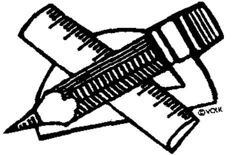
Abstracts



EDITOR: S. KORITALA • ABSTRACTORS: N.E. Bednarcyk, J.C. Harris, M.G. Kokatnur, F.A. Kummerow, G. Lakshminaraynana, G. List, B. Matijasevic, K.D. Mukherjee, D.B.S. Min, R.A. Reiners, and P.Y. Vigneron

• Detergents

STABILIZATION AND ENHANCEMENT OF ENZYMATIC ACTIVITY. F.L. Diehl, E. Zeffren and E.J. Milbrada (Procter & Gamble). *U.S. 4,011,169.* A detergent composition consists of 5–99% of an organic surface active agent and 50–0.1% of a mixture comprising (i) an enzyme suitable for use in detergent compositions and (ii) an aminated polysaccharide selected from the group consisting of aminated starch and animated cellulose having 0.01–2% of nitrogen in its elemental composition. The ratio of enzyme to aminated polysaccharide ranges from 1:500 to 1:1.

MARBLED DETERGENT BARS. J.H. Pickin, R.E. Compa, and H.H. Joshi. *U.S. 4,011,170.* A method for producing the bars comprises supplying a base detergent material to the inlet of the upper barrel of a double barrel plodder, extruding the detergent material through a pressure plate and into a vacuum chamber in the form of strands, spraying a coloring agent onto the falling strands in the vacuum chamber, plodding the resultant mixture to form a marbled detergent mass, extruding the mass as a billet, cutting the billet into bars, and pressing the bars into the desired shape.

BLEACHING ARTICLES. M.S. Marsan, F.L. Diehl and J.B. Edwards (Procter & Gamble). *U.S. 4,011,172.* An article for bleaching fabrics in an automatic clothes dryer comprises a thickened chlorine bleaching composition having 0.5–15% available chlorine and a pH of 8–11, and a water-insoluble dispensing means for holding the bleaching composition. The composition is thickened with one or more of the following thickeners: colloidal silicas, water-swellable and water soluble polyacrylamides, cellulose derivatives, and clays. The holder is in the form of a pouch having perforations of 0.05–3 mm diameter or embossed in such a manner that upon rupture perforations are formed with the desired diameters.

ADDITIVES FOR CLOTHES DRYERS. J. Rudy and A.A. Rapisarda (Lever Bros. Co.). *U.S. 4,012,326.* A solid composition for the application of an adjuvant to a fabric in a tumble-type dryer consists of up to 95% of one or more of the following: fabric softeners, optical brighteners, and anti-static agents. The distributing agent is selected from the group consisting of ammonium carbonate and water soluble lower molecular weight, innocuous, hydroxy carboxylic acids.

UNIQUE ALL SYNTHETIC DETERGENT SHAMPOO BAR. P. Orshitzer and A. Macander (American Cyanamid Co.). *U.S. 4,012,341.* The bar comprises 10–60% of a water soluble, solid, polyethoxylated dialkyl phenol, 30–60% of a sodium or potassium higher alkyl sulfate, and 10–40% of a monoethanolamide of stearic acid.

COLORIMETRIC DETERMINATION OF LAUNDERING EFFECTS—PART II. R. Griesser (Ciba-Geigy Ltd., Basle). *Soap, Cosmet., Chem. Spec.* **53**(2), 39–40, 76–7 (1977). Part I of this report appeared *Soap, Cosmet., Chem. Spec.* in January, 1977. In it, the whiteness formula used for the evaluations was described. In this part, reflectance/emission curves and reflectance curves are given for various soiled and laundered samples, and the data are discussed. The tests described show the effectiveness of tinting dyes incorporated in detergents at maintaining whiteness of laundered fabrics.

NONPHOSPHATE DETERGENT COMPOSITION. J.A. Yurko (Colgate-Palmolive Co.). *U.S. 4,009,114.* A detergent composition devoid of phosphate or nitogen-containing builders comprises (a) 12–16% linear alkyl aryl sulfonate, (b) 8–12% soap, (c) 12–25% citric acid or salt of citric acid, and (d) 45–75% builder salt mixture of alkali metal silicates and alkali metal carbonates. The ratio of silicate to carbonate is 1:0.25–4.

OPACIFYING AGENTS. R. Widder, P. Diessel, and D. Distler (BASF Ag.). *U.S. 4,009,139.* Opacifying agents for liquid detergent, cleaner, and cosmetics which are stable in the presence of detergents and electrolytes consist of an aqueous dispersion, of 30–50% solids and a particle size of 0.2–1 μm, produced by the free radical polymerization of styrene or styrene with up to 50% of an acrylate or alkyl methacrylate in aqueous emulsion in the presence of 1–10% of sodium polyacrylate and 1–8% of the sarcoside of an unsaturated carboxylic acid.

PROTECTION OF MATERIALS. R.J. Green and R.S. Johnson (Lever Bros. Co.). *U.S. 4,009,113.* An alkali stable, water dispersible, precursor-containing body for use in an alkaline powder detergent composition consists of (a) 40–80% of a particulate precursor compound capable of reacting with hydrogen peroxide in an aqueous medium to form a peracid bleaching species below 60 C; and (b) an inert carrier material of lauric acid, sodium dodecyl hydrogen phthalate, sodium dodecyl hydrogen succinate, sodium lauryl sulfate, or liquid paraffin. The carrier material is evenly distributed with the precursor compound to form a composite particle having an outer protective, non-deliquescent, coherent layer of polyvinyl alcohol, a polyacrylamide, a starch, a water soluble cellulose ether or a water soluble gum for preventing aqueous alkaline attack on the precursor compound.

SUPERFACTANT COMPOSITION. L.B. Lindy (Dow Chemical Co.). *U.S. 4,018,699.* The composition consists of an aqueous solution of (a) an alkali metal salt, ammonium salt, and/or magnesium salt of laurylsulfate, and (b) a mono-*n*-butyl ether of ethylene glycol.

LAUNDRY DETERGENT COMPOSITIONS IN EMULSION SUSPENSION. S.P. Lengyel (Procter & Gamble). *U.S. 4,018,720.* The composition consists of (a) 7–25% surfactant, (b) 6–25% inorganic phosphate builder, (c) 3–20% alkali metal sulfate as stabilizing electrolyte, and (d) 4–75% water. The surfactant comprises 3–25% of surfactant A which is selected from the group consisting of sodium alkyl sulfate and sodium alkyl ether sulfate, and surfactant B which is sodium alkyl benzene sulfonate.

DETERGENT COMPOSITIONS. G. Bevan (Lever Bros. Co.). *U.S. 4,020,015.* A built laundry detergent composition in powder form includes a soil release agent selected from the group consisting of (a) a copolymer of polyoxyethylene glycol and polyethylene terephthalate; (b) a condensation product of polyoxyethylene glycol, adipic acid, and caprolactam or hexamethylene diamine; or (c) a cellulose containing an ether linked, unsubstituted C_1–C_4 alkyl group and an ether linked substituent based on a C_2–C_4 hydroxyl alkyl group. There is claimed an improvement comprising the incorporation of the soil release agents into the composition in the form of granules. The granules consist of 5–70% of the agent dispersed throughout a solid, water soluble, detergent compatible carrier.

CLEANING COMPOSITIONS EFFECTIVE IN DISSOLVING SOAP CURD. C.S. Sokol (The Drackett Co.). *U.S. 4,020,016.* The composition consists of (a) 1–5% of a member selected from the group consisting of ammonium, alkylamine, or hydroxyalkylamine salt of nitrilotriacetic acid, and an alkylene polyamine polycarboxylic acid; (b) 0.75–2% of a nonionic surfactant having an HLB number of at least 13.5 selected from the group consisting of (1) ethoxylated linear primary alcohols, (2) ethoxylated linear secondary alcohols, (3) an ethoxylated linear primary alcohol which is a clear liquid having an HLB number of 14, and (4) ethoxylated octyl phenols; and (c) up to 98.25% water.

TOILET SOAPS—PRACTICAL CHARACTERISTICS AND TEST METHODS. D. Osteroth (Dynamit Nobel AG, Witten, Germany). *Soap, Cosmet., Chem. Spec.* **53**(4), 29–33, 52–6, 1977. This article deals with the cracking behavior of toilet soaps. A method for causing cracking under standard conditions followed by objective evaluation of the degree of cracking has been developed at Dynamit Nobel AG and is described and illustrated with colored photographs. Factors such as shape, processing

(Continued on page 657A)

• **Abstracts** (Continued from page 656A)

conditions, composition, and raw material characteristics as they affect cracking are discussed in detail. The effects of various ingredients on lathering behavior are also discussed. The main points made are: (1) the primary factor affecting crack formation in soaps use is the shape of the soap tablet itself; (2) fatty acid composition, titer, and degree of drying of the base soap have some effect on susceptibility to cracking; (3) a number of additives, notably polyols, may be used to improve crack resistance; (4) production line equipment can have a substantial influence on cracking behavior; the highest degree of compression of the soap mass is of special importance; (5) no agreement has so far been reached on a standard method for testing cracking behavior; (6) lathering is in large measure determined by the fatty component; additives may either improve or degrade lathering performance.

• Drying Oils and Paints

URETHANE COATINGS FROM RICE BRAN OIL AND COFFEE MEAL OIL. *I.S. Gupta, M. Singh, P. Singh and K. Singh. Res. Ind, New Delhi* **20**, 64–5 (1975). The possibility has been investigated of utilising the oils to form coatings by reacting toluene 2,4-diisocyanate with their glycerolysis products containing mono- and diglycerides. A study of their characteristics infers that the oils can be used as partial substitutes for soybean and linseed oils. (World Surface Coatings Abs. No. 417)

IDENTIFICATION OF SOLVENTS IN LACQUER THINNERS. H. Atanus. *Mod. Paint Coatings* **66** No 7, 39–42 (1976). A computer system program has been used to build up a library tape containing mass spectral data on 31 common lacquer solvents, obtained either directly or from the literature. Unknown solvent peaks in lacquer thinner mixts. are then identified in another program from a gas chromatography/mass spectroscopy scan. Examples of the procedure are given. (World Surface Coatings Abs. No. 417)

CYCLOPENTADIENE- AND STYRENE-MODIFIED OILS. B.M. Rudenko et al. *Lakokras. Mat.* **1976** No 3, 12–4. The olefin modification was carried out in the presence of sulfur and at various temps, and the experimental results were correlated. Some products derived from linseed oil and sunflower oil were prepared and characterised. Products capable of giving films of best weathering resistance were obtained at a 50:50 oil:styrene ratio or a 65:35 linseed oil:cyclopentadiene ratio. (In Russian) (World Surface Coatings Abs. No. 415)

YELLOWING AND OTHER FILM PROPERTIES OF LINSEED-DERIVED PAINTS INFLUENCED BY LINOLENATE CONTENT. H. Rakoff, F.L. Thomas and L.E. Gast. *J. Coatings Tech.* **48** No 619, 55–7 (1976). Extent of yellowing on storage in the dark (measured spectrophotometrically), drying time and hardness were determined on four experimental paints prepared from one of the following as vehicle: an alkali-refined linseed oil, a decolourised linseed oil, pure trilinolenin or a bleached hydrogenated linseed oil. These oils ranged in linolenate content from 0–100%. The trilinolenin paint dried the fastest and yellowed the most. The alkali-refined linseed oil paint yellowed just a little more than did the decolourised linseed oil paint. The bleached hydrogenated linseed oil paint dried slowly, did not yellow perceptibly and reached about one-half the Sward Rocker hardness of the other three paints. (World Surface Coatings Abs. No. 414)

RECENT ASPECTS ON THE PREPARATION AND EVALUATION OF SOME POLYESTERAMIDES FOR SURFACE COATINGS. PART I: PARAMETERS AFFECTING THE FORMATION OF VARIOUS DIHYDROXY-DIETHYLAMIDE DERIVATIVES OF FATTY ACIDS. A.M. Naser, M.A. El-Azmirly and A.Z. Gomaa (Department of Chemistry, Faculty of Science, Al-Azhar University, Nasr City, Cairo, Egypt) *J. Oil Colour Chem. Assoc.* **60**, 18–22 (1977). Hydroethylamide derivatives of fatty acids are used as starting materials in the formulation of the recently developed "polyesteramide" resins. Parameters affecting the formation of such compounds from oils and diethanolamine-such as the type and concentration of catalyst used and the reaction temperature-are investigated. The course of the reaction is followed by a thin layer chromatographic technique and by a turbidity technique. Bis-(hydroxyethyl) amide derivatives of various fatty acids are prepared in high percentage yield by reacting the oil (one mole), DEA (three moles) and zinc oxide (0.0014 mole) at 200° C. Lead oxide catalyst behaves in a manner similar to zinc oxide, except that the product shows a darker colour. The time of formation of such amide derivatives depends upon the temperature, catalyst concentration and the type of fatty acid unsaturation present. Saturated oils require longer times than those containing unsaturated acids.

• Edible Proteins

EXTRACTION OF PROTEINS FROM VEGETABLE SEED COMPOSITIONS. L.C. Wang (U.S. Secy. of Agriculture). *U.S. 4,018,755.* The procedure comprises the steps of sonicating a vegetable seed composition in a suitable solvent for a time sufficient to solubilize 50–100% of the total protein, separating the solids from the supernatant solution of protein, and recovering the protein from the supernatant solution. The sonic frequency used is 20 KHz.

PROTEIN FIBERS. A.J.M. Segeren and J.V. Boskamp (T.J. Lipton, Inc.). *U.S. 4,018,903.* A process for preparing soy protein fibers by spinning an aqueous soy protein solution comprises preheating the solution at 60–85% for a time sufficient to gel the 7S protein fraction but not gel all of the protein followed by extruding the partially pregelled solution into a coagulating medium for a time sufficient to gel the 11S fraction of the soy protein.

• Fats and Oils

BF_3-MEOH: A SINGLE REAGENT FOR OZONOLYSIS OF MONOETHYLENIC UNSATURATION. R.G. Ackman (Environment Canada, Fisheries and Marine Service, Halifax Lab., Halifax, Nova Scotia B3J 2R3, Canada) *Lipids* **12**, 293–6 (1977). Ozonolysis of monoethylenic fatty acids in BF_3-MeOH, or in MeOH with subsequent adddition of BF_3-MeOH, gives oxidative fission acid products as methyl esters in a nominal 100% yield and a purity $\geqslant 98\%$ of principal acid products. The in situ esterification step requires ca. 1 hr of heating with 7 or 14% BF_3, but other time requirements are much less, totalling no more than half an hour. Different liquid phases for open-tubular gas liquid chromatography of some products are compared.

MYRISTICIN. THE MAJOR VOLATILE COMPONENT IN MATURE SEED OF PORTENSCHLAGIA RAMOSISSIMA. M.A. Bohannon and R. Kleiman (Northern Reg. Res. Ctr., ARS, USDA, Peoria, Ill. 61604) *Lipids* **12**, 321–3 (1977). *Portenschlagia ramosissima* (Port.) vis. (Umbelliferae) seed contains 15% essential oils, 70% of which is the aromatic ether myristicin. These structural assignments were made from nuclear magnetic resonance, combined gas chromatography-mass spectrometry (GC-MS), and infrared and ultraviolet data. GC-MS data also indicate the presence of pinene, cymene, terpinene, elemicin, methyl eugenol, and a variety of sesquiterpene hydrocarbons.

4-BROMOMETHYL-7-METHOXYCOUMARIN AS A NEW FLUORESCENCE LABEL FOR FATTY ACIDS. W. Dunges (Pharmakologisches Inst. der Univ. Mainz, D-6500 Mainz, West Germany) *Anal. Chem.* **49**, 442–5 (1977). Reaction with 4-bromomethyl-7-methoxycoumarin (Br-Mmc) allows the fluorescence labeling of fatty acids. With the aid of microliter reflux techniques and thin-layer chromatography, an extensive screening program was performed. All unsubstituted and most substituted aliphatic monocarboxylic acids gave Mmc derivatives with strong blue fluorescence. Mmc esters of different fatty acids were prepared in millimole amounts. Their structure was confirmed by mass spectrometry and elementary analysis. Thin-layer chromatographic separation and in situ fluorescence measurement of their Mmc esters allows the determination of picomole amounts of fatty acids.

A NOVEL SPRAY REAGENT FOR PHOSPHOLIPID DETECTION. S.K. Kundu, S. Chakravarty, N. Bhaduri, and H.K. Saha (Dept. of Chem., Univ. Col. of Sci., Calcutta 700009, India) *J. Lipid Res.* **18**, 128–30 (1977). Ammonium pentachlorooxomolybdate in a solution of 7-9N H_2SO_4 was found to be an excellent spray reagent for the specific detection of phospholipids on thin-layer chromatograms. It is better than the usual molybdenum blue reagent due to its greater sensitivity and its ability to eliminate the problem of the development of background blue color on prolonged exposure.

A SIMPLE METHOD FOR THE PREPARATION OF PURE 9-D-HYDROPEROXIDE OF LINOLEIC ACID AND METHYL LINOLEATE BASED ON THE POSITIONAL SPECIFICITY OF LIPOXYGENASE IN TOMATO FRUIT. J.A. Matthew, H.W.-S. Chan and T. Galliard (Agr. Res. Council, Food Res. Inst., Colney Lane, Norwich, NR4 7UA, U.K.) *Lipids* 12, 324–5 (1977). Incubation of linoleic acid with crude homogenate of tomato fruit gave a high yield (69%) of linoleic acid hydroperoxides with a ratio of 9- to 13-hydroperoxide isomers of 96:4. After chromatography of the products, as free acids or methyl esters, hydroperoxides with 9- to 13-isomeric ratios of $>99:1$ were obtained. The major product was characterized as 9-D-hydroperoxy-octadeca-*trans*-10,*cis*-12-dienoic acid. The results demonstrate the positional specificity of lipoxygenase from tomato fruit.

A simple method for the preparation of cholesteryl esters. A.V. Prabhudesai (Dept. of Biochem., Marharashtra Assoc. for the Cultivation of Sci., Poona 411 004, India) *Lipids* 12, 242–4 (1977). A simple and convenient procedure for the synthesis of cholesterol esters of long chain saturated and unsaturated fatty acids is presented. Condensation is achieved with thionyl chloride as a catalyst.

Titration of sterol double bonds with dibromopyridine sulfate. F.U. Rosenstein, R. Caruso, and H.W. Kircher (Dept. of Nutr. and Food Sci., The Univ. of Arizona, Tucson, Arizona 85721) *Lipids* 12, 297–300 (1977). *Cis* and *trans*-22-dehydrocholesteryl acetates and *cis* and *trans*-22-cholesten-3β-yl acetates were prepared and compared to Δ^{22}-phytosterylacetates by titration with dibromopyridine sulfate. The cholesterol derivatives absorbed close to the theoretical quantity of bromine (1 Br_2 per double bond), whereas the Δ^{22}-C_{24}-alkylated sterols consumed 0.14 to 0.23 Br_2 in excess of the calculated values. This excess is attributed to the formation of additional unsaturation during bromination. Δ^{7} and $\Delta^{8(14)}$-sterols consume more than 2 and 3 moles Br_2, respectively, which indicates that at least one or two new double bonds are formed in these molecules during the bromination step.

Steroid oxetanones. 3. Synthesis of 5,7α-epoxy-5α-cholestan-6-ones. A.T. Rowland, R.S. Drawbaugh and J.R. Dalton (Dept. of Chem., Gettysburg College, Gettysburg, Pa. 17325) *J. Org. Chem.* 42, 487–90 (1977). Bromination of 5α-hydroxy-6-oxo cholestanes with pyridinium hydrobromide perbromide in hot acetic acid gave the corresponding 7α-bromo derivatives accompanied by significant amounts of by-products. Epimerization at C-7 by lithium bromide in dimethylformamide produced the 7β-bromo isomers which, upon treatment with methanolic potassium hydroxide in dimethyl sulfoxide, gave 5,7α-epoxy-5α-cholestan-6-ones and 5-hydroxy-7α-methoxy-5α-cholestan-6-ones. Spectroscopic data verify the structural assignments for the bromo ketones, oxetanones, and methoxy ketones. Among the few literature reports concerning the preparation of steroid oxetanones, this is the first to describe the production of α-methoxy ketones as competing products.

Gas chromatographic separation of cholesteryl esters of fatty acids of different degrees of unsaturation. T. Takagi, A. Sakai, Y. Itabashi and K. Hayashi (Dept. of Chem., Faculty of Fisheries, Hokkaido Univ., Hakodate, Japan) *Lipids* 12, 228–32 (1977). Cholesteryl esters prepared from the fatty acid methyl esters of linseed oil, pig liver lipids, and Japanese anchovy oil have been separated on the basis of their chain lengths and number of double bonds by gas liquid chromatography on a cyanosiloxane SILAR 10C column. The equivalent chain lengths of cholesteryl esters having acyl groups with 14–22 carbons and 0–6 double bonds are presented. A significant influence of the column temperature on the equivalent chain lengths of the polyenoic fatty acid cholesteryl esters has been found. Separation of the cholestanyl and epicholestanyl esters of linseed oil fatty acids, respectively, under the same conditions is also described.

Conjugated polyene fatty acids as fluorescent probes: Biosynthetic incorporation of parinaric acid by Escherichia coli and studies of phase transitions. E.S. Tecoma, L.A. Sklar, R.D. Simoni and B.S. Hudson (Depts. of Biol. Sci. and Chem., Stanford Univ., Stanford, Calif. 94305) *Biochemistry* 16, 829–35 (1977). The use of the fluorescent fatty acid, parinaric acid (9,11,13,15-octadecatetraenoic acid) (PnA), was studied in cells of an unsaturated fatty acid auxotroph of *Escherichia coli*. Growth conditions were found that permitted biosynthetic incorporation of PnA (up to 3%) into membrane phospholipids during growth on oleic or elaidic acid. Fluorescence measurements of incorporated PnA revealed phase transitions in cells, membranes, and phospholipids at temperatures that reflected the fatty acid composition of the sample. Transitions had a well-defined onset from high temperature, while the lower end point was less well defined. *cis*- and *trans*-PnA (*cis, trans, trans, cis,* and *all trans,* respectively) gave comparable results. Similar phase transitions were detected with PnA, which was not biosynthetically incorporated. Fluorescence of tryptophan was measured in *E. coli* membranes as a function of concentrations of PnA. Significant quenching of tryptophan fluorescence by PnA was observed.

Influence of phosphoric substances on the separation of the catalyst from the hydrogenated fats in an electrostatic field. T.G. Titova et al. *Maslozhir. Prom-st.* 1976(1), 16–7. The degree of separation of the catalyst from hydrogenated fats in an electrostatic field is determined by the quantity of phosphoric substances in the oil for hydrogenation and not by their composition. The presence of the phosphatides in the oil for hydrogenation implies the necessity to use substances which will initiate the precipitation of the catalyst on the electrodes. (Rev. Fr. Corps Gras)

Modification of color on the surface of the margarine wrapped in imitation parchment. I.V. Mikhaylova et al. *Maslozhir. Prom-st.* 1976(1), 17–20. To explain the causes of color modification on the superficial layer of the margarine during the process of storage, the authors examined the wrapping of margarine in imitation parchment. In the environmental conditions, the superficial layer of the margarine turns yellow after 2–3 days, which is in the first place connected with the water evaporation from the surface through the pores of imitation parchment. (Rev. Fr. Corps Gras)

Influence of some phosphoric emulsifiers on the content of water in the skin. I.V. Titova et al. *Maslozhir. Prom-st.* 1976(1), 25–7. Between the hydrating activity of the preparations of this emulsifier and their chemical structure, there exists a relation. The greatest hydrating activity appertains to "hostaphate" KW-340 (of Hoechst) containing an alkyl radical on C 16–C 18. The decrease of the length of the alkyl radical until C 12 (hostaphate KL-340) or the presence of an unsaturated bond in the radical (hostaphate KO-340) leads to a decrease of the hydrating activity of the product. (Rev. Fr. Corps Gras)

Loss of fatty acids with the effluent water eliminated from the barometric well during distillation. M.V. Irodov et al. *Maslozhir. Prom-st.* 1976(1), 21–3. Extensive loss of fatty acids with residual waters depends on the nature of the acids which are being distilled; much greater still is the influence of some technological factors (such as vacuum, quantity and temperature of the vapor, temperature of the water for cooling) on the content of fatty acids in the effluent waters. Stabilization of the conditions of work for the installation of distillation (increase of the vacuum in the system, regulation of the quantity and pressure of the vapor and of the water for cooling) allows the reduction of the losses of fatty acids. (Rev. Fr. Corps Gras)

Separation of mixtures of fatty acids. A.Kh. Nabiev et al. *Maslozhir. Prom-st.* 1976(1), 24–5. Most of the processes separate fatty acids into saturated and unsaturated fractions. The processes are time consuming and have a high consumption of solvent and a low temperature for cooling. The authors proposed the cooling of the solution of fatty acids in the essence of extraction. In this way, a saturated crystalline fraction which is separated by filtration is obtained. The filtrate is again cooled under the same conditions and the process is repeated 3 times. (Rev. Fr. Corps Gras)

Refining of linseed oil without alkali. T.Sh. Koyfman et al. (VNIIZ). *Maslozhir. Prom-st.* 1976(1), 36–8. Linseed oil contains 0.07–0.15% of phosphatides which are not completely eliminated with water during degumming. Often phosphoric acid is applied before neutralization of the oil to better eliminate the phosphatides. The method elaborated by the authors consists of phosphatides elimination with phosphoric acid without neutralization. The experiments have been done in the laboratory and in the factory. The oil is treated with phosphoric acid at 50–55C and with water at 55–70C. After phosphatides separation and drying, bleaching with active earth is applied. The experiments have been done in the factory in Rzhev on the "Gianazza" installation with a daily capacity of 25 t. The resulting oil satisfied GOST standard for standoil. (Rev. Fr. Corps Gras)

Influence of humidity on the storage of cottonseeds. F.M. Kancepolskaja et al. *Maslozhir. Prom-st.* 1976(2), 10–2. During the storage of low quality seeds, a decrease of oil content (about 3–4%) and an increase of acidity of the oil in the seeds and of the degree of oxidation of the oil occur. These changes are more pronounced if the humidity of the stored seed is higher. Parallel to the decrease of oil content in the seed during storage, an increase in the quantity of glycerides and of free fatty acids in the lipoprotein fractions occurs. (Rev. Fr. Corps Gras)

INFLUENCE OF PHOSPHORIC ACID HYDRATED AND NON-HYDRATED SUBSTANCES ON THE ELECTRICAL CONDUCTIBILITY OF SUNFLOWERSEED OIL. T.V. Mgebrishvili et al. *Maslozhir. Prom-st.* **1976**(2), 13-5. The authors studied the influence of the forms of phosphatides on the conductibility of the oil-agents of treatment system which react on the process of electroprecipitation of the dispersed systems and on the energy loss in the case where electrotechnology is applied. Comparing with the non-hydrated phosphatides, the hydrated phosphatides increase the conductivity of the sunflowerseed oil 3 to 5 times. At higher temperatures (190-200C), an abnormal decrease of conductivity of the oil-added agents system is observed. (Rev. Fr. Corps Gras)

REFINING OF SUNFLOWERSEED OIL WITHOUT THE USE OF ALKALINE SOLUTIONS. S.N. Volotovskaja et al. *Maslozhir. Prom-st.* **1976**(2), 15-7. The experiments done by the authors show that the elimination of phosphatides and coloring matters is most important for the refining of sunflowerseed oil. The free fatty acids are eliminated during distillation from the oil which is free of phosphatides and coloring matters. The acid value of the oil decreased from 3 to 0.21 and the distilled fatty acids have a light color. (Rev. Fr. Corps Gras)

GRANULOMETRIC COMPOSITION OF THE ADSORBANTS AND THEIR INFLUENCE ON THE EFFICIENCY OF CLARIFICATION OF OILS. V.V. Kljutchkine et al. *Maslozhir. Prom-st.* **1976**(2), 17-20. Maximal values of the adsorption of carotenoids and the necessary contact time depend as much on the homogeneity as on the size of used adsorbents. Increasing the uniformity of the latter increased adsorbent power of the earths. For the examined bleaching earths, the critical dimension of the diameter of particles (below it, it is not rational to crush the adsorbant) represents 0.1-0.2 mm. (Rev. Fr. Corps Gras)

PURIFYING TECHNICAL FATS BEFORE SPLITTING WITH SURFACE ACTIVE SUBSTANCES. N.P. Gavrilko et al. *Maslozhir. Prom-st.* **1976**(2), 23-7. The shortcomings of the methods used today for purification of technical fats before splitting are discussed. Instead of the treatment of fats with sulfuric acid, it is proposed to use a water solution of sodium-alkylsulfonate. This treatment allows some advantages compared with splitting with sulfuric acid. The elaborated method with the use of surface active substances can be done continuously. (Rev. Fr. Corps Gras)

ACCUMULATION OF THE 3,4-BENZOPYRENE IN THE SUNFLOWER SEED DURING DRYING. Ju.M. Koberveine et al. *Maslozhir. Prom-st.* **1976**(3), 17-9. The aim of this work was to study the influence of temperature and the drying agent, the time of the process, and the initial humidity of the seeds on the formation of 3,4-benzopyrene in sunflower seeds during drying with the flue gas obtained by burning of a combustible gas. The obtained results show that in the studied conditions, 3,4-benzopyrene doesn't accumulate. (Rev. Fr. Corps Gras)

EQUILIBRIUM MOISTURES OF OLIVE FOOT CAKES. INFLUENCE OF THE MOISTURE CONTENT AND THE STORAGE TIME ON THE OILS QUALITY EXTRACTED BY HEXANE. G. Cano Munoz, J.R. Hermida Bun and J. Contreras Cano *Grasas Aceites (Seville)* **27**(4), 245-53 (1976). After several storage times it is considered the influence that the moisture content and the stage of the olive foot cakes have on the oil quality extracted by hexane. This is measured by the acidity, peroxide and hydroxy-acid values as well as by the specific extinction at 270 nm, being deduced the most convenient moistures for the storage. The equilibrium isotherm at 30° C is obtained correlating the data obtained with the B.E.T. isotherm. The results obtained show the moisture influence on the hydrolysis of the glycerides, but not on the oxidation degraded phenomena.

OLIVE PRESS CAKE EXTRACTION. INFLUENCE OF FACTORS AFFECTING THE OIL YIELD. G. Cano Munoz, J.R. Hermida Bun and E. Ascanio Hidalgo *Grasas Aceites (Seville)* **27**(5), 303-8 (1976). The bibliography reports the influence of diverse factors on the phenomenon of fat extraction by solvents. The conclusions for oleaginous seed can not be generalized to fatty olive press cake due to the peculiarities of this product, though they can be orientations. The mechanical extraction of olive oil and the press cake manipulation prior to solvent extraction, determine the factors affecting this extraction: moisture, granulemetry, oil content and structure, her intrinsic factors being: temperature, time and solvent/solid relationship. Most of those factors and their inter-relations have been analyzed, and the conclusions can be used as orientations in order to improve the yields.

THE TIME FACTOR IN THE CONVERSION OF FATS INTO METHYL ESTERS. R.M. Utrilla, M. Juárez and I. Martínez (Instituto de Productos Lácteos. C.S.I.C. Arganda del Rey (Madrid) *Grasas Aceites (Seville)* **27**(5), 323-8 (1976). Four of the most used methods for fats methoxylation, using as catalysts H_2SO_4, BF_3, CH_3OK and KOH, are compared. With n-pentadecane, n-nonadecane and n-tetracosane as inert internal standards, the relative abundance in methyl esters changing the reaction time in each method is determined by gas chromatography. The progress of the reaction with the two later catalysts is also followed by thin layer chromatography.

STUDY ON OLIVE OILS FROM ARGENTINE. (Years 1971 to 1973). I.G. de Kuck, L.G.F. de Wetzler, E. Martinovich, E. de Sa Souza and R.A. Macchi (Departamento de Tecnologia de los Alimentos. Instituto Nacional de Tecnologia Industrial. Miguelete-Provincia de Buenos Aires-Argentina) *Grasas Aceites (Seville)* **27**(6), 397-403 (1976). A statistical study on the industrial production of olive oil in every zone of Argentine is made. This study covers the period from 1971 to 1973. Quality and identity characteristics of the oils were determined. The employed analytical technics were those of the recommended International Standard by FAO/OMS. In general, Argentine production is within the limits fixed by FAO, except for Bellier index, that for a confidence level of 95% its upper limit exceeds the value of 17,0° C; Vizern reaction (to detect seed oils) was negative with all the 375 analysed samples.

APPLICATION OF NUCLEAR MAGNETIC RESONANCE IN DETERMINATION OF THE FAT CONTENT IN OLEAGINOUS. I. SUNFLOWER, SOYA AND SAFFLOWERSEEDS. F. Romero Guzmán and J. Gracian Tous (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* **27**(6), 373-9 (1976). A series of experiences for determining by N.M.R. the fat content in sunflower, soya, and safflower seeds, are realized. The spectrometer used was a Newport Mk II, at constant frequency and variable magnetic field, eliminating the proton signal of the solid phase. Previously the optimum level of radiofrequencies and the residual content of non detectable water, are determined and an analytical procedure is established. Very satisfactory results are obtained with the samples used, with a statistical precision of analogous order to the obtained by the extraction method in Soxhlet.

DIRECTED TRANSESTERIFICATION OF FATS. III. TEMPERATURE INFLUENCE ON THE COMPOSITION OF THE SOLID AND LIQUID PHASES AT EQUILIBRIUM AND THE APPLICATION TO A TOTAL COMPOSITION MATHEMATIC MODEL. F.J. Nieto Rodriguez-Brochero (Instituto de Productos Lácteos. Patronato «Juan de la Cierva» (C.S.I.C.) Arganda del Rey (Madrid) *Grasas Aceites (Seville)* **27**(6), 389-97 (1976). When a mathematic treatment of the directed transesterification reaction is applied to the experimental results obtained from processes at different temperature with fats of different saturated fatty acids content, it is arrived to establish two functions which relate with the temperature the saturated fatty acids percentage of the liquid phase and the solid phase composition, both at equilibrium. These functions allow to calculate the glyceridic composition attained by any fat without a sensible difference from those tested, after being directly transesterified in only one stage at constant temperature between 12 and 34° C.

STUDIES ON COMPOSITION, STORAGE AND ACCEPTABILITY OF SUNFLOWER OIL. Ch. Parvathi and P. Geervani (College of Home Science, Andhra Pradesh Agricultural University, Hyderabad-4) *J. Food Sci Technol.* 13, 192 (1976). The chemical composition of sunflower oil produced in Hyderabad was different from sunflower oil of Canada in respect of essential fatty acids. Heating resulted in a decrease in linoleic and increase in oleic acid fraction. Studies on storage behaviour indicated that sunflower oil became rancid earlier than groundnut oil. Both prolonged heating and storage, accelerated rancidity in oils, the effect being more pronounced in sunflower oil. Consumers' acceptability revealed that most consumers felt that flavour quality of sunflower oil was similar to other vegetable oils.

TURBIDITY REDUCTION IN TRIGLYCERIDE STANDARDS. D.P. Bonderman. *U.S. 4,011,045.* A method for preparing serum which is suitable for use as a triglyceride standard comprises (a) reducing the triglyceride level normally present in the serum; (b) adding glycerides of fatty acids having 5–10 carbon atoms to the serum to achieve a concentration of at least 0.03% along with an effective amount of an alkyl-phenoxy polyethoxyethanol surfactant to solubilize the glycerides; and (c) preserving the serum by lyophilizing or freezing.

METHOD OF PREPARING ESTERS OF GLYCEROL AND POLYGLYCEROLS AND C_5–C_9 MONOCARBOXYLIC FATTY ACIDS. B.K. Tjurin, A.L. Momot, N.L. Volodin, V.T. Peremitina, A.V. Evdokimova, V.P. Churov, S.M. Krugly, and G.G. Garifzyanov. *U.S. 4,011,251.* The method comprises reacting the still residue from the distillation of synthetic glycerol produced by a chlorine method and containing glycerol, polyglycerols, sodium hydroxide, and sodium chloride with C_5–C_9 fatty acids at 140–210 C with continuous distillation of water present in the reaction zone. The reaction mixture contains the desired esters which are then isolated.

METHOD AND REAGENT FOR THE QUANTITATIVE ANALYSIS OF TRIGLYCERIDES. B. Carl and J. Stourac (Dr. Bruno Lange GmbH). *U.S. 4,012,287.* In the method for the quantitative analysis of triglycerides by enzymic hydrolysis in an alkaline aqueous medium to form glycerol, followed by quantitative analysis of the glycerol, there is described an improvement consisting of adding a catalytic amount of a low molecular weight chlorinated hydrocarbon to the hydrolysis medium to accelerate the hydrolytic cleavage.

PROCESS FOR EXTRACTING ANTIOXIDANTS. R. Viani (Nestle S.A.). *U.S. 4,012,531.* A process for extracting antioxidant substances from organic plant material of the Labiate or Umbellifer family comprises treating the organic material with an aqueous buffer solution with a pH of 7–11.5. The insoluble fraction is separated, and the soluble fraction containing the antioxidant substances is collected.

METHOD FOR PREPARING EDIBLE OIL. T. Okumori, Y. Tadokoro, Y. Takagi and N. Yoshida (Nisshin Seiyu Kabushiki Kaisha). *U.S. 4,009,290.* The process comprises the steps of mechanically expelling crude oil from the vegetable seeds, separating the expelled oil from the cakes, passing the crude oil through a layer of the separated cakes to filter sediment from the oil, and extracting the crude oil from the cakes with a solvent.

CONTINUOUS PROCESS FOR THE SEPARATION OF MIXTURES OF FATTY SUBSTANCES OF DIFFERENT MELTING POINTS. W. Stein and H. Hartmann (Henkel & Cie). *U.S. 4,009,213.* Fatty alcohol mixtures, consisting of liquid and solid phases are dispersed in aqueous solution containing a wetting agent. The dispersion then separates into two phases by gravity, and the top phase containing the liquid fatty alcohol is removed. The lower phase is removed and heated to melt the fatty alcohol which is then removed. The aqueous wetting agent solution thus recovered is then combined with fresh feed material to repeat the process.

PRODUCTION OF FATTY ACIDS FROM ALKANES BY OXIDATION. H.R. Gerberich, Jr. and E.F. Dougherty (Celanese Corp.). *U.S. 4,011,252.* The process comprises (a) oxidation of C_{20}–C_{30} normal alkanes with molecular oxygen to produce C_1–C_6 fatty acids which dissolve in an aqueous phase and C_7 and higher fatty acids which dissolve in a hydrocarbon phase; (b) hydrogenation of at least the hydrocarbon phase to reduce the degree of unsaturation by at least 50% without otherwise affecting the fatty acids; (c) nitric acid oxidation of the hydrogenation product to produce an aqueous phase containing most of the C_1–C_6 fatty acids and a hydrocarbon phase containing most of the C_7 and higher fatty acids; and (d) recovery of the desired fatty acids.

METHOD OF PREPARING FATTY ACIDS FROM THEIR CORRESPONDING SOAPS. A. Gueant and S. Mercier (Produits Chem. Ugine Kuhlmann). *U.S. 4,018,805.* The method comprises dissolving a melted soap in a melted C_5–C_{31} fatty acid in the absence of oxygen to form a liquid solution, contacting the solution with an aqueous solution of a strong mineral acid in a stoichiometrically equivalent amount to the soap, and allowing the cations of soap and strong acid to exchange phases.

PROCESS FOR RECOVERING SYMMETRICAL DIGLYCERIDES FROM GLYCERIDE MIXTURES. G.R. Wyness and R.W. Lodge (Procter & Gamble). *U.S. 4,018,806.* A process for recovering 1,3-diglycerides from a glyceride mixture comprising 5–60% triglyceride, 15–70% 1,3-diglyceride, 1–40% 1,2-diglyceride, and 8–50% monoglyceride consists of forming a solution of the glyceride mixture with a nonpolar hydrocarbon solvent and a polar organic solvent; inducing and maintaining crystallization of solid 1,3-diglyceride from the solution while maintaining the temperature of the solution below the saturation temperature of the 1,3-diglyceride and above the saturation temperature of the remaining components of the glyceride mixture; and recovering solid highly pure 1,3-diglyceride. The polar organic solvent is sufficiently polar to dissolve the monoglycerides in the original glyceride mixture.

PROCESS FOR DEEP FAT COOKING. E.S. Wright, J.W. Angstadt, and G.L. Garrow (Blaw-Knox Food and Chemical Equipment, Inc.). *U.S. 4,020,189.* The cooker has two cooking zones and a separate source of heated cooking oil. The heated oil is introduced into the bottom of the first cooking zone, and the uncooked food is introduced into the top of it. Upon removal of moisture, the food floats and is moved horizontally into the second cooking zone along with the cooking oil. Cooking is finished in the second zone after which the food is continuously removed and the oil is recycled through the heater to the first cooking zone.

A SIMPLE METHOD FOR DETERMINATION OF OIL CONTENT OF SEED AND ITS FATTY ACID COMPOSITION BY GLC USING SMALL AMOUNT OF SAMPLE. P. Kumar and K. Fujimoto (Faculty of Agriculture, Tohoku University, Sendai) *Yukagaku* **26**, 41–2 (1977). A simple method for determination of oil content and fatty acid composition in small seed sample (> 2 mg) is presented using methyl heptadecanoate as internal standard. Using this method, the possibility of loss of oil is eliminated, and simultaneous extraction and methyl esterification of oil in a test tube can be efficiently carried out. A comparison of the present method with conventional one revealed a close agreement with regard to oil content and fatty acid composition of two major rapeseed crops, viz., *Brassica napus* and *Brassica campestris.*

STUDIES ON THE METAL-PROTEIN COMPLEX. X. INHIBITORY EFFECTS OF L-AMINO ACIDS AND PEPTIDES ON THE OXIDATIVE ACTIVITY OF METAL IN OIL. S. Yamashoji, H. Yoshida and G. Kajimoto (Faculty of Nutrition, Kobe Gakuin University, Kobe), *Yukagaku* **26**, 28–31 (1977). Crystalline Glu, Lys and Cys had the antioxidative activities and inhibited the oxidative activity of ferrous chloride by the Active Oxygen Method (98° C). The inhibitory activities of the mixtures of L-amino acids containing Glu, Lys or Cys on the oxidative activity of ferrous chloride were proportional to those of L-amino acids described above. The inhibitory activities of peptides on the oxidative activity of metal salt were not proportional to those of the mixtures of the constituent L-amino acids. Polypeptides and proteins had small inhibitory activities on the oxidative activity of iron (II) chloride in comparison with Glu or Lys. Peptides and the mixtures of the constituent L-amino acids inhibited the oxidative activity of copper (II) sulfate. Iron and copper seem to adhere loosely on the surface of crystalline peptides under the conditions of Active Oxygen Method on the basis of IR spectra of the obtained metal-peptide complexes. However, the loss of the oxidative activities of metal salts was not proportional to the amounts of metal in the metal-peptides or metal-L-amino acids complexes.

EVALUATION OF HEAT TREATED FRYING OILS. III. COMPONENTS IN SUBFRACTIONS OF POLAR FATTY ACID METHYL ESTERS FROM HEAT TREATED SOYBEAN OIL. S. Toriyama and C. Urakami (Faculty of the Science of Living, Osaka City University, Osaka), *Yukagaku* **26**, 17–27 (1977). Polar fractions of fatty acid methyl esters (PFA) prepared from soybean oil heated 30 h by frying whale meat (Wh) and potato (Po) were subjected to fractionation by TLC and silicagel column chromatography (CC), monitoring each fraction for its UV-absorbance (at 233 nm). Highly UV-active fractions were analyzed by GLC and GC-MS to compare with the chromatographic patterns obtained from Wh and Po and to comprehend the nature of UV-active components. The fractions with R_f in a range of 0.23–0.96 by TLC (developed with petroleum ether-diethyl ether-ethanol 50:50:2) contributed nearly 90% of the total UV-absorption of PFA and amounted to 56–69% (on the weight basis) of PFA. These fractions showed strong intensities of absorption at 790–795 and 765–770 cm^{-1} in the IR region. The chromatograms obtained from both samples were quite similar, indicating similar nature of components being involved in both samples. The most remarkable UV-active subfractions obtained by CC (R_f 0.81–0.96) as well as five subsequent fractions (R_f up to 0.73) were found to be composed of short chain esters, chiefly C_{11}–C_{15}, having UV-active conjugated systems such as diene, enal (or enone), and formylenol. Compounds having a carbonyl or a hydroxyl group in their midchains were also detected in GLC fractions eluted at high temperatures. On the other hand, a subfraction with its R_f 0.59–0.67 was found to be composed of chiefly C_{18} compounds either in a normal chain or cyclohexyl form having the conjugated systems as mentioned above and also a keto or hydroxyl group. Other compounds found were 8-phenyloctanal, C_6 and C_8-esters carrying in their molecules the 5-oxo-1-cyclopentenyl residue, and dioctyl phthalate.

Recent advances in instrumental analysis of lipids. E.G. Perkins, J.C. Means and M.F. Picciano *Rev. Fr. Corps Gras* **24**(2), 73–84 (1977). Progress in knowledge of the chemistry and biochemistry of lipids has customarily been made as a result of prior advances in analytical methodology developed for use with liquid chromatography and gas-liquid chromatography, NMR and mass spectrometry. Different methods are reviewed: high performance liquid chromatography, gas-chromatography-mass spectrometry, pyrolysis by laser, NMR. Applications of instrumental analysis to lipids are discussed.

Use of palm oil-kernel oil mixtures for food purposes. M.T. Richert *Oléagineux* **32**, 21–3 (1977). This study could be of interest to West African and Indonesian consumers: performance of blends of palm oil/kernel oil on different planes, consistency at a few temperatures, oxidation stability, etc. Possibility of using blends of crude palm oil and refined kernel oil (in particular 50/50 blends) for food purposes, as a complement to palm oil.

Interesterification: edible applications. L. Faur *Rev. Fr. Corps Gras* **24**, 85–91 (1977). The purposes of interesterification, its different forms, the end products obtained are first described. Then, the best procedures are specified, particularly the fatty raw material characteristics (free fatty acids, water and peroxide contents, according the process, batch or continuous). The main edible uses are reviewed: fatstock for soft margarine with a high content in polyunsaturated fatty acids, special margarines for baker's products, shortenings, cocoa butter substitutes from interesterified palm or lard. The flexibility of the process and versatility of the end products properties are pointed out.

The Afzelia Bella Harms oil, an important source of crepenynic and dehydrocrepenynic acids. N. Kabele, A. Vieux, M. Lisika and C. Paquot *Rev. Fr. Corps Gras* **24**, 99–102 (1977). The Afzelia Bella Harms seeds provide an oil which consists of about 40% alkynoic acids (crepenynic and dehydrocrepenynic acids). The yield amounts to 25%.

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Effect of a single cis double bond on the structure of a phospholipid bilayer. A. Seelig and J. Seelig (Dept. of Biophys. Chem., Biocenter of the Univ. of Basel, CH-4056 Basel, Switzerland) *Biochemistry* **16**, 45–50 (1977). The ordering of the hydrocarbon chains and the rates of lipid motion are two independent parameters characterizing the structure and the dynamics, respectively, of a bilayer membrane. In this work, deuterium magnetic resonance has been used to elucidate the influence of a single cis double bond on the hydrocarbon chain *ordering* of a phospholipid bilayer. 1-Palmitoyl-2-oleoyl-3-*sn*-phosphatidylcholine was specifically deuterated at various segments of the palmitic acyl chain and at the 9,10 position of the oleic acyl chain, and the segmental order parameters were deduced from the quadrupole splittings of the unsonicated bilayer phases. The shape of the order profile of the palmitic acyl chain is similar to that observed for the corresponding fully saturated membrane, but the magnitude of the order parameters is distinctly smaller in the unsaturated system. This demonstrates that the presence of a double bond in a membrane causes a more disordered conformation of the hydrocarbon chains.

Chemical modification by trinitrobenzenesulfonate of a lipid and proteins of intracytoplasmic membranes isolated from Chromatium vinosum and Azotobacter vinelandii. K. Shimada and N. Murata (Dept. of Biophys. and Biochem., Faculty of Sci., Univ. of Tokyo, Hongo, Tokyo, Japan) *Biochim. Biophys. Acta* **455**, 605–20 (1976). The structure of intracytoplasmic membranes of a photosynthetic bacterium *Chromatium vinosum* and a nitrogen-fixing bacterium *Azotobacter vinelandii* was studied by chemical modification of amino groups of phosphatidylethanolamine and proteins with trinitrobenzenesulfonate. In the chemical modification of the intracytoplasmic membrane preparations, 30% of phosphatidylethanolamine and 15% of protein amino groups in *C. vinosum* and 45% of phosphatidylethanolamine and 20% of protein amino groups in *A. vinelandii* were estimated to be exposed to the aqueous phase. In the single-layered liposomes composed of phosphatidylethanolamine and phosphatidylglycerol with a ratio of 2:1, 40% of phosphatidylethanolamine were estimated to be exposed to the aqueous phase.

The preference of cholesterol for phosphatidylcholine in mixed phosphatidylcholine-phosphatidylethanolamine bilayers. P.W.M. VanDijck, B. De Kruijff, L.L.M. Van Deenen, J. De Gier and R.A. Demel (Lab. of Biochem., State Univ. of Utrecht, Univ. Ctr. "De Uithof," Padualaan 8, Transitorium 3, Utrecht, The Netherlands) *Biochim. Biophys. Acta* **455**, 576–87 (1976). The following phosphatidylethanolamines were studied by differential scanning calorimetry: 1,2-dipalmitoleoyl-, 1,2-dioleoyl-, 1,2-dilauroyl-, 1,2-dielaidyl-, 1,2-dimyristoyl- and 1,2-dipalmitoyl-*sn*-glycero-3-phosphoryl-ethanolamine. The saturated and trans-unsaturated species underwent thermotropic phase transitions at temperatures about 20–30°C higher than the corresponding phosphatidylcholines but the enthalpy changes were nearly identical. The transition temperatures for the cis-unsaturated species were about the same as those of the corresponding phosphatidylcholines but here the enthalpy change was markedly decreased as compared with the phosphatidylcholines. Freeze-fracture electron microscopy revealed phase changes from a lamellar to a hexogonal phase for 1,2-dipalmitoleoyl- and 1,2-dioleoyl-*sn*-glycerophosphorylethanolamine at 20 and 0°C respectively. At these temperatures no transitions were apparent in the calorimeter scan.

Ceramide aminoethylphosphonate in the fungus Pythium prolatum. M.K. Wassef and J.W. Hendrix (Dept. of Plant Path., Univ. of Ky., Lexington, Ky. 40506) *Biochim. Biophys. Acta* **486**, 172–8 (1977). Ceramide aminoethylphosphonate was characterized from the lower fungus *Phythium prolatum.* The compound was purified by silicic acid column chromatography, DEAE-cellulose column chromatography, the action of phospholipase D, and two-dimensional thin-layer chromatography. Infrared spectra lacked ester bands and suggested the presence of a bonded NH group. The compound was hydrolyzed by strong acid. Sphingosine comprised 99% of the long chain bases. The predominant fatty acids were palmitate, oleate, linoleate, and an unidentified long chain acid. The aqueous portion of the hydrolysis products gave an elemental analysis consistent with 2-aminoethylphosphonate. On paper and thin layer chromatograms, the ammonium salt of the aqueous hydrolysis product chromatographed with 2-aminoethylphosphonate but not 1-aminoethylphosphonate, 2-aminoethanol, serine or alanine. This appears to be the first report of a phosphonolipid from fungi.

The turnover rate of lipoprotein of $d < 1.006$ from plasma of laying turkey hens. W.L. Bacon and M.A. Musser (Dept. of Poultry Sci., Ohio Agr. Res. and Develop. Ctr., Wooster, Ohio 44691) *Poult. Sci.* **56**, 35–41 (1977). The turnover rate of plasma "low density fraction" (LDF, $d < 1.006$) lipoprotein was determined in two laying turkeys hens. LDF was labeled by injecting 1-14C-palmitate which was incorporated into the triglyceride (TG) of circulating LDF. The turnover rates were determined from concentration and half life ($t^{1/2}$) of the ultracentrifugally-isolated LDF. These values were 22 μ. equiv. of TG fatty acid (TGFA) per ml. plasma and 431 min. The turnover rate of LDF was 17.57 mili equiv. TGFA/day as stearate. It was estimated that 3.2 g. of LDF-TGFA/day were removed as egg yolk.

Fatty acids diffusion in lecithin multilayers: hydration and pH effects. J.L. Rigaud, C.M. Gary-Bobo, A. Sanson and M. Ptak (Lab. de Physiol. Cellulaire, College de France, 11, Place Marcelin Berthelot, 75231 Paris Cedix 05, France) *Chem. Phys. Lipids* **18**, 23–38 (1977). The diffusion of the sodium salt of monocarboxylic fatty acids, from formate to stearate, has been studied as a function of water content and pH in lecithin-water lamellar phases. Evolution of the diffusion coefficients with increasing chain length reflects the different localizations of fatty acids in the system. From formate to butyrate, which are mainly restricted to the hydrophilic layer of the phase, diffusion rates decreases rapidly. From butyrate to stearate, fatty acids (anchored at the hydrophilic-lipophilic interface) undergo lateral diffusion and then the decrease of D with increasing chain length is much slower. The diffusion of stearate is already comparable to the diffusion of the lecithin molecule itself. The diffusion rates strongly depend upon phase hydration and pH: it is shown that both parameters control the fatty acid ionization. The variations in diffusion rates observed may be ascribed to the fact that, depending upon their state of ionization, fatty acids assume a different localization and therefore experience different interactions in the lamellar system.

AMPHIPATHIC HELIXES AND PLASMA LIPOPROTEINS: THERMODYNAMIC AND GEOMETRIC CONSIDERATIONS. J.P. Segrest (Depts. of Pathol., Biochem. and Microbiol., Comprehensive Cancer Ctr., and Inst. of Dental Res., Univer. of Alabama in Birmingham Med. Ctr., Birmingham, Ala. 35294) *Chem. Phys. Lipids* **18**, 7–22 (1977). In this paper analyses are made of the thermodynamic and geometric properties of the predicted association between amphipathic helixes and phospholipid vesicles. From thermodynamic considerations it is proposed that a major driving force for such an association is the negative free energy gained by the transfer of a number of hydrophobic residues (contained within the non-polar faces of amphipathic helixes), from water to the interior of a phospholipid bilayer. The mechanism proposed is that in the aqueous state a potentially amphipathic sequence forms a non-helical hydrophobic patch on the surface of the apolipoprotein. On the basis of geometrical considerations a model for an intermediate state of high density lipoprotein (HDL) synthesis is proposed. This model consists of a cholesterol-containing phospholipid bilayer disc whose 'naked' hydrophobic edges are shielded from the aqueous phase by amphipathic helixes of the apolipoproteins. Exposure of these 'bicycle tire' micelles to the enzyme lecithin:cholesterol acyl transferase (LCAT) is postulated to result in the formation of mature spherical HDL particles with cholesteryl ester forming a neutral lipid core.

INHIBITION OF LIPOPROTEIN LIPASE ACTIVITY BY A MONOCLONAL IMMUNOGLOBULIN IN AUTOIMMUNE HYPERLIPIDEMIA. J.-L. Beaumont, M. Berard, M. Antonucci, B. Delplanque and R. Vranckx (Univ. Paris Val-de-Marne, INSERM et Assoc. Claude-Bernard, INSERM U32, Hopital Henri-Mondor, 94010 Creteil, France) *Atherosclerosis* **26**, 67–77 (1977). Autoimmune hyperlipidemia (AIH) may be induced by a variety of antibodies which inhibit different stages of the lipolytic process by which the lipid load is removed from the circulating lipoproteins. In a patient having a monoclonal gammopathy and a nephrotic syndrome with a glomerulonephritis and a marked hypertriglyceridemia, it was found previously that the monoclonal IgG λ Lac. reacted with human VLDL as well as with human serum albumin. Here it is demonstrated that the purified IgG λ inhibits the lipolysis of triglyceride substrates by reacting with a substance (Lac. S) necessary for lipoprotein lipase activity. The Lac. substance is different from the Pg and As substances which were found to react with IgA anti-Pg and IgG anti-As anti-bodies in previously reported antilipoprotein AIH.

THE EFFECT OF CONTINUOUS HEPARIN INFUSION FOR ONE YEAR ON SERUM CHOLESTEROL AND TRIGLYCERIDE CONCENTRATIONS IN THE DOG. P.J. Blackshear, T.D. Rohde, R.L. Varco and H. Buchwald (Dept. of Surgery, Univ. of Minn., Minneapolis, Minn. 55455) *Atherosclerosis* **26**, 23–7 (1977). Fourteen normal dogs received continuous infusions of intravenous heparin for one year by means of an implantable infusion pump. Heparin was administered at an overall mean rate of 666 units/kg/day, a dose sufficient to prolong the Lee-White clotting time to greater than twice normal. Eight control, animals, under the same dietary and activity regimen, received continuous infusions of bacteriostatic water for one year by means of implanted pumps. Serum cholesterol concentrations rose to 50% above control values after one month of heparin infusion, and remained significantly ($P < 0.05$) elevated at this level for the remaining 11 months. Serum triglyceride levels were unchanged. A possible mechanism for this elevation resides in the known effect of heparin to increase plasma free fatty acid concentrations by its activation of lipoprotein lipase. These results may have implications for the long-term use of heparin anticoagulation in the treatment of atherosclerotic states in man.

ACCELETATED "ATHEROSCLEROSIS". A MORPHOLOGIC STUDY OF 97 SAPHENOUS VEIN CORONARY ARTERY BYPASS GRAFTS. B.H. Bulkley and G.M. Hutchins (Cardiovascular Div. of the Dept. of Med. and the Dept. of Pathol., The Johns Hopkins Univ. School of Med. and Hosp., Baltimore, Md.) *Circ. Res.* **55**, 163–9 (1977). Intimal thickening of uncertain cause has been noted in saphenous vein bypass grafts. To study the development of these changes, 97 vein grafts in 55 autopsied patients were examined by angiography and histology. Significant alterations in the grafts were confined to the intima and included thin layers of circumferential thrombus, concentric fibrous plaque and occlusive thrombus with organization. Circumferential nonocclusive intimal thrombus was present in 36 (73%) postoperative patient grafts. Concentric fibrous plaque, found in all twelve patent late grafts, showed changes characteristic of atheromata, including smooth muscle and foam cells. Intimal fibroelastosis was absent in the grafts, indicating that concentric plaque is not a simple response to increased pressure, or an "arterialization" of the vein. The findings suggest that early appearing concentric intimal thrombus is converted into fibrous plaque, and that this early thrombus is a factor in the development of accelerated "atherosclerosis" in saphenous vein bypass grafts.

EFFECT OF ACUTE ETHANOL INGESTION ON FAT ABSORPTION. M. Boquillon (E.R., 188 C.N.R.S., U.E.R., Nutr., Sci Mirande, Campus Univ., 21 000 Dijon, France) *Lipids* **11**, 848–52 (1976). A test meal (300 mg casein, 600 mg sucrose, 100 mg corn oil, tracer does of 9.10^{3}H oleic acid) was given to fasting adult rats with intestinal lymph fistulas. One group received an acute oral dose of ethanol (3.2 g/kg body weight) simultaneously with the test meal. Controls received 2.5 ml of water instead of ethanol. Ingestion of ethanol temporarily delayed the removal of lipid radioactivity from the stomachs. More than 25% of radioactivity fed remained 8 hr after feeding whereas with control rats less than 10% of lipid radioactivity fed remained 6 hr after feeding. In controls and ethanol-treated rats, the amounts of exogenous lipids in the intestinal lumen and mucosa were low and similar enough. Quantities of endogenous and exogenous lipids found in the lymph collected during 24 hr after feeding were similar in the two groups, but the fat absorption peak was found after 6 hr in alcoholic rats and before 6 hr in controls. This delay was probably due to the retention of lipids in the stomach. More of the exogenous lipid was always transported by small particles moving in the region of α_1 globulins in cellulose acetate electrophoresis than by larger particles remaining at the origin. This proportion was enhanced in the ethanol-treated animals. The larger fat particles were richer in endogenous fatty acids in alcohol-treated rats than in controls.

IDENTIFICATION OF 6-KETOPROSTAGLANDIN $F_{1\alpha}$ FORMED FROM ARACHIDONIC ACID IN BOVINE SEMINAL VESICLES. W.C. Chang and S.I. Murota (Dept. of Pharm., Tokyo Met. Inst. of Gerontology, 35-2 Sakaecho, Itabashi-ku, Tokyo-173, Japan) *Biochim. Biophys. Acta* **486**, 136–44 (1977). The prostaglandin synthesizing system in bovine seminal vesicles was characterized by a radiometric assay. Two main products were formed from $[1\text{-}^{14}C]$-arachidonic acid, and their structures were confirmed by mass spectrometry. The less polar product was identical with prostaglandin E_2 and the more polar one was identical with a new prostaglandin, i.e., 6-ketoprostaglandin $F_{1\alpha}$.

THE INTERACTION OF FATTY ACID SYNTHETASE WITH CYTOPLASMIC PROTEIN IN THE CONTROL OF THE CHAIN-LENGTH OF FATTY ACIDS SYNTHESISED BY THE LACTATING RABBIT MAMMARY GLAND. E.M. Carey (Dept. of Biochem., Univ. of Sheffield, Sheffield, S10 2TN, U.K.) *Biochim. Biophys. Acta* **486**, 91–102 (1977). Fatty acid synthetase from rabbit mammary gland can be separated from the protein which modifies the chain-length at which fatty acids are released from the enzyme complex in the soluble fraction. This can be achieved by ultracentrifugation, precipitation with specific antibody or ammonium sulphate. The chain-length modifying protein in the supernatant fraction from rabbit mammary gland was less active towards cow mammary gland fatty acid synthetase than rabbit mammary gland fatty acids synthetase in the synthesis of medium-chain fatty acids. The fatty acid synthetases from these two tissues are also immunologically non-identical. It is proposed that there is a loose but specific interaction of rabbit mammary gland fatty acid synthetase with the chain-length modifying protein in regulating product chain length which is dependent on the concentration of interacting proteins.

COMBINED ACTION OF LIPASE AND MICROBIAL PHOSPHOLIPASE C ON A MODEL FAT GLOBULE EMULSION AND RAW MILK. G.L. Chrisope and R.T. Marshall (Dept. of Food Sci. and Nutr., Univ. of Missouri, Columbia, Mo. 65201) *J. Dairy Sci.* **59**, 2024–30 (1976). Phospholipase C from *Pseudomonas fluorescens* hydrolyzed phospholipids adsorbed to fat globules in a model emulsion composed of butteroil emulsified with crude soy lecithin. Modification of the membrane by this enzyme enhanced lipolysis when steapsin was introduced to the emulsion contained in a Bio-fiber beaker-type dialysis system. Following an initial period of induction, the velocity of lipolysis in the model emulsion was greater in the presence of phospholipase C than in its absence. Phospholipase C also enhanced the activity of milk lipase in raw milk. The magnitude of enhancement was much greater in milk than in the model emulsion. Presumptive data suggested that lipolysis by phospholipase C varied with intrinsic differences among various animals.

ETHER LIPID CONTENT OF PHOSPHOGLYCERIDES FROM THE RETINA AND BRAIN OF CHICKEN AND CALF. R.V. Dorman, H. Dreyfus, L. Freysz and L.A. Horrocks (Ctr. de Neurochem. du CNRS, 11 rue Humann, 67085 Strasbourg-Cedex, France) *Biochim. Biophys. Acta* **486**, 55–9 (1977). Phospholipid contents and compositions were determined for chicken and calf retinas, chicken brain and calf gray matter. Retinal phospholipid compositions differ from brain phospholipid compositions by including a higher percentage of choline phosphoglycerides and lower percentages of ethanolamine and serine phosphoglycerides. The proportion of sphingomyelin is lower in calf retina than in calf brain. The alkylacyl glycerylphosphocholines comprised 4.0% of the retina choline phosphoglycerides. Overall, a smaller proportion of retinal phospholipids than of brain phospholipids contained alkyl or alk-1-enyl ether groups and the ratio of alkyl groups to alk-1-enyl groups was greater in retina than in brain.

FECAL FAT, BILE ACID, AND STEROL EXCRETION AND BILIARY LIPID CHANGES IN JEJUNOILEOSTOMY PATIENTS. W.W. Faloon, A. Rubulis, J. Knipp, C.D. Sherman and M.S. Flood (Dept. of Med., Highland Hospital and the Univ. of Rochester School of Med. and Dentistry, Rochester, N.Y.) *Am. J. Clin. Nutr.* **30**, 21–31 (1977). Fecal fat, bile acid, and neutral sterol excretion and biliary bile acid, phospholipid, and cholesterol were studied in 36 patients 6 to 12 months after jejunoilestomy for obesity. No relationship was observed between the degree of steatorrhea and weight loss, although fecal fat rose sharply in all except 2 patients. Mean neutral sterol excretion in feces was unchanged after operation except in cholecystectomized patients. No relationship could be demonstrated between serum cholesterol decrease and fecal bile acid, which rose 3-fold, or between cholesterol and the sum of fecal fat and neutral sterol. Fecal excretion of cholic and deoxycholic acid together increased more than the total excretion of chenodeoxycholic and lithocholic acid. Bile saturation ratio and lithogenic index were not consistently changed postoperatively. No clear cut increase in lithogenic potential or in bile acid (lithocholic acid) hepatotoxic potential after jejunoileostomy was demonstrable.

STRUCTURAL ANALYSIS OF PHOSPHATIDYLCHOLINES OF YOSHIDA ASCITES HEPATOMA AND LIVER CELLS FROM HOST RATS FED A CONTROL AND AN ESSENTIAL FATTY ACID-DEFICIENT DIET. A. Fallani, D. Tombaccini and S. Ruggieri (Inst. of Gen. Path., Univ. of Florence, Viale Morgagni 50, Florence, Italy 50134) *Biochim. Biophys. Acta* **450**, 210–24 (1976). In order to study the effect of a dietetic manipulation on the phospholipid molecular structure of a poorly differentiated tumor, the phosphatidylcholines from the Yoshida hepatoma cells (AH130) grown either in essential fatty acid deficient or control rats were analyzed comparatively to those from the host livers. Due to essential fatty acid deficiency, the host rat liver exhibited an increased level of mono-unsaturated 1,2-diacyl-*sn*-glycero-3-phosphocholines, a reduced level of the species contained linoleic acid, and the substitution of tetra- and poly-unsaturated-1,2-diacyl-*sn*-glycero-3-phosphocholines with equivalent amounts of species containing eicosatrienoic acid.

FDA CONSIDERATIONS REGARDING NEW HYPOLIPIDEMIC AGENTS. M.J. Finkel (New Drug Evaluation, Bureau of Drugs, Food and Drug Admin., 5600 Fishers Lane, Rockville, Md. 20852) *Lipids* **12**, 64–5 (1977). Food and Drug Administration policy being considered for new marketed hypolipidemic agents includes: long-term safety to be demonstrated in postmarketing studies; evidence of clinical effectiveness to be demonstrated within a specified time period. Effectiveness is to be judged by one or more of the following: reduction in xanthomata, reduction in atherosclerotic plaque, reduction in morbidity of coronary artery disease or peripheral and cerebral atherosclerosis, and reduction in mortality. Randomized double blind trials are deemed necessary.

RELATIONSHIPS BETWEEN BASE-EXCHANGE REACTION AND THE MICROSOMAL PHOSPHOLIPID POOL IN THE RAT BRAIN IN VITRO. A. Gaiti, M. Brunetti, H. Woelk and G. Porcellati (Dept. of Biochem., The Univ. of Perugia, 06100 Perugia, Italy) *Lipids* **11**, 823–9 (1976). The calcium-stimulated incorporation of ethanolamine, choline and L-serine into rat brain microsomal phospholipids has been investigated. The membranes were prelabeled in vitro in their choline or serine phosphoglycerides by base-exchange and then chasing experiments were done by displacing the lipid-bound base by ethanolamine, choline, or L-serine labeled with a different isotope. The results indicate that membrane phosphatidylcholine is presumably a substrate for the exchange with all the three bases, whereas phosphatidylserine exchanges only with ethanolamine and L-serine but not with choline. A small phospholipid pool (3–7% of the total available pool) is active in the calcium-dependent exchange with choline, ethanolamine, and L-serine. When the microsomal membranes are prelabeled in vitro in their phosphatidylcholine moiety through the cytidine-dependent pathway and then chasing experiments are performed with the three nitrogenous bases, as above, the small phospholipid pool is hardly detectable. In view of these and other results, it is suggested that at least two different pools of phosphatidylethanolamine, phosphatidylserine, and phosphatidylcholine might exist in rat brain microsomes.

VERY LOW DENSITY LIPOPROTEIN. DISSOCIATION OF APOLIPOPROTEIN C DURING LIPOPROTEIN LIPASE INDUCED LIPOLYSIS. M.C. Glangeaud, S. Eisenberg and T. Olivecrona (Lab. of Lipid Res., Dept. of Med. B, Hadassah Univ. Hosp., Jerusalem, Israel) *Biochim. Biophys. Acta* **486**, 23–35 (1977). The fate of apo C in rat plasma very low density lipoprotein (VLDL) during lipolysis was studied using VLDL labeled specifically with ^{125}I-labeled apo C and purified bovine milk lipoprotein lipase. Incubations were carried out in vitro and included serum-containing systems and albumin containing systems. Free fatty acids generation proceeded with time of incubation in the two systems. It, however, was enhanced 1.5–2 fold by the presence of serum. On the basis of these observations, it is postulated that the removal of apo C during lipolysis of VLDL reflects the nature of the partially degarded VLDL particles, and is independent of the presence of a lipoprotein acceptor to apo C.

INHIBITION OF MAMMARY CANCER BY RETINYL METHYL ETHER. C.J. Grubbs, R.C. Moon, M.B. Sporn and D.L. Newton (IIT (Res. Inst., Chicago, Ill. 60616) *Cancer Res.* **37**, 599–602 (1977). Daily feeding of the synthetic retinoid, retinyl methyl ether, beginning one week after the oral administration of 7,12-dimethylbenz(a)anthracene to female Sprague-Dawley rats, inhibited the incidence of mammary cancer and diminished the number of mammary tumors, both malignant and benign, caused by 7,12-dimethylbenz(a)anthracene. Retinyl methyl ether also markedly increased the latent period for appearance of mammary cancers. Retinyl methyl ether caused no evident toxicity and did not affect weight gain in these experiments. This synthetic retinoid was superior to the natural retinoid, retinyl acetate, for inhibition of mammary carcinogenesis.

EARLY CHANGE OF SPECIFIC ACTIVITY OF PLASMA AND RED BLOOD CELL CHOLESTEROL FOLLOWING INTRAVENOUS ADMINISTRATION OF [4-^{14}C]CHOLESTEROL IN MAN. K-J. Ho, K. Biss and C.B. Taylor (Dept. of Pathol., Univer. of Alabama in Birmingham Med. Ctr., Birmingham, Ala. 35294) *Pro. Soc. Exp. Biol. Med.* **153**, 459–63 (1976). The tracer [4-^{14}C]cholesterol, incubated at 37° for 1 hr with the subject's own plasma, was administered intravenously to two subjects. The initial rapid decrease of plasma cholesterol specific activity indicated a net disappearance of [4-^{14}C]cholesterol from the bloodstream, presumably due to phagocytosis of the particulate cholesterol by the reticuloendothelial system. The initially disappeared [4-^{14}C]cholesterol quickly reappeared in the blood. Complete equilibrium between RBC and plasma-free cholesterol was attained within 12–18 hr, whereas the equilibrium between plasma-free and esterified cholesterol required 2 days. Therefore, the compartmental analysis should be based on the plasma total cholesterol specific activity obtained 2 days after the injection.

STUDIES ON PHOSPHATIDYLINOSITOL PHOSPHODIESTERASE (PHOSPHOLIPASE C TYPE) OF BACILLUS CEREUS. I. PURIFICATION, PROPERTIES AND PHOSPHATASE-RELEASING ACTIVITY. H. Ikezawa, M. Yamanegi, R. Taguchi, T. Miyashita and T. Ohyabu (Fac. of Pharm. Sci., Negoya City Univ., Mizuho-ku, Nagoya 467, Japan) *Biochim. Biophys. Acta* **450**, 154–64 (1976). A phosphatidylinositol phosphodiesterase from the culture broth of *Bacillus cereus*, was purified to a homogeneous state as indicated by polyacrylamide gel electrophoresis, by ammonium sulfate precipitation and chromatography with DEAE-cellulose and CM-Sephadex. The enzyme (molecular weight: 29,000 ± 1,000) was maximally active at pH 7.2–7.5, and not influenced by EDTA, *o*-phenanthroline, monoiodoacetate, *p*-chloromercuribenzoate or reduced glutathione. The enzyme specifically hydrolyzed phosphatidylinositol, but did not act on phosphatidylcholine, phosphatidylethanolamine and sphingomyelin, under the conditions examined.

AMINO ACID SEQUENCE OF A MAJOR APOPROTEIN FROM HEN PLASMA VERY LOW DENSITY LIPOPROTEINS. R.J. Jackson, H-Y. Lin, L. Chan and A.R. Means (Depts. of Cell Biol. and Med., Baylor College of Med., Houston, Tex. 77030) *J. Biol. Chem.* 252, 250–3 (1977). The complete amino acid sequence of a major apoprotein from white Leghorn hen plasma very low density lipoproteins has been determined. The apoprotein, designated apoVLDL-II, contains two identical polypeptide chains of 82 amino acid residues each which are linked by a single disulfide bond at residue 76.

ASSAY FOR THE TERMINAL ENZYME OF THE STEAROYL COENZYME A DESATURASE SYSTEM USING CHICK EMBRYO LIVER MICROSOMES. V.C. Joshi, A.C. Wilson, and S.J. Wakil (Marrs McLean Dept. of Biochem., Baylor Col. of Med., Houston, Texas 77030) *J. Lipid Res.* 18, 32–6 (1977). The NADH-dependent stearoyl CoA desaturase of hepatic microsomes (EC 1.14.99.5) is an enzyme system consisting of cytochrome b_5 reductase (EC 1.6.2.2), cytochrome b_5, and the terminal desaturase. We have developed a simple method for routine assay of the terminal enzyme based on complementation of the enzyme with chick embryo liver microsomes lacking desaturase activity. Desaturation of [1-^{14}C]stearoyl CoA by the enzyme-microsome mixture is then assayed by thin-layer chromatography of the reaction products and determination of the amount of oleate formed. Microsomes from the livers of starved-refed rats were used as the source of the stearoyl CoA desaturase. The enzyme alone, solubilized and free from cytocrome b_5 reductase and cytochrome b_5, was unable to catalyze the desaturation of stearoyl CoA. The use of chick embryo liver microsomes in this method eliminates the need to use purified cytochrome b_5 reductase, cytochrome b_5, and liposomes for routine assays and greatly reduces the complexities of timing and order of addition encountered in the existing assays.

MEASUREMENT OF CHOLESTEROL SYNTHESIS IN KINETICALLY DEFINED POOLS USING FECAL STEROID ANALYSIS AND DOUBLE LABELING TECHNIQUE IN MAN. M. Kekki, T.A. Miettinen, and B. Wahlstrom (Sec. Dept. of Med., Univ. of Helsinki, Helsinki, Finland) *J. Lipid Res.* 18, 99–114 (1977). The purpose of the study was to develop a kinetic method for measurement of different parameters of cholesterol metabolism in man using labeled cholesterol precursors that could initially be incorporated even into the slowly exchangeable cholesterol pool. For this purpose, tritiated water and [2-^{14}C]mevalonate were given to five normocholesterolemic subjects and the activities for serum cholesterol and body water were measured serially for up to eight weeks. Elimination of cholesterol was measured by fecal analysis of neutral and acidic steroids. For comparison, two subjects received a mixture of [4-^{14}C]cholesterol and [2-^{3}H]mevalonate. The study with [2-^{3}H]mevalonate and [4-^{14}C]cholesterol indicated synthesis in pool 2 to be 20–22% of the total. Up to 50% of the DL [2-^{14}C]mevalonate dose was incorporated into cholesterol. The fractional incorporation of DL-mevalonate into pool 2 was correlated with that of tritiated water, indicating that both precursors studied yielded essentially the same kinetic result.

EFFECT OF CRUDE FAT AND CRUDE PROTEIN ON REPRODUCTION AND WEALING GROWTH IN FOUR STRAINS OF INBRED MICE. J.J. Knapka, K.P. Smith and F.J. Judge (U.S. Dept. of Health, Education, and Welfare, Nat'l. Inst. of Health, Div. of Res. Ser., Veterinary Resources Branch, Bethesda, Md. 20014) *J. Nutr.* 107, 61–9 (1977). Diets made from natural ingredients were fed to four inbread strains of mice (BALB/cAnN, C3H/HeN, C57BL/6N and DBA/2N) to study the effects of different concentrations of dietary crude protein, 18% with crude fat concentrations of 4%, 8%, and 12% on reproduction and weanling growth. The parameters measured included the number of litters and pups born, the number of litters and pups weaned, weanling mortality and weanling weight. Neither crude protein nor crude fat concentrations had significant effects on any of the reproductive parameters tested. However, a significant fat x protein interaction was observed for reproduction. These results indicate that the absolute concentrations of crude protein and crude fat in diets for inbread mouse production are not as important as the ratio of these two nutrients.

DIET AND CHOLESTEREMIA. D. Kritchevsky (The Wistar Inst. of Anatomy and Biol., 36th St. at Spruce, Philadelphia, Penn. 19104) *Lipids* 12, 49–52 (1977). The statistical correlation between elevated serum cholesterol levels and increased risk of coronary heart disease has channeled thinking towards regarding dietary fat and cholesterol as the principal causes of hypercholesteremia. Since 1909 there have been a number of changes in nutrient availability in the United States. Protein availability is unchanged but the ratio of animal to vegetable protein rose from 1.06 in 1909 to 2.37 in 1972. Fat availability has risen by 26% with the ratio of animal to vegetable fat falling from 4.88 in 1909 to 1.64 in 1972. A review of available data indicates that amount and type of protein may affect cholesteremia and atherosclerosis in experimental animals.

LINOLEIC ACID AMIDES: EFFECT ON CHOLESTEREMIA AND ATHEROSCLEROSIS. D. Kritchevsky, S.A. Tepper, and J.A. Story (The Wistar Inst. of Anat. and Biol., 36th St. at Spruce, Philadelphia, Penn. 19104) *Lipids* 12, 16–21 (1977). Several of a series of linoleic acid amides have been reported to inhibit cholesterol-induced atherosclerosis in rabbits. The three amides which have been studied to the greatest extent are (in order of increasing activity) N-cyclohexyl linoleamide (AC23), N(α-methylbenzyl) linoleamide (AC223), and N[α-phenyl-β-(p-tolyl) ethyl] linoleamide (AC485). We have found AC223 to inhibit cholesterol absorption in rats and to slightly inhibit exogenous but not endogenous cholesteremia in rabbits. In a fiber-free diet, AC223 reduces serum cholesterol and liver triglyceride levels. Rats were also fed a basal semipurified diet with and without AC223. Fecal excretion of labeled exogenous (as [^{14}C]cholesterol) or endogenous (as [^{14}C]mevalonolactone) steroid was 44 and 43% higher in drug treated groups. The mechanism of hypocholesteremic action of the linoleamides appears to involve inhibition of cholesterol absorption.

FATTY ACID COMPOSITION OF ADIPOSE TISSUE IN PATIENTS WITH CORONARY HEART DISEASE. P.D. Lang, M. Degott and J. Vollmar (Klinsches Inst. for Herzinfarktforschung, Dept. of Med., Heidelberg Univ., Bergheimer St. 58, D-6900, Heidelberg, W. Germany) *Atherosclerosis* 26, 29–39 (1977). In order to study the relationship between the fatty acid composition of adipose tissue and coronary heart disease (CHD), 34 consecutive male patients with acute myocardial infarction and 33 hospitalized men free of CHD were compared. Patients with diabetes mellitus, endocrine disorders, liver and kidney diseases, recent changes in body weight and deviations from the "normal", customary diet were excluded. A statistically significant difference between the two groups was observed only in stearic acid, its proportion being lower in CHD patients (3.25% vs. 4.13%). Using multivariate discriminant analysis, age discriminated best between the groups, followed by stearic acid. The signs observed were positive for the former and negative for the latter. All other acids, relative body weight, and skinfold measurements did not significantly contribute to the discrimination. Age did not correlate with the proportion of stearic acid. Blood lipids from samples taken within 24 hr of admission did ont significantly differ between the groups. Three months later they had risen considerably in the infarct patients. The metabolic basis of the relationship between CHD and stearic acid is not clear at present. Additional studies are necessary to substantiate the importance of this acid as an indicator of CHD.

LECITHIN:CHOLESTEROL ACYL TRANSFERASE ACTIVITY IN THE SERUM OF RATS FED SATURATED AND UNSATURATED FATS. P.W. Larking and W.H.F. Sutherland (Dept. of Med., Otago Univ. Med. School, P.O. Box 913, Dunedin, New Zealand) *Atherosclerosis* 26, 225–32 (1977). Groups of rats were fed diets containing either butter, beef fat or safflower oil. After 20 or 70 days of feeding, blood was taken from the animals in a postabsorptive state. Serum lipid levels and lecithin:cholesterol acyl transferase activity were measured. Feeding the different fats did not alter serum total cholesterol levels but free cholesterol and triglycerides were significantly lower in the safflower oil-fed group. Net cholesterol esterification in vitro was also significantly depressed in the safflower oil-fed group and this was shown to be due to the inability of the lipoprotein substrate to support the reaction rather than because of low LCAT enzyme activity.

RIBOSOMAL-ASSOCIATED PHOSPHATIDYLSERINE SYNTHETASE FROM ESCHERICHIA COLI: PURIFICATION BY SUBSTRATE-SPECIFIC ELUTION FROM PHOSPHOCELLULOSE USING CYTIDINE 5′-DIPHOSPHO-1,2-DIACYL-SN-GLYCEROL. T.J. Larson and W. Dowhan (Dept. of Biochem. and Mole Biol., Univ. of Texas Med. School, Houstin, Tex. 77025) *Biochemistry* 15, 5212–8 (1976). Cytidine 5′-diphospho-1,2-diacyl-*sn*-glycerol (CDPdiglyceride): L-serine *O*-phosphatidyltransferase (EC 2.7.8.8, phosphatidylserine synthetase) is bound tightly to the ribosomes in crude extracts of *Escherichia coli*. After separation of the enzyme from the ribosomes by the method of Raetz and Kennedy, we have purified the enzyme to 97% of homogeneity. The major portion of the overall 5500-fold purification was attained by substrate-specific elution from phosphocellulose using CDP-diglyceride in the presence of detergent. The purified enzyme migrated as a single band with an apparent minimum molecular weight of 54,000 when subjected to electrophoresis on polyacrylamide disc gels containing sodium dodecyl sulfate.

Changes in the concentration of fatty acids from the nonpolar phospho- and glycolipids during storage of intact lamb muscles. C.R. Lazarus, J.C. Deng and C.M. Watson (Dept. of Animal Sci., Univ. of Florida, IFAS, Gainesville, Fla. 32611) *J. Food Sci.* **42**, 102–7 (1977). Lean lamb muscle tissue from the longissimus and semitendinosis was removed from intact chilled carcasses at 0, 1, 4, 7 and 9 days postmortem. Following separation of the lipids by silicic acid column chromatography, fatty acid methyl esters of the nonpolar, phospho- and glycolipid fractions were identified by gas chromatography. Lamb longissimus had significantly ($P < 0.05$) more nonpolar lipid percentage than the semitendinosus, while phospho- and glycolipid content was similar ($P > 0.05$). Analysis of variance of the data based on grams fatty acid per 100 g tissue resulted in more significant differences between muscles and storage periods than when the data analyzed on a percent of total fatty acids.

Intravenous fat tolerance. Correlation with very low density lipoprotein apoprotein B kinetics in man. A. Nicoll, G. Sigurdsson, A. Marsh and B. Lewis (Dept. of Chem. Path., St. Thomas's Hosp. Med. Sch., London SE 1, Great Britain) *Atherosclerosis* **26**, 17–22 (1977). The intravenous fat tolerance test (IVFTT) has been introduced as a measure of the fractional catabolic rate of the endogenous triglyceride of plasma. To assess the validity of this test we have compared this test in 21 normal and hyperlipidaemic subjects with direct measurement of the fractional catabolic rate of autologous radio-iodinated VLDL. There was a strong positive correlation between the rate constant K_2 of the IVFTT and the fractional catabolic rate of VLDL-apolipoprotein B ($r = +0.87$). The two rates were considerably different in magnitude. The IVFTT appears to be a valid index of the fractional catabolic rate of VLDL. Its limitations and uses are discussed.

Inhibition of glycolysis in brain by a phospholipid effect on interconversion of fructose phosphates. A possible regulatory control on utilization of glucose 6-phosphate. A.L. Majumder and F. Eisenberg, Jr. (Lab. of Biochem. and Metabolism, Nat'l. Inst. of Arthritis, Metabolism and Digestive Diseases, Nat'l. Inst. of Health, Bethesda, Md. 20014) *J. Biol. Chem.* **251**, 7149–56 (1976). Glucose 6-phosphate accumulation in $10,000 \times g$ supernatant of rat brain was enhanced up to 16-fold by the addition of phosphatidylcholine, other common phospholipids, or linoleate. This glucose 6-phosphate is of endogenous origin via UDP-glucose and glucose 1-phosphate but not glucose. The accumulation is the result of inhibition of glycolysis by an effect of phospholipid on the interconversion of fructose 6-phosphate and fructose 1,6-biphosphate. Brain is therefore capable of gluconeogenesis from fructose 1,6-biphosphate. A regulatory function for phospholipid which coordinates glycolysis and other major routes of utilization of glucose 6-phosphate in brain, e.g. inositol synthesis, is proposed.

Interaction of apoliprotein C-III with phosphatidylcholine vesicles. Dependence of aproprotein-phospholipid complex formation on vesicle structure. J.D. Morrisett, H.J. Pownall and A.M. Gotto, Jr. (Div. of Athero. and Lipoprotein Res., Dept. of Med., Baylor Col. of Med. and The Methodist Hosp., Houston, Texas 77030) *Biochim. Biophys. Acta* **486**, 36–46 (1977). We have studied the interaction of an apolipoprotein from human very low density lipoproteins (apoC-III) with egg yolk phosphatidylcholine in the form of single- and multi-bilayer vesicles. The reactivity of single-bilayer vesicles with apoC-III$_1$ appears to be greater than that of the multibilayer vesicles according to several thermodynamic and spectroscopic criteria. In the complexes formed by the association of apoC-III with single-bilayer vesicles, the α-helical content of the peptide backbone and the apolarity of the environment around the tryptophan residues are greater than that observed in the complexes formed with the multibilayer vesicles. A higher yield and more homogeneous density distribution of lipid-apoprotein complexes results from the interaction of apoC-III with the single-bilayer vesicles relative to those obtained with the multibilayer vesicles.

The time course of metabolic changes induced by dietary cholesterol in guinea pigs. R. Ostwald, W. Yamanaka, M. Light and J. Kroes (Dept. of Nutr. Sci., Univ. of Calif., Berkeley, Calif. 94720) *Atherosclerosis* **26**, 41–53 (1977). The time course of the effects of dietary cholesterol on the lipid composition of liver, plasma and red cells of guinea pigs, of the pathological changes of tissues and of hematological parameters was studied. The purpose was to identify the primary injury and so to contribute to the eludication of the mechanism(s) for the development of the hemolytic anemia observed in this species after long-term cholesterol supplementation. The results showed that the initial effects observed within 1 week occur in the liver lipids and histology accompanied by changes in plasma and RBC lipids. These events were followed by further, slower increases of tissue lipids without major qualitative changes. The earliest signs of an anemia were observed between weeks 5 and 7. We conclude that the primary insult of cholesterol is liver damage leading to the production of abnormal plasma lipoproteins which in turn cause a net increase of RBC-cholesterol that is accompanied by their morphological abnormalities. The hemolytic anemia does not seem to be caused directly by either the altered composition of RBC nor their altered morphology.

Effects of colestipol hydrochloride and neomycin sulfate on cholesterol turnover in the rat. W.A. Phillips and G.L. Elfring (The Upjohn Co., Kalamazoo, Mich. 49001) *Lipids* **12**, 10–5 (1977). Three groups of male rats were fed diets containing the bile acid sequestrant colestipol hydrochloride (1%), neomycin sulfate (0.25%), or basic diet during the test. After 15 days, each rat was injected IV with 3.9 μCi cholesterol-1,2-^{3}H complexed with serum lipoproteins; specific radioactivity of the total serum cholesterol was measured at several time intervals for a period of 7 weeks. Computer analysis of the data indicated that the turnover of cholesterol could best be fitted by a three-pool model. In pool 1, colestipol HC1 caused a significant increase in production rate (10.99 to 15.96 mg/day) and the excretion rate constant (0.53 to 0.79 day^{-1}) of cholesterol without significantly altering the size of the pool or serum cholesterol concentrations. These results are compatible with an agent capable of binding bile acids in the rat but do not cause a decrease of the sterol pool because of an adequate compensatory increase in cholesterol biosynthesis. Neomycin SO_4 caused a significant reduction in serum cholesterol (9%) without altering turnover parameters and apparently exerts its hypocholesterolemia by some mechanism other than bile acid sequestration.

Carbon-13 NMR studies on cholesterol biosynthesized from [^{13}C]mevalonates. G. Popják, J. Edmond, F.A.L. Anet, and N.R. Easton, Jr. (Dept. of Biol. Chem., School of Med., Univ. of Calif., Los Angeles, Los Angeles, Calif. 90024) *J. Am. Chem. Soc.* **99**, 931–5 (1977). Two specimens of [^{13}C] cholesterol, one biosynthesized from [5-^{13}C]mevalonate and the other from [3′,4-$^{13}C_2$]mevalonate, were examined by Fourier transform ^{13}C NMR spectroscopy. The observations confirmed the biochemically predictable positions of ^{13}C labels in cholesterol and provided also an unambiguous proof of the assignments of the ^{13}C resonances for 16 of the 27 carbon atoms in the ^{13}C NMR spectrum of cholesterol. New and additional evidence is provided for a 1:2 methyl shift, from position 14 to 13, during the cyclization of squalene oxide to lanosterol. The stereochemistry of the reduction of the 24(25) double bond in the side chain of lanosterol (or of desmosterol), determined by others, and the magnetic nonequivalence of C-26 and C-27 in cholesterol led to the assignment of the resonance at 22.9 ppm downfield from the reference to C-27 (derived from C-3′ of mevalonate), the pro-(*S*)-methyl group attached to C-25. The resonance of C-26, the pro-(*R*)-methyl group attached to C-25, originating from C-2 of mevalonate, is at 22.7 ppm downfield from the reference. One-bond (sp^3) and triple-bond (vicinal) ^{13}C–^{13}C coupling constants are also reported.

Composition-structure-function correlations in the binding of an apolipoprotein to phosphatidylcholine bilayer mixtures. H.J. Pownall, J.D. Morrisett and A.M. Gotto, Jr. (Dept. of Med., Baylor Col. of Med. and The Methodist Hosp., Houston, Texas 77030) *J. Lipid Res.* **18**, 14–23 (1977). We have studied the lipid binding of apoC-III with two types of mixed vesicles of DMPC (dimyristoyl phosphatidylcholine) and DPPC (dipalmitoyl phosphatidylcholine). DMPC vesicles mixed with those of DPPC produce a macroscopic mixture in which the DMPC and DPPC vesicles remain intact.

The circular dichroism and fluorescence spectra of apoC-III in the presence of this macroscopic mixture exhibit major changes near the transition temperature of each of the pure lipids, confirming the independent existence of the two PC's. Combining DMPC:DPPC macroscopic mixtures with apoC-III above the transition temperature, T_c 23°C, of DMPC produces an isolatable complex consisting of 4:1 DMPC:DPPC. If the DMPC and DPPC are within the same vesicle, this microscopic lipid mixture has properties that are functions of the temperature and lipid composition. The temperature dependence of the binding of apoC-III to the microscopic mixtures may be due to phase separation or to cocrystallization; our data support the latter process.

EFFECT OF FLUOTIDE ON THE SERUM LIPIDS OF GUINEA PIGS. D. Townsend and L. Singer (Dept. of Biochem., 227 Millard Hall, Univ. of Minn., Minneapolis, Minn. 55455) *J. Nutr.* 107, 97–103 (1977). The effects of fluoride intake on the serum lipids of guinea pigs were determined in animals provided with either high or low levels of fat in their diet and fluoride in their drinking water. Evidence of the difference in fluoride intake were reflected by serum fluoride contents. The results suggested that, in guinea pigs receiving excess dietary cholesterol, an inadequate fluoride intake is reflected in increased serum cholesterol. Fluoride intake also influenced the serum triglyceride levels, but the direction of the response was dependent on the amount of dietary fat. Serum free fatty acids and phospholipids were not influenced by fluoride intake.

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