QU, U.K.). *Biochem. J.* 133, 273–81 (1973). Supernatant proteins from rat brain were separated into two fractions containing phosphatidylinositol phosphodiesterase activity by chromatography on DEAE-Sephadex A-50. The first fraction sediments in linear sucrose density gradients in two bands corresponding to molecular weights of 66,000 and 36,000. There was presumptive evidence that the lighter protein constituted the monomeric form of the enzyme. The second fraction sediments predominantly as a single protein of molecular weight 86,000. Treatment of rat brain supernatant with [^{3}H]colchicine abolished the second DEAE-Sephadex peak and removed the lighter protein from the first peak. Some phospholipase activity characteristic of the second peak from DEAE-Sephadex was associated with one fraction of added microtubular protein. This fraction was identified on the basis of the ^{3}H:^{32}P ratio as the β subunit of the protein treated with ATP and cyclic AMP. The subunit of added microtubular protein untreated with nucleotides was not associated with phospholipase activity.

HEPATIC STEAROYL-CoA DESATURASE ACTIVITY IN MICE AS AFFECTED BY EARLY POSTNATAL DIETARY CYCLOPROPENE FATTY ACIDS. P.K. Raju and R. Reiser (Dept. of Biochem. and Biophysics, Texas A&M Univ., College Station, Tex. 77843). *J. Nutr.* 103, 904–7 (1973). The effect of inhibition of hepatic microsomal stearoyl-CoA desaturase in the early postnatal period by dietary cyclopropene fatty acids (CFA) on the activity of the enzyme in adult mice was investigated. Feeding 0.2% CFA in the form of *Sterculia foetida* seed oil to lactating mice from 1 day to 30 days postpartum inhibited the hepatic stearoyl-CoA desaturase activity of the month-old pups. CFA-free diet fed during the second month did not restore the activity of the desaturase. The Halphen reaction of the lipids of the adult mice indicates that even though the characteristic absorption at 500 nm due to CFA was absent, there was a sharp absorption at 550 nm. This absorption could be due to a residual cyclopropene-containing metabolite of CFA which may also inhibit stearoyl-CoA desaturation. *sn*-Glycerophosphate-acyl-transferase activities were high in the CFA groups at all stages of development. The mechanism of this effect is not clear.

EFFECTS OF DIETARY FAT AND OF A LIPOLYTIC AGENT ON POSTPRANDIAL FREE FATTY ACIDS AND FASTING SERUM LIPIDS IN THE DOG. W.F. Prigge and F. Grande (Jay Phillips Res. Lab., Mt. Sinai Hosp., Minneapolis, Minn. 55455). *J. Nutr.* 103, 1200–7 (1973). The effect of feeding low fat and high fat diets, with and without administration of a lipolytic agent, on postprandial free fatty acids (FFA) and fasting serum lipid levels was studied in dogs. The lipolytic agent used (SP54) was a low molecular weight polysulfated pentosane. Compared with the low fat diets all the high fat diets caused significant elevations of plasma FFA during the postprandial period, and of the fasting levels of cholesterol and phospholipids measured after 2 weeks of feeding. Daily injection of SP54 following feeding caused elevations of postprandial FFA and fasting serum cholesterol and phospholipids above the levels observed when the corresponding diets were fed without lipolytic agent treatment. The mean serum cholesterol and phospholipid levels at 2 weeks of feeding high fat diets containing equal proportions of either coconut oil, olive oil or sunflower oil (40% of total calorie intake), with and without SP54 administration, showed significant positive correlation with the corresponding postprandial plasma FFA levels. These results suggest that changes in plasma FFA associated with fat feeding may be involved in the mechanism by which dietary fat influences serum lipid levels in the dog.

AFFINITY CHROMATOGRAPHY OF SERUM ALBUMIN WITH FATTY ACIDS IMMOBILIZED ON AGAROSE. T. Peters, Jr., H. Taniuchi and C.B. Anfinsen, Jr. (M.I. Bassett Hosp., Cooperstown, N.Y. 13326). *J. Biol. Chem.* 248, 2447–51 (1973). Fatty acids immobilized on agarose have been employed in the isolation and study of serum albumin by affinity chromatography. Various oleyl- and palmityl-aminoalkyl-amino-agarose preparations bound about 10 mg of albumin per ml of agarose; other proteins were retained in smaller amounts and with lesser affinity. Fatty acid-agarose columns which had been exposed to human serum and then washed yielded essentially pure albumin upon elution with 50% alcohol at pH 3. Lengthening the aminoalkylamino "arm" from 2 to 10 carbon atoms had little effect on the capacity for albumin, but increased the binding of other serum proteins. That the albumin binding was caused by the immobilized fatty acids was shown by the use of control preparations without fatty acids, by the inverse relation of albumin binding to the fatty acid content of the albumin, and by the ability to elute albumin from the agarose with solutions of sodium oleate. Efforts were made to isolate fatty acid binding regions of the bovine albumin molecule after tryptic digestion of albumin which was bound to fatty acid-agarose. Two peptides with molecular weight of about 10,000 and 23,000 were obtained which were resistant to further digestion; the larger of these was purified and its amino acid composition determined. This tryptic peptide lacked cysteine and tryptophan, and apparently arises

Kubelka-Munk law, at least for light and moderate soilings. For heavy soiling deviations could appear, and these were largest when aqueous media were used whereas with organic solvents they were much smaller. Fabrics soiled with red iron oxide were also prepared and the concentration determined by chemical analysis. Similar results were obtained.

ORGANIC BUILDER SALTS AS REPLACEMENTS FOR SODIUM TRIPOLYPHOSPHATE (I). E.A. Matzner, M.M. Crutchfield and R.D. Swisher (Monsanto Ind. Chem. Co., St. Louis, Mo. 63166). *Tenside Detergents* 10(3), 119–25 (1973). Technical factors involved in developing satisfactory replacements for sodium tripolyphosphate in detergents are reviewed. The difficulty of this task has probably been underestimated by both those urging removal and those seeking substitutes. The obvious requirements for any substitute are that it be safe, functionally effective, environmentally acceptable and economically practical. The technical implications of these deceptively simple requirements with respect to acceptable molecular structures are discussed in greater detail. The classes of compounds which have been considered by many investigators in the continuing search are reviewed. Monsanto has now evaluated many hundred different chemical structures. The approach to the selection of potential candidates is described including screening tests and pass-fail standards. The importance of certain key tests such as sequestration, detergency performance, biodegradability, toxicity, and physical characteristics is highlighted.

THE THERMODYNAMICS OF DILUTION OF N-DODECYLTRIMETHYLAMMONIUM BROMIDE MICELLES IN AQUEOUS SOLUTIONS. M.N. Jones and J. Piercy (Dept. Biological Chem., U. of Manchester, Manchester M 13 9 PL, England). *Koll.-Z. u. Z. Polymere* 251, 343–7 (1973). The relative partial molal thermodynamic function $\Delta_{\mu 1}$, $\overline{\Delta H_1}$ and $\overline{\Delta S_1}$ have been derived from reported experimental light scattering and calorimetric measurements on micellar solutions of n-dodecyltrimethylammonium bromide. It is shown that the magnitudes of the thermodynamic functions are considerably larger than can be accounted for by the interaction of the electrical double layers surrounding the micelles. Possible enthalpy changes arising from a change in micelle shape, size and degree of dissociation on dilution are discussed.

ROLE OF OILY SOILS IN DETERGENCY TESTS. P. Sosis and W.D. Burch (Continental Oil Co., Saddle Brook, N.J.). *Soap/Cosmetics/Chemical Specialties* 49(7), 32–8 (1973). The authors studied the build-up in amount and composition of oily soil on Spangler-type detergency test cloths composed of three different fibers following up to 10 wash cycles in four different detergents. Concurrent build up of particulate soil was also studied. The detergents used were AP (anionic plus phosphate), NP (nonionic plus phosphate), AC (anionic plus carbonate) and NC (nonionic plus carbonate). Reflectance readings were taken after soiling and after each washing. Solids build up was assessed, and chloroform extracts of the cloths were taken after 1, 5, and 10 cycles. Thin-layer chromatography was used to determine the amount and composition of the residual oily soil. With cotton, all four detergent formulations gave about equal ratings throughout the 10 cycles. Cleaning efficiency dropped only slightly with increased cycles. On permanent press cloth, larger differences in efficiencies of the different detergent formulations were found. With Dacron, the active ingredient was more critical to good detergency than the type of builder. Cotton picked up more fatty acid soil than did the synthetics. The more polar oily soil components were more completely removed in washing than the less polar ones such as paraffins and triglycerides, especially on polyester and blends. The build-up of solid matter increased with exposure to soil and washing. The largest increases occurred with the carbonate formulations and especially the AC system, indicating deposition of a precipitate.

WASHING COMPOSITIONS. J. Ziffer (Pabst Brewing Co.). *U.S. 3,741,901.* Water soluble sulfites and bisulfites are used to increase washing effectiveness of detergent compositions, especially those containing bacterial protease and/or bacterial amylase, and to give a buffered pH level, particularly where other components give too high a pH which would normally affect the stability of the enzymes.

DETERGENT COMPOSITIONS. J.M. Evans (Lever Bros.). *U.S. 3,741,903.* A detergent composition of the low temperature type comprises an inorganic persalt, e.g., sodium perborate, an inorganic peracid precursor, e.g., N,N,N′,N′-tetraacetyl ethylene diamine, a cotton substantive fluorescent agent of the 4,4′-di(symtriazinylamino)-stilbene-2,2′-disulfonate type, and not more than 0.001% of a triazine derivative of specified formula. The compositions have a decreased tendency to discolor and form off odors during storage.

PREPARATION OF A PROTECTED GRANULE AND DISHWASHING COMPOSITION FORMED THEREWITH. R.H. Christensen, E.E. Combs, and M.A. Patrone (Miles Laboratories, Inc.). *U.S. 3,741,904.* A protected granule is formed by adding to a builder salt an aqueous solution of a nonionic surfactant and subsequently adding a liquid sodium silicate having an SiO_2/Na_2O ratio between 2.4 and 2.5 inclusive and a viscosity at 68F of 1700–2200 cp. This protected granule may be combined with a chlorine releasing agent to form an improved dishwashing composition.

PHOSPHATE FREE DETERGENT COMPOSITION. H.J.S. Shane (Hart Chemical Ltd.). *U.S. 3,741,911.* The composition is built using conventional builders, optionally including an organic sequestering agent, and contains as the active system a coacervate system containing an alkyl or alkyl-aryl polyoxyalkylene carboxylic acid and a nonionic detergent. The coacervate system is suitable for washing fabrics and for use in automatic dishwashing machines.

LOW FOAMING DETERGENT. T.M. Kaneko (BASF Wyandotte Corp.). *U.S. 3,741,912.* The composition may be formulated with automatic dishwashing detergents to reduce foam during use in the presence of proteinaceous matter. It comprises 95–99.5% of a nonionic surface active agent and 0.5–5.0% of (a) alkyl phosphate ester having 18 carbon atoms in the alkyl radical plus (b) oxyethylated amines selected from the group consisting of an oxyethylated mono- or dialkyl amine or a mono or di(hydroxyalkyl) amine wherein the alkyl group contains 10–20 carbon atoms and the oxyethylene portion contains 1–50 units. The ratio of the alkyl phosphate ester to the oxyethylated fatty amine is 2:1–1:2.

PROCESS FOR MAKING SPRAY DRIED DETERGENT COMPOSITIONS. A. Waag (Mo Och Domsjo Aktiebolag). *U.S. 3,741,913.* A process is disclosed which spray dried, homogeneous detergent compositions are prepared from aqueous slurries containing surface active ethylene oxide adducts. Prior to spray drying the slurry, an organic mono- or polyphosphate ester is incorporated with the ethylene oxide adduct and other ingredients in order to inhibit separation into different layers. The phosphate ester may be added at any time in the preparation of the aqueous slurry of the ingredients.

CLEANING AND POLISHING COMPOSITION. L.R. Parks (Procter & Gamble). *U.S. 3,741,914.* The compositions, which are dryable to a bright surface without buffing, comprise a continuous aqueous phase, a dispersed, non-volatile, water insoluble, solid film forming polymer capable of being deposited in a smooth, bright, protective film upon evaporation of the aqueous phase and having a molecular weight of 5–15 million; a plasticizer; a cleaning agent; and sufficient base to adjust the pH of the formulation to 8–12.

SULFONATE DETERGENTS. S.C. Paviak (Gulf Res. Dev. Co.). *U.S. 3,741,915.* The aqueous composition contains sodium alkene sulfonates or sodium hydroxy alkane sulfonates and an alkali metal sulfate in an amount sufficient to increase the viscosity thereof.

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adenylate cyclase activity. Diet shifts to high carbohydrate or high protein regimens result in the restoration of the epinephrine-stimulated, but not the glucagon-stimulated, activity without a significant reduction in mean cell diameter. Both hormone-resistant adipocyte ghosts from fat-fed animals and ghosts obtained from hormone-sensitive adipocytes bind the same amount of [^{3}H]-epinephrine per milligram of membrane protein. These data indicate that the fat diet inhibits epinephrine-stimulated adenylate cyclase activity at a point between the hormone receptor and the catalytic unit of adenylate cyclase.

PERMEABILITY AND TOPOGRAPHY OF MEMBRANES. L.L.M. van Deenen (Dept. of Biochem., State Univ. of Utrecht, Utrecht, Netherlands). *Fette Seifen Anstrichmittel* **75**, 101–3 (1973). In this brief review, we report that the permeability of both artificial and natural membranes depends at least on the following lipid parameters: I) The nature of the hydrocarbon chains of phospholipids. Because of a less compact packing of unsaturated phospholipids when compared with saturated ones, the former barrier will be more permeable. II) Interaction of phospholipids with sterols. The so-termed condensing effect of a sterol like cholesterol limits the mobility of the fatty acid chains. The effect depends not only on the chemical nature of the phospholipid, but also on structural details of the sterol partner. III) The chemical nature of the polar headgroup of the phospholipid. Wide variations in structure occur and the net charge of phospholipid can range from extremely negative to positive, thereby influencing ion permeation. In addition some recent results obtained with action of pure phospholipases A and C on erythrocytes are mentioned.

SYNTHESIS OF CONJUGATED BILE ACIDS BY MEANS OF A PEPTIDE COUPLING REAGENT. L. Lack, F.O. Dorrity, Jr., T. Walker and G.D. Singletary (Dept. of Physiol. and Pharmacol., Duke Univ. Med. Center, Durham, N.C. 22710). *J. Lipid Res.* **14**, 367–70 (1973). The conditions for the preparation of conjugated bile acids by means of N-ethoxycarbonyl-2-ethoxy-1,2-dihydroquinoline are described. Conjugation is obtained in one step via the intermediary formation of mixed carbonic-carboxylic acid anhydrides.

A METHOD FOR THE SPECIFIC LABELING OF THE GLYCEROL IN GLYCERIDE-CONTAINING LIPIDS OF STREPTOCOCCUS FAECALIS ATCC 9790. R.A. Pieringer and R.T. Ambron (Dept. of Biochem., Temple Univ. Schl. of Med., Philadelphia, Pa. 19140). *J. Lipid Res.* **14**, 370–2 (1973). Cells of *S. faecalis* incorporate radioactive glycerol exclusively into the glycerol moieties of monoglucosyl diglyceride, diglucosyl diglyceride, phosphatidyl diglucosyl diglyceride, phosphatidylglycerol, diphosphatidylglycerol, phosphatidic acid, diglyceride and a phospholipid tentatively identified as an amino acyl phosphatidylglycerol. Phosphatidylglycerol is one of the major radioactive lipids synthesized and contains an equal amount of radioactivity in each of its two glycerol moieties.

EFFECT OF CHRONIC ETHANOL FEEDING ON HEPATIC MICROSOMAL GLYCEROPHOSPHATE ACYLTRANSFERASE ACTIVITY. J.-G. Joly, L. Feinman, H. Ishii and C.S. Lieber (Dept. of Med., Mt. Sinai Schl. of Med. of the City Univ. of N.Y. 10468). *J. Lipid Res.* **14**, 337–43 (1973). The activity and submicrosomal distribution of α-glycerophosphate acyltransferase (GPAT) were studied in rats fed ethanol for 6 wk. GPAT activity was also measured in rats after 10 days of alcohol feeding, 22 days of phenobarbital administration, or 24 days on a high fat (71% of total calories) diet. After 6 wk of ethanol feeding, GPAT activity was increased 73% when expressed per milligram of protein and 133% when expressed per 100 g of body weight ($P > 0.005$). GPAT activity was more abundant in the smooth than in the rough microsomes of both control and ethanol-fed rats when expressed per milligram of microsomal protein and when expressed per gram of liver; the smooth microsomes accounted for most of the increased GPAT activity after ethanol. 10 Days of ethanol feeding or 22 days of phenobarbital administration did not increase GPAT activity. Feeding a high fat diet for 24 days increased GPAT activity per milligram of protein to an extent similar to that observed after chronic ethanol administration. When expressed per 100 g of body weight, however, the increase was much greater after ethanol. The significance of these findings in vivo has not been elucidated. Increased GPAT activity might contribute to the persistence of alcoholic fatty liver and the development of hyperlipemia.

HORMONE-STIMULATED LIPOLYSIS IN ISOLATED FAT CELLS FROM "YOUNG" AND "OLD" RATS. E.A. Miller and D.O. Allen (Dept. of Pharmacol., Indiana Univ. Schl. of Med., Indianapolis, Ind. 46202). *J. Lipid Res.* **14**, 331–6 (1973). The biphasic nature of the lipolytic dose-response curve of epinephrine in fat cells from "young" rats (40–45 days) was confirmed. The first phase (Lipolysis I) occurred at concentrations of from 10^{-7} M to 3×10^{-6} M. The second phase (Lipolysis II) occurred at concentrations of from 10^{-5} M to 3×10^{-4} M. Insulin (0.1 mU/ml) abolished Lipolysis I and slightly augmented Lipolysis II. Higher concentrations of insulin (1.0 mU/ml) augmented Lipolysis II even further. These results may help to explain some of the conflicting reports in the literature concerning the effects of insulin on lipolysis. The dose-response curve of epinephrine using fat cells from "old" rats (14–16 months) was monophasic. Based on results with propranolol, K^+-free media and insulin, it was concluded that the lipolytic response in tissue from older animals corresponds to Lipolysis II in tissue from younger rats. The lipolytic response to ACTH was greatly reduced in the cells from the older rats, but the response to theophylline was unaltered.

HYPOLIPEMIC ACTION OF GLUCAGON IN EXPERIMENTAL ENDOGENOUS LIPEMIA IN THE RAT. R.P. Eaton (Dept. of Med., Univ. of New Mexico Schl. of Med., Albuquerque, N.M. 87106). *J. Lipid Res.* **14**, 312–8 (1973). The effect of glucagon on serum lipids and very low density lipoproteins (VLDL) has been examined in the eulipemic and the hyperlipemic rat. An inhibition of amino acid incorporation into hepatic lipoprotein apoprotein was observed, with an associated decrease in circulating VLDL apoprotein, decreased serum triglyceride concentration and a loss of the pre-β band as judged by serum lipoprotein electrophoresis. The data suggest that an important action of this hormone is to decrease the synthesis of the protein moiety of the VLDL; this may contribute to the hypolipemic action of glucagon by introducing a limitation in hepatic lipoprotein production.

BIOSYNTHESIS OF LYMPH AND PLASMA LIPOPROTEIN APOPROTEINS BY ISOLATED PERFUSED RAT LIVER AND INTESTINE. H.G. Windmueller, P.N. Herbert and R.I. Levy (Lab. of Nutr. and Endocrinology, Natl. Inst. of Arthritis, Metabolism and Digestive Diseases, and Molecular Diseases Branch, Natl. Heart and Lung Inst., Natl. Insts. of Health, Bethesda, Md. 20014). *J. Lipid Res.* **14**, 215–23 (1973). The ability of rat intestine and liver to synthesize the various apoproteins of plasma lipoproteins was investigated. After the individual isolated organs were perfused with blood containing [^{3}H]lysine, chylomicrons plus very low density lipoproteins (VLDL), low density lipoproteins (LDL) and high density lipoproteins (HDL) were isolated from the perfusates and the intestinal lymph. After lipoprotein delipidation, apoproteins were separated by polyacrylamide gel electrophoresis and the ^{3}H content was determined. Livers incorporated [^{3}H]lysine into all apoprotein bands of VLDL and HDL. The ^{3}H content was greater in large proteins that remained in the stacking gel (group I, predominantly β-apoprotein) than in proteins with apparent molecular weights near 50,000 (group II) or in the smaller peptides (molecular weights near 10,000, group III). In the intestine, ^{3}H was incorporated into group I and, in larger amounts, into group II apoproteins of lymph VLDL. No labeled VLDL appeared in the perfusate. ^{3}H was also incorporated into group II apoproteins of lymph and perfusate HDL. Significantly, no [^{3}H]lysine was found in the group III peptides of any lymph or intestinal perfusate lipoproteins.

IMPROVED ESTIMATION OF BODY MASSES AND TURNOVER OF CHOLESTEROL BY COMPUTERIZED INPUT-OUTPUT ANALYSIS. P. Samuel and S. Lieberman (Rockefeller Univ., N.Y. 10021). *J. Lipid Res.* **14**, 189–96 (1973). In 23 patients, the decay curves of serum cholesterol specific activity after a single intravenous dose of radioactive cholesterol were measured for 16–66 wk and were subjected to computerized input-output analysis. Of 17 patients with decay curves followed for longer than 50 wk, a three-exponential curve fit was better in 12, and a two-exponential curve fit in 5, according to

Dermatol. and Biochem., Univ. of Miami Schl. of Med., Miami, Fla. 33152). *J. Lipid Res.* 14, 377–84 (1973). The biosynthesis of prostaglandin E_2 (PGE_2) from [1-^{14}C]arachidonic acid has been demonstrated in homogenates and subcellular fractions of human epidermis. This biosynthetic capacity is localized in the microsomal fraction, indicating the presence of an active prostaglandin synthetase system associated with membranes of the skin. The incorporation of ^{14}C from [1-^{14}C] arachidonic acid into PGE_2 by the microsomal fraction was enhanced by EDTA. This apparent increase in ^{14}C incorporation into PGE_2 in the presence of EDTA could be due at least in part to its chelating properties of removing the divalent cations in the homogenate that enhance the selective formation of $PGF_{2\alpha}$ and the suppression of the activity of epidermal phospholipase A, which causes the release of nonradioactive fatty acid precursors from endogenous phospholipids. This study has also demonstrated that the formation of PGE_2 from arachidonic acid by the microsomal fraction from human skin could be inhibited by polyunsaturated fatty acids, suggesting a possible regulatory role of fatty acids released from endogenous phospholipids on prostaglandin synthesis in this tissue. The inhibitory effects of some anti-inflammatory drugs on skin microsomal prostaglandin synthetase were also demonstrated in these studies.

BILE ACID COMPOSITION IN SOME DESERT RODENTS. I.M. Yousef, M.K. Yousef and W.G. Bradley (Dept. of Pathol., Univ. of Toronto, Toronto, Canada). *Proc. Soc. Exp. Biol. Med.* 143, 596–601 (1973). Seven species of desert rodents representing three families were used to investigate bile acid composition of the bile acid pool isolated from the gall bladder. Cholic acid (CA) was the common primary bile acid among all species. The other primary acid, chenodeoxycholic acid (CDOCA), was detected in all species but one. The ratio CA:CDOCA differed from species to species. The secondary metabolic products of CA and CDOCA showed a different pattern among the seven species and deoxycholic acid was a prominent feature of all species. Additional studies are needed to fully understand the role of ecologic distribution, phylogeny and nutrition on bile acid composition.

ACYL COENZYME A:1-ACYLGLYCEROPHOSPHORYLGLYCEROL ACYLTRANSFERASE FROM RAT LIVER. B. Wittels (Dept. of Pathol., Duke Univ. Med. Center, Durham, N.C. 27710). *J. Biol. Chem.* 248, 2906–11 (1973). Rat liver microsomes are capable of catalyzing the acylation of 1-palmitoyl-*sn*-glycero-3-phosphoryl-*rac*-glycerol for phosphatidylglycerol formation. The requirements for the reaction appear to be the same as the analogous reaction for lecithin synthesis. In contrast, however, to oleoyl-CoA:1-palmitoyl-*sn*-glycero-3-phosphorylcholine acyltransferase, which has a pH optimum of 7.0, oleoyl-CoA:1-palmitoyl-*sn*-glycero-3-phosphoryl-*rac*-glycerol acyltransferase functions optimally at pH 9.0. The latter is also distinguishable by being more stable at the alkaline pH than the former. The data indicate that in addition to positional specificity and acyl group preferability, acyl-CoA:acyl glycerophospholipid acyltransferases also possess phosphoryl-alcohol group specificity.

CHANGES IN SERUM CHOLESTEROL AND CORONARY HEART DISEASE MORTALITY ASSOCIATED WITH CHANGES IN THE POSTWAR JAPANESE DIET. Chi-Pang Wen, and S.N. Gershoff (Dept. of Nutr., Harvard School of Public Health, Boston, Mass. 02115). *Am. J. Clin. Nutr.* 26, 616–9 (1973). The changes in fat and cholesterol consumption in the American diet over the last 60 years have not been great. Therefore, it is not surprising that, using similar assumptions and calculations, Kahn could not account for the CHD increase in the United States on the basis of changes in known dietary risk factors. As demonstrated in this study, even with a marked increase in fat and cholesterol consumption, it appears that increased lipid consumption is only responsible for a small proportion of the increase in deaths resulting from CHD in Japan.

EFFECTS OF FEEDING AND EXERCISE REGIMENS ON ADIPOSE TISSUE GLYCEROKINASE ACTIVITY AND BODY COMPOSITION OF LEAN AND OBESE MICE. R.F. Welton, R.J. Martin, and B.R. Baumgardt (Dept. of Animal Sci., Pennsylvania State Univ., University Park, Pa. 16802). *J. Nutr.* 103, 1212–9 (1973). Glycerokinase activity in adipose tissue has been suggested as the basic genetic difference between lean and obese-hyperglycemic mice. These mice were used as animal models to compare lean and obese adipose tissue glycerokinase activity and to investigate the effects of feed restriction and exercise on glycerokinase activity and body composition. Body weights and feed consumption of ad libitum-fed obese-hyperglycemic mice were significantly higher ($P < 0.01$) than their lean controls. Liver glycerokinase activity was significantly higher ($P < 0.001$) than adipose tissue glycerokinase activity in lean and obese female mice. Liver and adipose tissue glycerokinase specific activities were consistently higher in the obese mouse when compared to the lean controls. Obese-hyperglycemic mice pair-weighed to the lean controls and exercised to exhaustion once a day, were approximately the same size but contained more body fat than the lean control.

INTESTINAL BILE ACIDS AND CHOLESTEROL ABSORPTION IN THE GERMFREE RAT. B.S. Wostmann (Lobund Lab., Dept. of Microbiol., Univ. of Notre Dame, Notre Dame, Ind. 46556). *J. Nutr.* 103, 982–90 (1973). The bile of the adult germfree rat fed diets low in cholesterol (0.05% or less) contained approximately three times as much bile acid as found in conventional rat bile. The taurocholic acid content was 1.6 to 1.7 times higher, the tauro-β-muricholic acid approximately 10 times higher in bile from germ-free than from conventional rats. In germfree bile taurocholic acid and tauro-β-muricholic acid were present in about equal amounts, and together accounted for 98% of the total bile acids. Biliary bile acid composition of the germfree rat was quite similar to the pattern found in its feces, except for a moderate preponderance of tauro-β-muricholic acid in the feces resulting from preferential reabsorption of taurocholic acid in the ileum of the germfree rat. The cholesterol accumulation found in the germfree rat fed cholesterol-containing diets may therefore be caused not only by reduced elimination via bile acids, but also, indirectly, by enhancement of the absorption of dietary lipids.

EFFECTS OF THE DIETARY CARBOHYDRATE-FAT COMBINATION ON CHANGES IN LIPID METABOLISM INDUCED IN RATS BY AMINO ACID IMBALANCE. L. Williams and C. Carroll (Home Econ. Dept., Agr. Exp. Sta., Univ. of Arkansas, Fayetteville, Ark. 72701). *J. Nutr.* 103, 991–8 (1973). A study was conducted to evaluate interrelated effects of type of carbohydrate and fatty acid content of fat in the diet on lipid accumulation in liver of rats fed imbalanced protein diets, deficient in threonine. Regular and high oleic safflower oils were each combined with fructose and with glucose in both balanced and imbalanced protein diets. Rats were fed for 3 weeks. Rats fed fructose-imbalanced rations accumulated more liver lipid than rats fed glucose-imbalanced rations. The only significant differences attributable to the type of safflower oil fed were in fatty acid content of liver and adipose lipids. Liver fatty acids from all rats fed imbalanced rations had a pattern of reduced 18:0, increased 16:1 and 18:1, and a higher 18:2/20:4 ratio as compared with those from rats fed a balanced ration. These differences were accentuated by fructose. This pattern existed with either oil, although the absolute percentage of each fatty acid was a reflection of the dietary oil.

FATTY ACID SYNTHESIS BY THE LIVER PERFUSED WITH DEUTERATED AND TRITIATED WATER. M. Wadke, H. Brunengraber, J.M. Lowenstein, J.J. Dolhun and G.P. Arsenault (Grad. Dept. of Biochem., Brandeis Univ., Waltham, Mass. 02154). *Biochemistry* 12, 2619–24 (1973). Fatty acid synthesis has been studied in livers of rats perfused with 10% D_2O and with >90% D_2O. The number of deuterium atoms incorporated in 100% D_2O is 22.3 and 24.9 per molecule of newly synthesized palmitate and stearate, respectively. The result for palmitate agrees with the result obtained by Jungas with rat adipose tissue under quite different conditions. Mass spectrometric measurements of deuterium content were used to measure the rate of fatty acid synthesis. The results so obtained agree well with results obtained by measuring tritium incorporation from ^3H_2O. Mass spectrometric examination of fatty acids synthesized in the presence of high concentrations of D_2O provides direct information concerning the extent to which a fatty acid is formed by de novo synthesis and by chain elongation of other fatty acids. Stearate is synthesized at about 40% the rate of palmitate. Of the stearate formed about 97% is made by de novo synthesis. (An alternative interpretation of the last result is that the chain elongation mechanism uses only palmitate synthesized de novo and little or no preexisting palmitate.)

SLOWLY MISCIBLE CHOLESTEROL POOLS IN PROGRESSING AND REGRESSING ATHEROSCLEROTIC AORTAS. W.D. Wagner and T.B. Clarkson (Arteriosclerosis Res. Center, Bowman Gray Schl. of Med., Wake Forest Univ., Winston-Salem, N.C. 27103). *Proc. Soc. Exp. Biol. Med.* 143, 804–9 (1973). Cholesterol pools were characterized metabolically in normal aorta and aortic plaques in White Carneau pigeons with naturally occurring, cholesterol-aggravated, and regressed athero-

from the carboxyl-terminal portion of the albumin molecule. Some implications on the properties of the fatty acid-binding sites on albumin have been offered.

25-HDROXYCHOLECALCIFEROL (25-OHD$_3$) II. EFFICACY OF PARENTERAL ADMINISTRATION IN PREVENTION OF PARTURIENT PARESIS. W.G. Olson, N.A. Jorgensen, L.H. Schultz and H.F. DeLuca (Dept. of Dairy Sci. and Biochem., Univ. of Wisconsin, Madison, Wisc. 53706). *J. Dairy Sci.* **56**, 889–95 (1973). Three trials involving subcutaneous or intramuscular injection of 25-hydroxycholecalciferol in 5 ml of sesame oil tested its efficacy in preventing parturient paresis. Subcutaneous injection of 2.0 mg of 25-hydroxycholecalciferol was unsatisfactory because of unpredictable absorption rate of the oil and poor protection. Intramuscular injection of 4.0 or 8.0 mg 25-hydroxycholecalciferol prevented parturient paresis when calving occurred between 72 h and 10 days after injection. When all treated cows were compared, administration of 4.0 mg 25-hydroxycholecalciferol reduced the overall incidence from 29% in control cows (7 of 24) to 16% in treated cows (4 of 21) while administration of 8.0 mg 25-hydroxycholecalciferol reduced the incidence from 52% in control cows (12 of 23) to 19% in treated cows (4 to 21). No clinical signs of hypervitaminosis D were observed in any treated animals.

INFLUENCE OF CHOLECALCIFEROL (VITAMIN D$_3$) ON THE INITIAL KINETICS OF THE UPTAKE OF CALCIUM BY RAT SMALL-INTESTINAL MUCOSA. J.M. O'Donnell and M.W. Smith (Agr. Res. Council Inst. of Animal Physiol., Babraham, Cambridge CB2 4AT, U.K.). *Biochem. J.* **134**, 667–9 (1973). The uptake of Ca^{2+} by isolated small-intestinal mucosa from vitamin D-depleted and -repleted rats was analysed for the effects of vitamin D on initial kinetics. The rapid association of Ca^{2+} with the tissue, which is complete within 1 min, was unaffected by the vitamin, whereas the subsequent linear uptake was significantly increased. Neither the tissue space accessible to inulin nor the permeability to thiourea was influenced by vitamin D treatment.

PARTIAL PURIFICATION AND PROPERTIES OF AN ACYL COENZYME A: SN-GLYCEROL 3-PHOSPHATE ACYLTRANSFERASE FROM RAT LIVER MITOCHONDRIA. G. Monroy, H.C. Kelker and M.E. Pullman (Dept. of Biochem., Public Health Res. Inst. of the City of New York Inc., New York, N.Y. 10016). *J. Biol. Chem.* **248**, 2845–52 (1973). The partial purification (6-fold) and properties of a position and substrate specific acyl coenzyme A: *sn*-glycerol-3P acyltransferase from rat liver mitochondria are described. The preparation is devoid of acyl-CoA: monoacylglycerol-3-P acyltransferase and lipid phosphomonoesterase activity. All of the glycerol-3-P acylated in the presence of palmityl-CoA is identified as 1-palmityl-*sn*-glycerol-3-P. The order of effectiveness of various acyl-CoA donors is palmityl $>$ stearyl $\simeq$ myristyl $>$ decanyl-CoA. Oleyl- and linoleyl-CoA were about 5% as effective as palmityl-CoA. Palmitic acid was esterified exclusively in position 1 of the *sn*-glycerol molecule. The activity is stimulated by phosphatidyl serine, asolectin and lecithin, whereas cardiolipin, lysophosphatidic acid and phosphatidic acid were inhibitory. Mg^{++}, Ca^{++}, Mn^{++} and to a lesser extent Co^{++} enhance the activity. The findings demonstrate that the acylation of *sn*-glycerol-3-P involves an enzyme activity separate from that which acylates 1-palmityl-*sn*-glycerol-3-P. The enzyme preparation offers a convenient and efficient method for the preparation of 1-palmityl-*sn*-glycerol 3-phosphate.

METABOLIC CONSEQUENCES OF DIETARY MEDIUM-CHAIN TRIGLYCERIDES IN THE RAT. J.H. Wiley and G.A. Leveille (Dept. of Animal Sci., Univ. of Illinois at Urbana-Champaign, Urbana, Ill. 61801). *J. Nutr.* **103**, 829–35 (1973). Some metabolic effects of feeding rats medium-chain triglyceride (MCT), triglyceride containing primarily C_8 and C_{10} fatty acids, were compared to the effects of feeding triglycerides composed of long-chain fatty acids. In vitro rates of lipogenesis in liver and adipose tissue of animals receiving long-chain triglycerides were significantly depressed relative to rates in tissues of rats receiving a low fat diet. MCT was markedly less effective in depressing lipogenesis. Malic enzyme, citrate cleavage enzyme and glucose-6-phosphate dehydrogenase + 6-phosphogluconate dehydrogenase enzyme activities were depressed in rat liver as a result of adding triglycerides containing either long- or medium-chain fatty acids to a low fat diet. In adipose tissue MCT was much less effective than were triglycerides containing long-chain fatty acids in depressing the activity of these enzymes. Circulating levels of β-hydroxybutyrate were markedly elevated by MCT feeding. Adding corn oil or MCT to the low fat diet appeared to increase circulating insulin levels, whereas only corn oil elevated circulating triglycerides. The lack of effect of MCT on lipogenesis is attributed to its portal absorption and rapid uptake and oxidation by the liver. Results support the theory that long-chain fatty acids or their CoA derivatives are involved in the regulation of fat synthesis in both liver and adipose tissue.

EFFECT OF DIET AND WEANING AGE ON IN VITRO LIPOGENESIS IN YOUNG SWINE. H.J. Mersmann, J.M. Houk, G. Phinney and M.C. Underwood (Shell Development Co., Modesto, Calif. 95352). *J. Nutr.* **103**, 821–8 (1973). We have studied glucose utilization by adipose tissue slices and the activity of a number of enzymes concerned with fat synthesis in order to evaluate the effects of chronological age, age of weaning and the accessibility of creep-feed upon the emergence of high rates of lipogenesis. Preweaning activities of all parameters were low, and there were some minor fluctuations. Two weeks after weaning, glucose incorporation into CO_2 or lipids was increased in animals weaned at 21 or 35 days, while animals weaned at 14 days had only marginal increases. Enzyme activities generally increased in the same manner with marginal increases observed in animals weaned at day 14. The adaptive pattern (to increased lipogenesis) was unique for each enzyme. Animals fed creep-feed generally had increased glucose incorporation into lipids, as well as increased enzyme activity (50 to 250% depending on the parameter) even though not yet weaned. The degree of adaptation to a high carbohydrate diet seems to depend not only upon the relative amounts of carbohydrate and lipid in the diet (milk or milk plus creep or starter ration) but also upon the age at which the animal is weaned.

INHIBITION OF GLUCOSE OXIDATION AND FATTY ACID SYNTHESIS IN LIVER SLICES FROM FED, FASTED AND FASTED-REFED RATS BY GLUCAGON, EPINEPHRINE AND CYCLIC ADENOSINE-3',5'-MONOPHOSPHATE. A.W. Meikle, G.J. Klain and J.P. Hannon (Physiol. Div., U.S. Army Med. Res. and Nutr. Lab., Fitzsimons Gen. Hosp., Denver, Colo. 80240). *Proc. Soc. Exp. Biol. Med.* **143**, 379–81 (1973). Glucagon and cyclic adenosine-3',5'-monophosphate (cAMP) markedly decreased glucose-U-^{14}C oxidation and conversion into fatty acids in liver slices from fed and fasted-refed rats. Epinephrine was much less effective. Lipogenesis from fasted rats was not reduced by any of these compounds below the level already produced by 2-day fast. The data suggest that hepatic glucagon levels are important in regulating glucose oxidation and its conversion into fatty acids. This effect appears to be mediated via modification of hepatic tissue cAMP levels.

LIPID MODEL MEMBRANES. CHARACTERIZATION OF MIXED PHOSPHOLIPID VESICLES. B.J. Litman (Dept. of Biochem., Univ. of Virginia, Schl. of Med., Charlottesville, Va. 22901). *Biochemistry* **12**, 2545–54 (1973). Mixed phospholipid vesicles, formed by ultrasonic irradiation, were characterized with respect to homogeneity of size and composition in order to extend the range of this model system apropos of simulating the complex mixture of phospholipids found in biological membranes. A study of the mole fraction dependence of the incorporation of phosphatidylethanolamine into phosphatidylcholine vesicles shows a slight deviation from linearity, whereas a similar study of the incorporation of phosphatidylinositol into phosphatidylcholine vesicles demonstrated linear behavior over the entire mole fraction range. The linearity of trapped volume measurements and consistency of composition determinations for fractions taken from the trailing side of the internal volume peak of a Sepharose 4B column indicate that the size and compositional distribution are constant for these fractions.

HYPOTHALAMIC-ADIPOSE TISSUE INTERRELATIONSHIPS. S. Lepkovsky (Dept. of Poultry Husbandry, Univ. of California, Berkeley, Ca. 94720). *Fed. Proc.* **32**, 1705–8 (1973). The White Leghorn cockerel regulates its food intake so that it is normally lean. It is postulated that the hypothalamus gives the control system of the adipose tissues of this breed a set point that requires very little fat. The amount of fat in the adipose tissues is regulated by lipolysis and lipogenesis. When the amount of fat in the adipose tissues increases above the set point level, lipolysis is accelerated; the availability of endogenous energy (fatty acids) for the lean body mass is increased and, concomitantly, the rate of the absorption of food from the small intestine is decreased, food accumulates in the upper intestine and crop, and food intake decreases.

THE PERMEABILITY OF LIPID MEMBRANES TO NON-ELECTROLYTES. J. Lelievre and G.T. Rich (Schl. of Biol. Sci., Univ. of East Anglia, Norwich, NOR 88C, Great Britain). *Biochim. Biophys. Acta* **298**, 15–26 (1973). The permeabilities of smectic

• Abstracts. . .

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EFFECT OF OZONATION MEDIUM, AND DECOMPOSITION CONDITIONS ON THE YIELDS OF OZONOLYSIS REACTIONS. M. Naudet and A. Pelloquin (National Lab. of Oils and Fats—ITERG, Univ. of Provence, Marseille, France). *Rev. Franc. Corps Gras* 20, 89–94 (1973). With the use, during ozonation, of a polar hydrated solvent which cannot react with the substrate or the reaction products, the formation of secondary products—principally parasitic esters—during preparative ozonolysis, may be greatly reduced. The maximum amount of water which may be used is that compatible with a total solubilization of the substrate.

STABILITY OF SULFATED OILS AFTER HYDROLYSIS. J. Pore and C. Chasseboeuf (Society of Houghton Products, 92-Puteaux, France). *Rev. Franc. Corps Gras* 20, 153–7 (1973). To determine their stability, sulfated oils derived from foots, caster oil and spermaceti were hydrolyzed in acid medium at various temperatures and pH values. The combined SO_3 was determined by Epton's method and the variation of this content was used as a criterion of degree of hydrolysis. It was found that this hydrolysis is very slow. The poor stability of certain oils is not due to hydrolysis but to a separation of aqueous and oily phases during storage or uses.

DEHYDROGENATION OF FATTY ACIDS TO THE CORRESPONDING α,β-UNSATURATED DERIVATIVES. G. Cainelli, G. Cardillo and A. Umani Ronchi. *J. Chem. Soc. Chem. Comm.* 1973, No. 3, 94–5. The α-anions of linear fatty acids can be dehydrogenated with 2,3-dichloro-5,6-dicyanobenzoquinone to give exclusively the (*E*)-α,β-unsatd. derivatives. (World Surface Coatings Abs. No. 372)

INCORPORATION OF NON-WHEAT FLOURS OR STARCHES INTO BAKED GOODS. C.C. Tsen and W.J. Hoover (Kansas State Univ. Research Found.). *U.S. 3,752,675.* There is disclosed a method for incorporating non-wheat grain or tuber flours or starches into wheat flour-based bread, baked, or fried goods doughs at levels which would deleteriously affect the quality of the end products. The method comprises introduction of 0.1–3% of an additive selected from the group of sodium salts of acyl lactylates of C_{14}–C_{22} fatty acids, and the condensation product of 10–95 parts of ethylene oxide and 90–5 parts of a partial glycerol ester of C_{10}–C_{24} fatty acid containing at least 10% monoglyceride. The supplemental flour or starch may be added at levels as high as 40% of the wheat flour by use of 0.5% of the additive. A protein source material may also be added to supplement the wheat protein in the dough so long as the additive is present.

MULTIFUNCTIONAL EMULSIFICATION AGENTS. B.D. Buddemeyer. *U.S. 3,752,770.* There are disclosed powdered, free flowing, relatively non-hygroscopic emulsification compositions for improving the physical properties and quality of food products, and especially carbohydrate containing food products, confections, and prepared mixes. The compositions contain (a) 20–80 parts of at least one of the aliphatic polyol esters of C_{10}–C_{24} fatty acids, glyceryl lactopalmitate, glyceryl lactostearate, succinylated monoglycerides, and acetylated tartaric acid esters of mono- and diglycerides; (b) 80–20 parts of at least one polyoxyethylene derivative of any of the polyol esters of fatty acids and having a total of 5–100 moles of ethylene oxide per mole of polyol ester; and (c) a hydrogenated triglyceride to the extent of 20–80% of the composition.

PHOSPHATIDE SEPARATION. R. Aneja and J.S. Chadha (Lever Bros.). *U.S. 3,752,833.* N-acyl phosphatides, *e.g.*, N-acetylcephalin, are separated from phosphatides without an acylatable amino group, such as lecithin, by lowering the pH to less than 3.5 under aqueous conditions and then solvent fractionating with acetone or methyl acetate.

SELECTIVE REACTION OF FATTY ACIDS AND THEIR SEPARATION. B.F. Ward (Westvaco Corp.). *U.S. 3,753,968.* A process for making a dicarboxylic acid having 21 carbon atoms from fatty acids is accomplished by reacting the linoleic acid portion of a fatty acid mixture with up to 26% of fatty acids of acrylic acid and with 0.01–0.05% of other fatty acids in the presence of iodine catalyst at 200–270C. The fatty acid-dicarboxylic acid mixture is then separated by distillation into an oleic-type fatty acid and a C_{21} dicarboxylic acid. This process is especially applicable to separating tall oil fatty acids.

Laubscher promoted to president of Woodson-Tenent

American Biomedical Corporation recently announced the promotion of James Laubscher to president of Woodson-Tenent Laboratories, Memphis, Tenn. He has been with Woodson-Tenent as vice president for two and one-half years.

Laubscher received his M.S. degree in agricultural chemistry from the University of Arizona in 1968. He has had advanced studies in pesticide residue, chemistry, and business management. ■

• Biochemistry and Nutrition

EFFECT OF CO_2 CONCENTRATION OF PHOSPHOLIPID METABOLISM IN THE ISOLATED PERFUSED RAT LUNG. W.J. Longmore, C.M. Niethe, D.J. Sprinkle and R.I. Godinez (Dept. of Biochem., St. Louis Univ. Schl. of Med., St. Louis, Mo. 63104). *J. Lipid Res.* 14, 145–51 (1973). Studies have been carried out on the incorporation of [U-^{14}C]glucose, [2-^{14}C]pyruvate, [2-^{14}C]acetate, and [1-^{14}C]palmitate into the phospholipids of the isolated perfused rat lung in the presence of either 6 or 45 mM total CO_2 concentration in the perfusion medium. Incorporation of [U-^{14}C]glucose into total phospholipid and into the phosphatidylcholine fraction was increased 10–53% over the 2-hr perfusion period in lungs perfused with medium containing 45 as compared with 6 mM CO_2. The incorporation of [2-^{14}C] acetate, [2-^{14}C]pyruvate and [1-^{14}C]palmitate was not affected by the change in medium CO_2 concentration. Increased incorporation of [U-^{14}C]glucose combined with a shift toward greater incorporation into the fatty acids of the phosphatidylcholine fraction produced a maximum increase of 90% in [U-^{14}C]glucose incorporation into the fatty acids of phosphatidylcholine after 2 hr of perfusion in the presence of medium containing 45 mM CO_2 as compared with 6 mM CO_2. The increase in medium CO_2 concentration produced as much as a 150% increase in [U-^{14}C]glucose incorporation into palmitate derived from the phosphatidylcholine fraction. The results provide evidence that glucose functions as an important precursor of palmitate in the phosphatidylcholine fraction of lung phospholipids and that the CO_2 concentration of the perfusion medium affects the incorporation of glucose into palmitate.

USE OF THE ISOLATED PERFUSED RAT LUNG IN STUDIES ON LUNG LIPID METABOLISM. R.I. Godinez and W.J. Longmore (Dept. of Biochem., St. Louis Univ. Schl. of Med., St. Louis, Mo. 63104). *J. Lipid Res.* 14, 138–44 (1973). A procedure for the use of the isolated perfused rat lung in studies on metabolic regulation has been developed. The procedure, reasonably uncomplicated, yet physiological, maintains the lung so that edema is not observed. The phospholipid content remains normal, and incorporation of [1-^{14}C]palmitate, [2-^{14}C]acetate and [U-^{14}C]glucose is linear with time for a minimum of 2 hr. The incorporation of [1-^{14}C]palmitate and [2-^{14}C]acetate into the total lung phospholipid fraction and into the phosphatidylcholine and phosphatidylethanolamine fractions has been studied. Increasing the concentration of palmitate in the medium from 0.14 to 0.51 mM increased by 60% the incorporation of [1-^{14}C]palmitate into the total lung phospholipid fraction at 2 hr. When the palmitate concentration of the medium was 0.14 mM, addition of 0.11 and 0.79 mM oleate to the medium decreased [1-^{14}C]palmitate incorporation into the total lung phospholipid fraction at 2 hr by 37 and 49%, respectively. The results suggest that the incorporation of exogenous fatty acids, present in the medium perfusing the lung, into lung phospholipids may depend upon the fatty acid composition of the medium. Known specific acyltransferase activities may be responsible for the ordered incorporation of available fatty acids into lung phospholipids.

N-HEXYL-O-GLUCOSYL SPHINGOSINE, AN INHIBITOR OF GLUCOSYL CERAMIDE β-GLUCOSIDASE. J.S. Erickson and N.S. Radin (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor, Mich. 48104). *J. Lipid Res.* 14, 133–7 (1973). A synthetic

6.8 in imidazole-HCl or maleate-NaOH buffer. The enzyme activity of platelets from normal subjects was similar to the activity from patients with renal and hepatic failure.

INHIBITION OF PALMITOYL CoA DEACYLASE BY CHLOROPHENOXYISOBUTYRATE AND BETABENZALBUTYRATE. R.G. Lamb, P.M. Hill, and H.J. Fallon (Depts. of Med. and Pharmacol., Univ. of North Carolina Schl. of Med., Chapel Hill, N.C. 27514). *J. Lipid Res.* **14**, 459–65 (1973). Palmitoyl CoA deacylase activity was measured in preparations of rat liver microsomes. Two hypolipidemic agents, chlorophenoxyisobutyrate and betabenzalbutyrate, caused inhibition of palmitoyl CoA deacylase in vitro. The I_{50} values for chlorophenoxyisobutyrate and betabenzalbutyrate were 5.0 and 7.5 mM, respectively. The inhibition by both agents was reversible, and both drugs lowered the palmitoyl CoA-binding capacity of microsomes. The deacylase reaction rate was maximum when the binding of palmitoyl CoA to soluble or microsomal protein was low. Addition of albumin to the reaction mixture resulted in greater binding of palmitoyl CoA to protein and a lower reaction rate. Inhibition of the deacylase by chlorophenoxyisobutyrate and betabenzalbutyrate also was greater when palmitoyl CoA was not protein bound. The inhibition of palmitoyl CoA deacylase by these hypolipidemic agents may contribute to their effects on lipid metabolism.

METABOLIC FATE OF RAT AND HYMAN LIPOPROTEIN APOPROTEINS IN THE RAT. S. Eisenberg, H.G. Windmueller and R.I. Levy (Lab. of Nutr. and Endocrinology, Natl. Inst. of Arthritis, Metabolism, and Digestive Diseases, and Molecular Disease Branch, Natl. Heart and Lung Inst., Natl. Insts. of Health, Bethesda, Md. 20014). *J. Lipid Res.* **14**, 446–58 (1973). The fate of ^{125}I-labeled apolipoproteins was studied in vivo in rats that had received intravenous injections of ^{125}I-labeled rat HDL and ^{125}I-labeled human HDL, LDL and VLDL. Plasma decay curves of rat and human HDL were exponential with similar half-lives in the circulation (11–12 hr). After injection, low molecular weight apolipoproteins (apoLP-alanine of human HDL and fraction HS-3 of rat HDL) were found to redistribute to other lipoproteins, predominantly VLDL. Decay curves of individual HDL proteins were constructed after lipoprotein fractionation, delipidation and polyacrylamide gel electrophoresis. It was found that the half-lives of the different HDL apoproteins were not identical. A major rat HDL protein (52% of total counts) had a circulating half-life ($t_{0.5}$) of 12.5 hr. Two others had a $t_{0.5}$ of 8–9 hr while the $t_{0.5}$ of several others was 11–12 hr. The $t_{0.5}$ of three well-characterized human HDL apoproteins, apoLP-glutamine I, apoLP-glutamine II, and apoLP-alanine, were 13.5, 9.0 and 15.0 hr, respectively. The fate of ^{125}I-labeled human VLDL and LDL apoproteins in rats was similar to that described previously in humans. After injection of ^{125}I-labeled human VLDL into rats, apoLP-glutamic acid and apoLP-alanine rapidly transferred to rat HDL and were lost thereafter from the circulation from both VLDL and HDL.

REGULATION OF TRIGLYCERIDE BIOSYNTHESIS IN ADIPOSE AND INTESTINAL TISSUE. D. Polheim, J.S.K. David, F.M. Schultz, M.B. Wylie and J.M. Johnston (Dept. of Biochem., Univ. Texas Southwestern Med. Schl. at Dallas, Dallas, Tex. 75235). *J. Lipid Res.* **14**, 415–21 (1973). The synthesis of phosphatidic acid and di- and tri-glycerides via the glycerol-3-phosphate pathway is markedly inhibited by 2-monooleyl ether in microsomal and whole cell preparations obtained from adipose and intestinal tissue. Monoglycerides are also inhibitors under conditions in which their hydrolysis is minimized. A correlation between inhibition by, and the hydrolysis of, monoglycerides has been demonstrated. 2-Monooleyl ether is the most effective inhibitor of the several mono- and di- ethers and esters studied. The specificity of the inhibition of glycerol-3-phosphate acylation by 2-monoethers or 2-monoesters has been demonstrated because microsomal NADH- and NADPH-cytochrome *c* reductase activities were not significantly inhibited. The reported control mechanism for triglyceride biosynthesis is discussed in relation to the regulation of fatty acid uptake and release in adipose tissue and the absorption and metabolism of triglycerides by the intestinal mucosa.

REGULATORY EFFECTS OF DIETARY STEROLS AND BILE ACIDS ON RAT INTESTINAL HMG CoA REDUCTASE. S. Shefer, S. Hauser, V. Lapar and E.H. Mosbach (Dept. of Lipid Res., Public Health Res. Inst. of the City of New York, Inc., N.Y. 10016). *J. Lipid Res.* **14**, 400–5 (1973). The specific activity (concentration) of microsomal HMG CoA reductase of intestinal crypt cells was studied in rats fed sterols and bile acids, either singly or in combination. It was found that the basal activity of the reductase was not suppressed by the administration of relatively large amounts of bile acid (taurocholate or taurochenodeoxycholate). Bile acids reduced the specific activity of the reductase only in rats in which the activity of the enzyme had first been enhanced by biliary diversion or by sitosterol feeding. In addition, bile acid feeding abolished the diurnal elevation of reductase activity that normally occurs between midnight and 2 a.m. In no case did bile acids reduce enzyme activity below basal levels. A pronounced (60%) reduction of intestinal HMG CoA reductase activity was observed in rats fed cholesterol and bile acid in combination. This reduction in activity could not be ascribed to an increase in sterol concentration within the intestinal crypt cells. These results indicate that dietary sterols and bile acids both play a role in the regulation of intestinal HMG CoA reductase.

BILE ACIDS. XXXVIII. CONVERSION OF 5α-CHOLESTANE-3β,7α-DIOL TO ALLO BILE ACIDS BY THE RAT. B.W. Noll, E.A. Doisy, Jr. and W.H. Elliott (Dept. of Biochem., St. Louis Univ. Schl. of Med., St. Louis, Mo. 63104). *J. Lipid Res.* **14**, 385–90 (1973). 5α-[4-^{14}C, 3α-^{3}H]Cholestane-3β,7α-diol was prepared from individual samples of 5α-[3α-^{3}H]cholestane-3β,7α-diol and 5α-[4-^{14}C]cholestane-3β,7α-diol, each derived from 3β-acetoxycholest-5-en-7-one. Bile was collected for 11 days from adult male rats, with cannulated bile ducts, that had received intraperitoneally 0.90–0.92 mg of the doubly labeled diol. Bile from the first 10 hr, containing 63% of the administered ^{14}C and 6% of the ^{3}H, was hydrolyzed, and the bile acids were separated by acetic acid partition chromatography. Allochenodeoxycholic and allocholic acids contained at least 20.6% and 48.6%, respectively, of the ^{14}C retained in the biliary acids. Small amounts of ^{14}C (2.5% and 1.9%, respectively) were present in the 3β isomers of these acids, but the tritium content totaled more than half of that found in the bile acid fraction. No evidence was obtained for presence of the extensive quantities of the allomuricholates.

XXXIX. METABOLISM OF 5α-CHOLESTANE-3β,26-DIOL AND 5α-CHOLESTANE-3β,7α,26-TRIOL IN THE RAT WITH A BILE FISTULA. *Ibid.*, 391–9. 25R-5α-[5α,6α-^{3}H$_2$]Cholestane-3β,7α,26-triol was prepared from 3β,26-diacetoxy-5α-[5α,6α-^{3}H$_2$]cholestane-7-one that was obtained from kryptogenin. Huang-Minlon reduction of the ketone provided 25R-5α-[5α-^{3}H]cholestane-3β,26-diol. Results from mass spectrometry, molecular rotation and several types of chromatography are consonant with the assigned structures. Bile was collected for 8 days from adult male rats, with cannulated bile ducts, that had received approximately 0.8 mg of the triol or diol intraperitoneally. Bile from the first 12 hr was hydrolyzed, and the bile acids were separated by partition chromatography. The chromatographic pattern of separated bile acids was much simpler for the triol than the diol. Approximately 50% of the bile acids derived from the triol were trihydroxy allo acids (allocholic acid, 44%, and its 3β isomer, 5.3%); only 16.4% allocholic acid was obtained from the diol. Comparable amounts of allochenodeoxycholic acid were derived from the diol and triol (21.2% and 28.2%, respectively). Unidentified metabolites in the dihydroxy acid fraction derived from the diol constitute 15.8% of chromatographed material.

BIOSYNTHESIS OF PROSTAGLANDIN E_2 IN HUMAN SKIN: SUBCELLULAR LOCALIZATION AND INHIBITION BY UNSATURATED FATTY ACIDS AND ANTI-INFLAMMATORY DRUGS. V.A. Ziboh (Depts. of

• Obituary

David Bruce McIsaac, Sr., 79, of Kershaw, S.C., died July 28 after a long illness.

He joined AOCS in 1928 and was a member until he retired a few years ago from the Kershaw Oil Mill, Kershaw, S.C. He was the recipient of the Smalley Cup six times and had permanent possession of two cups. He was one of the early members of the AOCS Seed Grading Committee, first joining this Committee in 1934.

Mr. McIsaac was born in Chattanooga, Tenn., son of the late Peter and Margaret McKinlay McIsaac. He attended Chattanooga public schools and the University of the South, Sewanne, Tenn.

He is survived by two daughters, Mrs. Robert L. Coleman, Jr., and Mrs. Sue Mullen; two sons, D. Bruce and Malcolm; and three brothers, William J., Alfred C., and George D. ■

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2. DATE OF FILING: October 1, 1973

3. FREQUENCY OF ISSUE: Monthly

4. LOCATION OF KNOWN OFFICE OF PUBLICATION *(Street, city, county, state, ZIP code) (Not printers)*: 508 South Sixth Street, Champaign, Illinois 61820

5. LOCATION OF THE HEADQUARTERS OR GENERAL BUSINESS OFFICES OF THE PUBLISHERS *(Not printers)*: 508 South Sixth Street, Champaign, Illinois 61820

6. NAMES AND ADDRESSES OF PUBLISHER, EDITOR, AND MANAGING EDITOR

PUBLISHER *(Name and address)*: American Oil Chemists' Society, 508 S. Sixth Street, Champaign, Illinois 61820

EDITOR *(Name and address)*: A. R. Baldwin, 508 South Sixth Street, Champaign, Illinois 61820

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sclerosis. Ultracentrifugation methods were used to separate in vivo [^{3}H]-cholesterol labeled aortic homogenates into top (nonbound), middle and pellet (bound) fractions. Naturally occurring and cholesterol-aggravated plaques had 40–50% of the total arterial cholesterol in the unbound pool whereas regressed lesions had only 8%. The unbound pool was described as the cholesterol capable of leaving a lesion after regression. The bound fraction of all plaques was the site of a slowly miscible cholesterol pool, and an increased amount of elastin-bound cholesterol. The relative miscibility of plaque cholesterol pools with plasma was the greatest in cholesterol-aggravated lesions, less in naturally occurring lesions and dramatically reduced in regressed lesions.

EFFECTS OF DIETARY MANIPULATION ON ADIPOSE TISSUE GLYCEROKINASE ACTIVITY AND PLASMA METABOLITE LEVELS IN THE CHICKEN (GALLUS DOMESTICUS). R.F. Welton, R.J. Martin, R.W. Scholz and B.R. Baumgardt (Dept. of Animal Sci., Pennsylvania State Univ., University Park, Pa. 16802). *J. Nutr.* 103, 890–8 (1973). The recent development of sensitive radiochemical assays has facilitated the detection of glycerokinase activity in adipose tissue. However, the effects of dietary manipulation on the activity of this enzyme in adipose tissue have not been investigated. Experiments were conducted to: detect and characterize glycerokinase activity in the chicken; compare relative changes in glycerokinase activity in lean and obese laying hens, and examine the physiological effects of dietary manipulation on glycerokinase activity in the laying hen and growing chicken. Adipose tissue glycerokinase activity was detected in the chicken by a radiochemical assay which appeared sensitive enough to measure nanomoles per hour (units) of enzyme activity. Obese laying hens appeared to have higher glycerokinase activity than lean hens but this difference was not statistically significant. These results indicate that the physiological importance of glycerokinase in chicken adipose tissue appears to be positively correlated with the degree of obesity.

DIURNAL CHANGES IN THE FATTY ACID PATTERNS OF RAT LIVER LIPIDS. P.S. Wadhwa, C.E. Elson and D.J. Pringle (Dept. of Nutr. Sciences, Univ. of Wisconsin, Madison, Wisc. 53706). *J. Nutr.* 103, 899–903 (1973). Certain changes in the fatty acid composition of liver lipids could be related to diurnal cycles. To examine this, the fatty acid profiles of liver triglycerides, phospholipids and cholesterol esters were determined at 6-hour intervals using rats fed a high fat (corn oil) diet either ad libitum or hourly, one twenty-fourth of the food consumed by the former group. Diurnal changes were most prominent in the triglyceride fraction, and in the ad libitum-fed group reflected the pattern of dietary intake. One cycle, affecting linoleate and arachidonate, was on an 18–6 hour basis and the second, primarily affecting palmitate, was uniform with 12-hour phases. The maxima were displaced 12 and 6 hours, respectively, by hourly feeding and may be related to the light cycle. Consistent in both groups and in all fractions was the increase in arachidonate towards the end of the light period.

FURTHER STUDIES ON TESTOSTERONE 5α-REDUCTASE OF HUMAN SKIN. STRUCTURAL FEATURES OF STEROID INHIBITORS. W. Voigt and S.L. Hsia (Dept. of Dermatology and Biochem., Univ. of Miami School of Medicine, Miami, Fla. 33136). *J. Biol. Chem.* 248, 4280–5 (1973). Inhibition of the microsomal testosterone 5α-reductase of human skin was studied with various steroids bearing structural resemblance to testosterone. Since three of the most potent inhibitors found, *i.e.* progesterone, deoxycorticosterone acetate and 4-androsten-3-one-17β-carboxylic acid, were shown by kinetic studies to be competitive inhibitors of testosterone 5α-reduction, the degree of inhibition caused by the various steroids tested in this study has been related to structural features of the steroid-binding site of the enzyme. A strict requirement for a 3-keto-Δ^4 structure was found for effective inhibitory activity of a steroid, suggesting a hydrophilic nature of the enzyme at the binding site in the vicinity of Ring A of the steroid molecule. A 17β (but not α) side chain containing one or more oxygen functional groups is another required feature of the inhibitory steroid molecule, suggesting another hydropholic region on the enzyme at the point of attachment of the side chain. This region in contrast to the region around Ring A is likely to be open or flexible, in view of the larger allowable variations in size of the side chain without detriment to the inhibitory activity.

FATTY ACID SYNTHETASE OF DEVELOPING BRAIN AND LIVER. CONTENT, SYNTHESIS AND DEGRADATION DURING DEVELOPMENT. J.J. Volpe, T.O. Lyles, D.A.K. Roncari and P.R. Vagelos (Dept. of Biol. Chem., Washington Univ. School of Med., St. Louis, Missouri 63110). *J. Biol. Chem.* 248, 2503–13 (1973). Immunochemical techniques have been utilized to study the content, synthesis and degradation of the fatty acid synthetase in liver and brain during development and in various nutritional states. The distinctive changes in synthetase activity during development of both tissues are related entirely to changes in content of enzyme. During fasting and fat-free feeding, in contrast to the lack of change in synthetase activity of brain, there are dramatic alterations in hepatic activity. These changes are related entirely to changes in the content of enzyme in liver.

CALCIFICATION OF A LYSOZYME-INOSITOL PHOSPHATIDE COMPLEX IN VITRO. J.J. Vogel, M.M. Campbell and J. Ennever (Univ. of Texas Dental Sci. Inst. at Houston, Houston, Tx. 77025). *Proc. Soc. Exp. Biol. Med.* 143, 677–80 (1973). A synthetic basic protein-acidic phospholipid complex was prepared from lysozyme and inositol phosphatides. Suspension of the complex in metastable calcium phosphate solutions resulted in formation of membrane-bound vesicles and apatite nucleation. The results suggest that calcium binding lipoproteins might have a function in calcification.

ON THE ROLE OF A PALMITYL THIOESTERASE IN FATTY ACID ELONGATION. D.E. Vance, T.W. Esders and K. Bloch (J.B. Conant Chem. Lab., Harvard Univ., Cambridge, Mass. 02138). *J. Biol. Chem.* 248, 2310–6 (1973). Elongation of palmityl-CoA to longer chain fatty acids by the high molecular weight fatty acid synthase from *Mycobacterium phlei* requires a factor present in boiled mycobacterial extracts in addition to and distinct from the polysaccharides (3-*O*-methylmannose-containing polysaccharide (MMP) or lipopolysaccharide that contains 6-*O*-methylglycose and glucose (MGLP)) which support the de novo synthesis of fatty acids from acetyl-CoA in this system. This elongation factor (EF) has been purified 46-fold and is shown to be a protein with a molecular weight of about 10,500. EF catalyzes the hydrolysis of long chain acyl-CoA derivatives and the following evidence indicates that it functions as thioesterase in palymityl-CoA elongation. Elongation and thioesterase activities show parallel chain-length specificities for acyl thioesters from C_{10} to C_{18}. The two activities are inactivated at similar rates on heating at 50C. Elongation and thioesterase activities migrate the same distance on gel electrophoresis at pH 8.5. Thioesterase I from *Escherichia coli* can replace EF in stimulating palmityl-CoA elongation by the *Mycobacterium phlei* fatty acid synthetase. Free conenzyme A, in adequate concentrations, stimulates palmityl-CoA elongation as effectively as EF. It is concluded that EF, by virtue of its thioesterase activity, adjusts intracellular concentrations of palmityl-CoA and free CoA to levels which are favorable for chain elongation. The regulatory significance of thioesterase activities is discussed.

DESATURATION OF OLEYL PHOSPHOLIPID TO LINOLEYL PHOSPHOLIPID IN TORULOPSIS UTILIS. B. Talamo, N. Chang and K. Bloch (J.B. Conant Lab., Harvard Univ., Cambridge, Mass. 02138). *J. Biol. Chem.* 248, 2738–42 (1973). An enzyme system from *Torulopsis utilis* consisting of microsomal pellet and

mesophases (liposomes) to polar non-electrolytes were studied by measuring solute reflection coefficients. The measurements employed a rapid reaction stopped-flow apparatus. For a given solute the permeability is a function of the area per lipid molecule in the membrane. Thus the permeability of lecithin liposomes is decreased by incorporation of cholesterol and increased by incorporation of phosphatidic acid. A comparison of different solutes shows that liposome permeability depends on solute size and lipid solubility in a manner similar to that observed for non-electrolyte permeation through synthetic polymers and some "non-porous" cell membranes. In the presence of 1 mM 2,4-dinitrophenol at pH 3.6 the permeability of lecithin liposomes to nonelectrolytes decreases. A similar, but much smaller effect is observed in the presence of 5 mM Ca^{2+}.

EFFECT OF MEDIUM-CHAIN TRIGLYCERIDES ON LIVER FATTY ACID COMPOSITION IN ALCOHOLICS WITH OR WITHOUT CIRRHOSIS. J.R. Malagelada, W.G. Linscheer, U.M.T. Houtsmuller, A.J. Vergroesen, M. Shah and F.L. Iber (Tufts Univ. School of Med., Mayo Clinic, Rochester, Minn. 55901). *Am. J. Clin. Nutr.* 26, 738-43 (1973). Dietary fatty acids are known to be deposited in liver lipids of alcoholic patients, but their role in the pathogenesis of alcoholic cirrhosis is uncertain. In the present study, the fatty acid composition of liver biopsies obtained from seven patients with alcoholic cirrhosis on an essentially normal hospital diet (100-g fat diet for 2 weeks) was compared with those of noncirrhotic alcoholics (six patients) on the same diet. No significant difference was found in the relative amounts of any 14 fatty acids ranging from 12:0 to 22:6.

AN INTERACTING SPIN LABEL STUDY OF THE FLUIDIZING AND CONDENSING EFFECTS OF CHOLESTEROL ON LECITHIN BILAYERS. D. Marsh and I.C.P. Smith (Div. of Biol. Sci., Natl. Res. Council of Canada, Ottawa, K1A OR6, Canada). *Biochim. Biophys. Acta* 298, 133-44 (1973). The molecular origin of the fluidizing and condensing effects of cholesterol has been investigated using interacting spin label pairs in multibilayer films of various lecithins. The spin label pair method is a probe of the lateral separation of molecules within the bilayer. The cholestane spin probe separation is found to increase with increasing cholesterol composition in dipalmitoyllecithin bilayers and to decrease with increasing cholesterol composition in both egg and dioleoyllecithin bilayers. These changes in close-packing of the molecules within the lecithin bilayers correspond respectively to the fluidizing and condensing (and rigidifying) effects of cholesterol. The measured decrease in lateral separation corresponding to fluidization of the dipalmitoyllecithin-cholesterol bilayers correlates reasonably well with the latent heat and change in volume at the liquid crystal transition of pure dipalmitoyllecithin. The size of the decrease in lateral separation in egg lecithin bilayers indicates that the condensing effect of cholesterol arises from both molecular interaction with the lecithin chains and the existence of molecular cavities within the lecithin chain region of the bilayer.

TRANSMEMBRANE POTENTIALS AND PHOSPHOLIPID FLIP-FLOP IN EXCITABLE MEMBRANE VESICLES. M.G. McNamee and H.M. McConnell (Stauffer Labs. for Physical Chem., Stanford Univ., Stanford, Cal. 94305). *Biochemistry* 12, 2951-8 (1973). Excitable membrane vesicles prepared from the electroplax of *Electrophorus electricus* are permeable to tempocholine, a spin-labeled choline analog. The inside-outside distribution of tempocholine measures the transmembrane electrical potential difference induced in the vesicles by a concentration gradient of sodium sulfate. Dioleoylphosphatidyltempocholine (OPTC), a spin-labeled phosphatidylcholine analog, can be incorporated into excitable membrane vesicles by incubating spin-label vesicles with the membranes at 30C. The rate of inside-outside transitions (flip-flop) of the spin-labeled phospholipid, measured by an ascorbate reduction procedure, is characterized by a half-time of 3.8-7 min at 15C. This rate is an order of magnitude faster than the corresponding rate in pure phospholipid vesicles.

25-HYDROXYCHOLECALCIFEROL (25-OHD_3). I. TREATMENT FOR PARTURIENT PARESIS. W.G. Olson, N.A. Jorgensen, A.N. Bringe, L.H. Schultz and H.F. DeLuca (Dept. of Dairy Sci. and Biochem., Univ. of Wisconsin, Madison, Wisc. 53706). *J. Dairy Sci.* 56; 885-888 (1973). Eleven cows were given .5 to 2.0 mg 25-hydroxycholecalciferol intravenously when first observed down with parturient paresis. Six of the 11 cows recovered in 13 h (range, 3 to 24 h) post-treatment. Two of the five cows which did not recover within 24 h after treatment were not hypocalcemic. One had obturator nerve paralysis while the other died from acute pulmonary emphysema. Two of the three hypocalcemic nonrecovery cows developed complications. At the time of treatment, serum calcium and phosphorus were highest in the fast recovery (recovery $<$ 12 h) group. Recovery times greater than 12 h or nonrecovery were accompanied by low serum calcium and phosphorus. The prolonged recovery time and the possibility of complication while down preclude the use of 25-hydroxycholecalciferol as a single treatment. In a field study of 125 dairy cows, attempts to reduce the relapse rate by giving 1.0 mg 25-hydroxycholecalciferol immediately before administration of calcium borogluconate were unsuccessful. Relapse rate was nearly equal between groups, 22.0% with calcium plus 25-hydroxycholecalciferol.

• Edible Proteins

METHIONINE SUPPLEMENTATION OF SOY MILK TO CORRECT CYSTINE LOSS RESULTING FROM AN ALKALINE SOAKING PROCEDURE. A.F. Badenhop and L.R. Hackler (Cornell Univ., N.Y. State Agr. Exp. Sta., Geneva, NY 14456). *J. Food Sci.* 38, 471-3 (1973). A study was conducted to evaluate the use of methionine supplementation for improving the nutritive value of alkaline-extracted soy milk. Samples of soy milk of four different pH's were prepared by soaking soybeans in water and in three concentrations of NaOH; half of each sample was heat-processed for 10 minutes at 121C. Amino acid analyses showed cystine was the only amino acid which decreased with pH in both the unprocessed and processed samples while tryptophan decreased 14% at pH 8.97 in only the heat-processed soy milk. Animal feeding studies using the soy milk as the protein source indicated supplementation with 0.35% L-methionine improved nutritive value in both the heat-processed and nonprocessed samples. In no case was methionine supplementation alone found as effective as a combination of heat processing and methionine supplementation for improving the nutritive value of soy milk.

COMPARISON OF THE PROTEIN NUTRITIONAL VALUE OF TVP, METHIONINE-ENRICHED TVP AND BEEF FOR ADOLESCENT BOYS. M. Korslund, C. Kies and H.M. Fox (Dept. of Food & Nutr., Nebr. Agr. Exp. Sta. and College of Home Ec., Univ. of Nebr., Lincoln, NE 68503). *J. Food Sci.* 38, 637-8 (1973). The protein nutritional value of an extruded soybean product resembling beef (TVP), a 1% DL-methionine-enriched TVP product and beef for adolescent boys was compared. The experimental diets supplied food energy to approximately maintain weight and were supplemented with vitamins and minerals. Mean nitrogen balances of subjects fed 4.0 grams nitrogen as TVP, methionine-enriched TVP, or beef in successive 6-day periods were -0.08, $+0.48$ and $+0.32$ grams per day, respectively. Nitrogen retention was significantly higher in response to methionine-enriched TVP or beef than to TVP alone.

A SIMPLE SHEAR PRESS FOR MEASURING TENDERNESS OF WHOLE SOYBEANS. J. Spata, M.P. Steinberg and L.S. Wei (Dept. of Food Sci., Univ. of Ill., Urbana, Ill. 61801). *J. Food Sci.* 38, 722-3 (1973). A simple shear press instrument for measuring the tenderness of whole soybeans was developed. A perforated plate was forced through a sample of beans by a hydraulic piston and the required pressure of the hydraulic fluid indicated the force required which was related to tenderness of the beans. Soybeans were processed to various degrees of tenderness. Samples were tested by both the simple shear press and a L.E.E. Kramer shear press. The correlation coefficient between these instruments was 0.9933. The average of the coefficients of variation of all samples tested with the simple shear press was 4.61%. This showed that the simple shear press could be used in place of the L.E.E. Kramer shear press for determining tenderness of whole soybeans.

REVISED KJELDAHL TOTAL NITROGEN METHOD FOR FEEDS AND PREMIXES. R. Odland (Pure Plant Food International, Ltd., P.O. Box 483, Sioux Falls, S. Dak. 57101). *J. Assn. Off. Anal. Chem.* 55, 984-5 (1972). A Kjeldahl method for equivalent crude protein in feeds was modified by using a smaller sample (0.25 gram) and smaller amounts of reagents in order to reduce analysis time and cut costs. A 6% $CuSO_4$ catalyst was used for the complete digestion of refractory material. Winkler's boric acid method was modified by including a 90% pretitration to insure complete retention of ammonia so that only one standardized reagent is needed.

SPECIAL SOY PROTEIN PRODUCT FOR BREAD BAKING. E. Turro

and E. Sipos (Food Chem. Res., Central Soya Co., Chicago, Ill.). *Bakers Digest* 47(3), 30–38 (1973). A new product of specially processed soy flour with certain functional and nutritional additives is described. The new product contributes to good loaf volume and symmetry, produces good color in both the side wall and top crust, and gives grain and texture that compare favorably with those of nonfat dry milk bread. The new composite soy product can be used in both continuous and conventional dough systems and is an economical, functional and nutritive substitute for nonfat dry milk.

CHANGES IN THE NITROGENOUS CONSTITUENTS OF STAPLE FOODS AND FEEDS DURING STORAGE. II. CHANGES IN PROTEIN SOLUBILITY AND ADSORPTION OF SULPHONIC DYES. I. Ben-Gera and G. Zimmerman (Volcani Inst. of Agr. Res., Bet-Dagan, Israel). *J. Food Sci. Technol. (India)* 9, 200–4 (1972). Nonfat dry milk, cottonseed, peanut and soybean meals, chickpeas, rice, wheat and soybeans were stored for 18 months. Temperatures (20, 30 and 40C) were selected to simulate practical conditions for storage; relative humidities (40 and 60%) were within a range that would not favor the growth of microorganisms. Samples were stored in cloth bags or in closed metal containers under vaccuum. Parameters were measured in order to characterize heat-induced type changes in the solubility and dye-adsorption properties of proteins. The results verify assumptions that long-term storage may cause changes in the foodstuffs similar to those caused by severe heat treatment.

EFFECT OF ISOELECTRIC FOCUSING ON THE AMINO ACID COMPOSITION OF PROTEINS. S. Jacobs (National Inst. for Med. Res., Ridgeway, Mill Hill, London, N.W. 7, England). *Analyst* 98, 25–33 (1973). The normal isoelectric focusing method has been used to separate various proteins into fractions. The fractions and the parent proteins have been hydrolyzed and the amino-acid composition of each has been determined by ion-exchange chromatography. Evidence was obtained that shows that the parent protein is modified by the normal isoelectric focusing procedure; the sulphur-containing amino-acids cystine and methionine for example, were shown to be present partly in the form of cysteic acid and methionine sulphoxides, in a greater proportion than with hydrolysates of proteins isolated by other separation procedures. An improved method has been devised so as to prevent the oxidation or modification of the protein, which would otherwise occur during the normal isolation procedure.

• Drying Oils and Paints

PREPARATION OF LINSEED OIL FILMS CONTAINING CHEMICALLY BOUND FERROCENE. C.U. Pittman, Jr. and R.M. Hanes (Dept. of Chem., University, Ala. 35486). *J. Paint Technol.* 45(582), 78–79 (1973). Described is the preparation of linseed oil films containing from 0.1 to 5 wt. % of vinyl-ferrocene which is chemically bonded into the film matrix. Such films are readily prepared by dissolving vinylferrocene into linseed oil, mixing in the drier and air curing the film. Similar films containing h-(vinylcyclopentadienyl)-tricarbonylmanganese were also made.

GAMMA IRRADIATION OF ACRYLATED OILS. A.E. Rheineck and S. Wako (North Dakota State U.). *J. Paint Technol.* 45(582), 66–77 (1973). Effects of gamma irradiation on acrylated oils made by esterifying partially-epoxidized linseed oil with acrylic acid in the presence of hydroquinone and solvent were studied. The acrylic acid content varied from 3.5 moles to 4 moles per mole of oil. These oils were irradiated with various doses of irradiation from 4 to 50 megarads in both bulk and in clear and pigmented films. There is definite relationship of film hardness between dose and acrylic content. From a practical view, an oil containing 3.5–4.0 moles of acrylic residue per mole of oil is about optimum. The acrylated oils may be copolymerized with other monomers, styrene, other acrylic acid esters and acrylic acid. It appears that polymerization is an irradiation induced free radical mechanism. In the presence of other monomers, the major reaction is one of copolymerization. There is some evidence that homopolymers are also present. Film properties of the acrylated oils are a function of modification and dose, improving to a maximum. In clear and pigmented systems, film hardness, flexibility, impact resistance, alkali resistance and after-yellowing are all better than conventional alkyd resins of the same oil content.

BINDER ADSORPTION ON MODIFIED RUTILE. Y.I. Abramov et al. *Lakakras, Mat.* 1972, No. 5, 15–6. The effect of surface treatment of rutile on the adsorption of PF-060n alkyd and the effect of a water film on rutile R-1 on adsorption of ethyl linoleate were investigated. Typical modification involved treatment with ε-amino-caproic acid. The adsorption was evaluated by employing adsorption isotherms and I.R. spectroscopy studies. It was established that surface modification of rutile ensured good bonding of the alkyd to both the pigment and surface modifier. (World Surface Coatings Abs. No. 371)

POLYMERISED PRODUCTS BASED ON DEHYDRATED CASTOR OIL. A.P. Smirnov. *Maslo. Zir. Prom, SSSR* 1972, No. 7, 40–2. Polymerisation conditions were studied and polymerisation products from dehydrated castor oil (DCO) and from sunflower oil were prepared and tested. Film-forming properties of the DCO products were superior to those obtained from linseed oil. (World Surface Coatings Abs. No. 371)

INFRARED SPECTROSCOPIC INVESTIGATION OF THE INTERACTION OF SURFACE-ACTIVE SUBSTANCES WITH THE TITANIUM DIOXIDE SURFACE. E.M. Aleksandrova and T. Yu Ts'ung-Hsing. *Colloid J. U.S.S.R.* 34(3), 385–7 (1972). It was established by an I.R. investigation of the adsorption that a surface-active substance (Na oleate) at concentrations up to 0.25% is adsorbed chemically on to TiO_2 of the rutile and anatase modification forming "soap-like" compounds. In addition to this, the physical adsorption of the anionic agent on to the layer of molecules which has already been chemisorbed is observed with a further increase in the concentration. The oleic acid formed through hydrolysis is stably bonded to the surface of the TiO_2. (World Surface Coatings Abs. No. 372)

UTILISATION OF CASTOR AND ITS PRODUCTS. V.V.S. Mani and M.M. Paulose. *J. Sci. & Ind. Res.* 31(5), 237–40 (1972). A report of a seminar on castor seed, oil and cake, with particular relevance to the Indian economy. Present and potential uses for castor oil in coatings technology are discussed. (World Surface Coatings Abs. No. 372)

WATER DILUTABLE ALKYL RESINS MODIFIED BY RADICALS OF DRYING FATTY ACIDS. R. Dhein, H. Schnell and K. Raichle (Bayer Ag.). *U.S. 3,752,778.* Alkyd resins containing urethane groups are modified by drying fatty acid radicals. The resins have an acid number of 30–70 and a hydroxyl number of 20–120. Alkali, ammonia, or amine salts of the resins are soluble in water, and the aqueous solutions are suitable as varnishes.

• Detergents

MICELLE FORMATION IN MIXED SOLUTIONS OF HOMOLOGOUS AND NONHOMOLOGOUS TENSIDE. H. Lange and K.-H. Beck (Lab. Henkel & Cie GmbH, Düsseldorf). *Koll. -Z. u. Z. Polymere* 251, 424–31 (1973). Critical micelle concentrations c_M have been determined in aqueous mixed solutions of two surface active agents from surface tension-concentration curves. Mixed systems of two homologous nonionic or anionic agents as well as one nonionic and one ionic agent were involved. The results have been compared with an earlier derived equation of c_M as a function of the mixing ratio. The validity of this equation presupposes that the mixed micelles behave thermodynamically like ideal mixtures. It was found that the c_M values measured in mixed systems of two homologous surface active agents agree with the equation within the limits of experimental error. However, with mixtures of one nonionic and one ionic agent the c_M values of the mixed solutions are considerably smaller than those calculated by the equation. If both components have nearly equal c_M values a strong diminution of c_M below this value is observed. The results are discussed in terms of the mixing behavior of the hydrophobic and the hydrophilic groups of the components.

SOME EXPERIMENTS ON DETERGENCY IN AQUEOUS AND NONAQUEOUS MEDIA, III: RELATIONSHIP BETWEEN REFLECTANCE AND SOIL CONCENTRATION FOR FABRICS SOILED WITH COMPLETELY DISPERSED PARTICULATE SOILS. S.V. Vaeck and E.C. Maes (Central Lab. of the Ministry of Economic Affairs, Brussels, and Central, Laundering and Dryeleaning Inst., Antwerp). *Tenside Detergents* 10(3), 126–30 (1973). Using previously described methods, different carbon blacks were completely dispersed by ultrasonic treatment and their concentration in the dispersion measured before and after soiling of cotton fabric swatches. Thus the concentration of the carbon black on the fabric could be calculated. It was found the relationship between reflectance and concentration closely followed the