Abstracts

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

• Drying Oils and Paints

Coating composition. W.S. Briggs (Georgia-Pacific Corp.). *U.S. 4,017,430.* The composition comprises a reaction product of a polyunsaturated carboxylic acid having 5-22 carbon atoms and a phenolated-lignosulfonate. The reaction is carried out until a substantial proportion of the carboxyl groups of the acid react with the phenol hydroxyl groups of the phenolated-lignosulfonate. The latter compound is obtained by reacting a phenol with the lignosulfonate.

• Detergents

Bleaching composition. W.J. Bradley (Procter & Gamble). *U.S. 4,017,412.* A fabric bleaching composition with a viscosity of 200-100,000 cps comprises 5-35% of a solid, water insoluble peroxygen compound selected from the group consisting of diperazelaic acid, diperbrassylic acid, dipersebacic acid, and diperisophthalic acid; a starch thickening agent; and a liquid carrier.

Process for making variegated soap. H.H. Joshi (Colgate-Palmolive Co.). *U.S. 4,017,573.* The process comprises supplying a base soap material to the first barrel of a double barrel plodder. A colored material consisting of a liquid oil vehicle and a water soluble dye is added into the vacuum chamber separating the two barrels and mixed with the base soap material in the lower barrel to form a multicolored soap mass. The mass is extruded to form a billet, subdivided into bars, and pressed into the desired final shape.

Process for making variegated soap. H.H. Joshi (Colgate-Palmolive Co.). *U.S. 4,017,574.* The process is the same as described in *U.S. 4,017,573.* The colored material which is added into the vacuum chamber consists of a melted, wax or wax-like material with a melting point above 100 C, and a water soluble dye.

Liquid household cleaner. E.M.A.A. Demessemaekers, G. Bognolo, and G.L. Spadini (Procter & Gamble). *U.S. 4,017,409.* The composition consists of (a) 2–15% of a mixture of an anionic, organic, synthetic sulfonate and an anionic, organic sulfate; (b) 3-7.5% of a builder salt, (c) 0.3-3% of a suds depressing system comprising a fatty acid ester and sodium, potassium, or ammonium soap of a fatty acid; and (d) water.

Novel organopolyphosphates in aqueous cleaning compositions. D. Connor, M.Y. Groes, F. Cuciti, and E.J. Lowe. *U.S. 4,014,806.* The composition consists of 10% dodecyl benzene sulphonic acid, 6% triethanolamine, 3% monoethanolamine, 2.7% of a 27% aqueous solution of ethoxylated sodium lauryl sulphate, 4% coconut fatty acid, 6% of a polyphosphate consisting of 36.75% P_2O_5 and 63.25% monoethanolamine, 2% polyglycol condensate, and the remainder water. The polyphosphate is obtained by forming an aqueous polyphosphoric acid solution comprising 82-86% P_2O_5 and reacting the solution with monoethanolamine at pH 4–12 and 15–70 C.

Heavy duty dry biodegradable detergent composition. H.E. Wixon (Colgate-Palmolive Co.). *U.S. 4,013,577.* The composition, which is devoid of phosphate and nitrogenous builders, consists of 8-30% anionic synthetic detergent salt; 30-70% builder salt selected from silicates, carbonates, oxydiacetates, and/or citrates; 0-5% alkali metal soap, and 10-50% filler.

Toilet soap trends worldwide. P. Midwood (Proprietary Perfumes, Ltd., Maywood, N.J.). *Soap, Cosmet., Chem. Spec.* 53(3), 32-8, 62-4 (1977). Basic brand positioning in six categories is reviewed. The categories are deodorancy, freshness, natural freshness, family, beauty/skin care, and indulgence. Although toilet soap is presently a declining market, the personal cleanliness market, taken as an entity, appears to be one of opportunity. Increasingly, toilet soaps are moving away from their household product image and into the toiletry area.

Utilization of a Type A zeolite as a laundry detergent builder. A.C. Savitsky (Procter & Gamble, Cincinnati, Ohio). *Soap, Cosmet., Chem. Spec.* 53(3), 29-31, 64-6. The focus of this paper is on characteristics of the zeolite, which is a crystalline sodium aluminosilicate ion exchanger, as they relate to laundry product applications. Chemical and physical properties of the zeolite are first discussed, followed by evaluation of its ion exchanging capabilities. While formulas built with zeolite alone are deficient to current phosphate based detergents, particularly at medium and high hardness conditions, performance parity can be achieved through co-building with lower levels of phosphate. Particle size considerations, especially with reference to deposition on clothes and removal during waste water treatment, indicate an optimum size of 1–10 microns. Results from safety testing have been encouraging and indicate that Type A zeolite formulations compare favorably with STP built formulations.

Detergents—1985. H.J. Schneider (Rohm and Haas Co., Spring House, Pa.). *Soap, Cosmet., Chem. Spec.* 53(3), 40-2, 121, (1977). This article is a forecast for detergents and disinfectants in 1985. First, conclusions gleaned from the literature are summarized; then some evidence and opinions pro and con are related. Finally, the author discusses whether these conclusions are really the predictions those in the industry want to happen. The conclusions are: I. No radically new surfactants will come into widespread use. II. The relative dominance of phosphate builders will not be seriously challenged. III. The growth rate of surfactants will be lessened by innovations in mechanical and quasi-mechanical cleaning techniques. IV. Attacks by environmental groups on standard, long-used products will decrease as industry self-control grows with regulatory concurrence.

Hydrophilic-lipophilic balance and surface film state of nonionic surfactants. L. Marszall (Pharmacy No. 62, Nowe k/Swiecia, Poland). *Colloid Polym. Sci.* 255(1), 62-4 (1977). The polarographic study on the effect of nonionic surfactants on the damping of oxygen maximum confirms the validity of Van Voorst Vader's rule and a major part which the hydrophilic-lipophilic balance plays of surfactant molecules in surface phenomena. On this basis the simple relationships are presented between the molecular area in surface film (A) and Griffin's and Davies' HLB. It is shown that at a specific pressure the A increases with increasing HLB values for homologous series of nonionic surfactants. The limitations of the validity of the relations derived with respect to the specific surface pressure chosen are also considered.

Studies on the adsorption of some cationic detergents on the sodium benzyl-penicillin stabilized oil-in-water emulsion. M.K. Sharma and S.N. Srivastava (Chem. Labs., Agra College, Agra, India). *Colloid Polym. Sci.* 255(1), 45-9 (1977). The adsorption studies of cationic detergents on the lowering of interfacial tension of toluene (weighted by chloroform)/water system in the presence of sodium benzyl-penicillin have been made and from the data, the amount of the cationic detergents adsorbed per unit area of the surface has been calculated with the help of the Gibbs equation.

Dielectric behavior in low frequencies of emulsions of the oil/water type. M. Clausse. *Colloid Polym. Sci.* 255(1), 40-4 (1977). From a numerical analysis of Hanai's formula, it is possible to show that oil/water type emulsions exhibit a Cole-Cole type dielectric relaxation which is hardly noticeable experimentally, owing to its weak intensity. To illustrate this point, results are reported which concern benzene-in-water and nujol-in-water emulsions.

Mixing and agitating with special allowance for products containing surface active agents. H. Bock. *Seifen, Ole, Fette, Wachse* 103(2), 39-41 (1977). The particulars stated with regard to agitation of products containing surfactants show the connections between the agitators on the one hand and the agitator vessels and prescriptions on the other. Reasons are stated to support the decision in favor of high-speed agitators.

The marked viscosity depressions of 50 wt% titanium dioxide suspensions by additions of anionic surfactants. N. Moriyama (Ind. Res. Labs., Kao Soap Co., Wakayama-shi, Japan). *Colloid Polym. Sci.* 255(1), 65–72 (1977). The effects of various types of anionic surfactants on the apparent viscosities of 50 wt% titanium dioxide suspensions are examined. The additions of surfactants to the suspensions depress the apparent viscosities from the values of more than 10,000 centipoise (c.p.) to those of about 10 c.p. The concentration of surfactants required to depress the apparent viscosity, which is designated as C_o, increases with decreasing alkyl chain length of anionic surfactants and the degree of condensation of formalin condensates. The surfactants having large critical micelle concentrations, on the other hand, have not the marked viscosity depression effects. Both the absolute value of zeta potential and the amount of adsorption increase remarkably with their concentration up to somewhat higher concentrations than the C_o and then they become almost constant. The marked viscosity depression data are closely related to the zeta potential and to the stability data of 1 wt% pigment suspensions.

Some experiments on detergency in aqueous and non-aqueous media. IX. A comparison of laboratory and machine tests on the influence of surfactant concentration in two-phase (emulsion) cleaning. S.V. Vaeck, D. Toureille, J. Constant and W. Verleye (CENATRA Laundering and Drycleaning Inst. B 2000 Antwerp). *Tenside Deterg.* 14(1), 15–8 (1977). As a check on the validity of laboratory experiments in predicting practical results in two-phase (emulsion) cleaning, the influence of the concentration of a surfactant on soil removal and redeposition was studied both by means of laboratory tests and by means of tests in a full-size commercial machine. It was found that the curves representing soil removal or redeposition as a function of surfactant concentration were similar in laboratory and practical tests for most kinds of soils and fabrics, but that they rarely coincide exactly. The reason for this must be sought in the differences in liquor ratio which result in different relative proportions of surfactant and/water distributed between fabric and emulsion, even if the initial composition of the emulsion is identical.

Solved and unsolved questions relating to the ecology of detergents and cleaners. P. Berth, W.K. Fischer and R. Schmid (Henkel & Cie. GmbH, Düsseldorf, Germany). *Tenside Deterg.* 14(1), 1–3 (1977). Demands of the ecological harmlessness of detergents and cleaners are subject to a dynamic process. The industry understands these changes as a challenge for the development of new and better products. The solved questions include the primary degradability of surfactants as well as the ecological assessment of phosphates and perborate. Unsolved questions include the continuing biological degradation up to complete mineralization, as well as the question of metabolites of surfactants. Another problem that has not yet been satisfactorily solved is the contribution towards entrophication of surface waters through detergent phosphates. The solution of outstanding problems overtaxes the capacity of individual industrial companies as well as that of research institutes and authorities and collaboration between the state, science and industry is the only way out.

Adsorption of alkylphenol-oxypolyethylene oxides on pyrogenic silicon dioxides and on surface treated silicon dioxides in aqueous dispersions. H.-P. Seng and J.-J. Sell (Fraunhofer-Gesellschaft, Inst. for Interfacial- and Biotechnics, Stuttgart). *Tenside Deterg.* 14(1), 4–11 (1977). The adsorption of detergents on dispersed Aerosil has been determined from the dependence of the surface tension of aqueous solutions on the concentration of the detergent. Adsorption isotherms in aqueous solution have been obtained for a series of nonionic detergents having various chain lengths of the type

$$C_nH_{2n+1}\text{—} \qquad\qquad \text{—}O\text{—}[CH_2CH_2O]_m\text{—}H$$

which were adsorbed on Aerosil 200 and on surface-modified Aerosil 200. The results show that an adsorbed film is produced and give indications about its structure.

Application of radiotracer technics for the study of the role of phosphate ions in cationic flotation of calcite. S.F. Estefan and T.A. Bibawy. *Tenside Deterg.* 14(1), 12–4 (1977). The flotation behavior of calcite in the presence of phosphate ions was investigated through cationic flotation of the mineral at different pH values. Adsorption tests and electrokinetic potential measurements revealed that phosphate ions are specifically adsorbed on calcite mineral whereas no significant adsorption of these ions could be detected on the gangue mineral quartz. The electrokinetic index and the adsorption density were correlated with the flotation response of calcite. The role played by the pH of the system was elucidated.

Thermodynamics of micellar solubilization of various water-insoluble dyes. K.S. Birdi and T. Magnusson (Fysisk-Kemisk Inst., Tech. Univ, Lyngby, Denmark). *Colloid Polym. Sci.* 254(12), 1059–61 (1976). A linear relation between the free energy of micellar solubilization, ΔG_s, and surfactant alkyl chain length is shown. This relation is found to be valid for various water-insoluble dyes in different homologous series of surfactants. It is further shown that the change in ΔG_s, per added CH_2 group is constant in these various systems, within the experimental accuracy.

Sodium-aluminum-silicates in the washing process. I. Physico-chemical aspects of phosphate substitution in detergents. M.J. Schwuger and H.G. Smolka (Henkel & Co. GmbH, Düsseldorf, Germany). *Colloid Polym. Sci.* 254(12), 1062–9 (1976). The action of water-soluble complexing agents in the washing process is determined by specific interface effects on the fiber and soil, together with the complexing of multivalent metal ions from the water. A fraction of the complexing agent can be replaced by water-insoluble, inorganic ion-exchangers of the Na-Al-silicate type, possessing suitable particle sizes ($< 50\ \mu$). In addition to a binding ability for multivalent metal-ions, Na-Al-silicates have the following advantageous properties for the washing process: adsorbents for monomolecularly dispersed, water-soluble dirt molecules, heterocoagulants for colloidally dissolved pigment dirt, substrates for sparingly soluble salts. According to present experience, water-soluble complexing agents are also necessary to alter the interface energy at the interfaces dirt/water and fiber/water. By means of a carrier effect, water soluble complexing agents are able to accelerate the carry-over of multivalent metal ions from the fiber/dirt combination onto the heterogeneous inorganic ion-exchanger. As various types of Na-Al-silicates are important constituents of the earth crust, the use of special types of Na-Al-silicates in laundering might be called "washing with activated dirt."

• Fats and Oils

Modern methods of processing soya beans. M. Singer (Bucharest, Rumania). *Seifen, Ole, Fette, Wachse* 103(2), 31–3 (1977). The soya bean processing method and enrichment of the albumen content in the grits are described.

Chlorinated long-chain fatty acids. Their properties and reactions. IX. The kinetics and stereochemical course of the neutral and the base-promoted dehydrochlorination of sodium erythro- and threo-9(10)-chloro-10(9)-hydroxyoctadecanoates. M.L. Kalevipihlaja and M. Ketola (Department of Chemistry, University of Turku, SF-20500 Turku 50, Finland) Acta Chem. Scand., Series B 30, 953–6 (1976). The base-promoted and neutral dehydrochlorination of sodium *erythro*- and *threo*-9(10)-chloro-10(9)-hydroxyoctadecanoates in water has been studied. The appreciable contribution of the neutral reaction was taken into account by determining the rate coefficient for this and for the base-catalysed reaction simultaneously. The observation that the different reaction rates of the diastereoisomers are mainly due to the differences in the ground state energies of their *anti* conformations [$k_{erythro}/k_{threo} = 4.3 \pm 0.6$ (k_{OH}) and 2.3 ± 0.7 (k_o) and 4.5 (est.) at 298 K] confirmed the postulation that the reaction is stereochemically a *trans* process.

A method for the rapid determination of trace organic halogens in lipids. R.H. White and L.P. Hager (Department of Biochemistry, University of Illinois, Urbana, Illinois 61801) *Anal. Biochem.* 78, 52–6 (1977). Analytical methods have been developed for the rapid determination of trace lipid-soluble organic halogenated compounds in biological materials. Biological samples are extracted with a methanol-toluene mixture and, after partitioning with water to remove the inorganic halogens, the resulting toluene layers are assayed for their halogen content. A specifically designed instrument is described for the determination of total halogens (Cl, Br, and I) and the bromine content of these toluene extracts. Lipid-soluble organic halogen concentrations down to 1 μg/g wet weight of tissue were routinely assayed by the methods described.

TRANSPORT AND FATE OF PLASMA LIPIDS IN A NORMAL MAN. J.C. Fruchart and G. Sezille. *Rev. Fr. Corps Gras*, 24(3), 151–59 (1977). Lipoproteins are divided into different classes (chylomicrons, VLDL, LDL, HDL and VHDL) according to several criteria: content in lipids, density, molecular size, mobility. The distribution of some lipoproteins depends on the age, sex and edible diet, while others (HDL) are stable for every man. The biosynthesis and secretion of lipoproteins are investigated in the two implicated organs: intestine and liver. Then, the three processes occuring in lipoproteins catabolism are reviewed.

WATER POLLUTION IN FATS AND OILS INDUSTRY AND PARTICULARLY IN INDUSTRIAL LIPOCHEMISTRY. P. Droste. *Rev. Fr. Corps Gras*, 24(3), 161–6 (1977). The technology of fats and oils and of lipochemistry is characterized by several specific water pollution problems which need the use of special methods of epuration. First, the main sewages polluted coming from a lipochemistry plant are reviewed: raw materials treatments, hydrogenation, fat-splitting, fatty acids distillation, separation or purification, esterification, glycerol purification, etc. Then, some practical examples of purification are given for the different effluents. Some practical examples of purified-water recirculation are described.

HORIZONTAL CENTRIFUGAL SEPARATORS WITH SCREW CONVEYOR. T. Bardon and A. Leveque, *Oléagineux*, 32(2), 65–9 (1977). The horizontal centrifugal separator with a screw conveyor for sediment has brought a new solution to separating problems thanks to its absolutely continuous operation and the possibility of discharging high-dryness solids on the one hand and a well-clarified liquid on the other. In vegetable oil mills, the process of clarifying press oils with a horizontal separator is almost universally used. Different methods are adopted according to the final destination of the oil.

OUTLOOKS FOR TECHNOLOGY OF VEGETABLE OILS. J. Hollo. *Rev. Fr. Corps Gras.* 24(3), 137–43 (1977). Quantitative and qualitative problems related to production and refining of vegetable oils as well as general outlooks of technology are reviewed. The continuous production, energy expenditure, problem of automatization and environmental protection are emphasized.

NEW VISTAS AND OPPORTUNITIES FOR ANIMAL FATS. W.R. Boehme. *Rev. Fr. Corps Gras*, 24(3), 145–50 (1977). The author reviews the uses to which inedible animals fats are put today. A resurgence of interest in the use of animal fats for the manufacturing of soaps has taken place in recent years. Lime soap dispersant agents (LSDA) prevent the precipitation of Ca and Mg salts of the long chain fatty acids when used in hard water, so that the presence of phosphates is not necessary. Tallow methylsulfonate and tallow alkanolamide sulfate are both, good detergents and LSDA. Their cost is low. LSDA are now under investigation, which, when added to tallow soap will sequester Ca and Mg soaps. A detergent formulation using tallow methyl sulfonate as LSDA was tested commercially and found satisfactory. New uses for oxidation products (dibasic acids) of long chain fatty acids have been discovered, for example as lubricants or as plasticizers.

CREATION OF GENETIC VARIABILITY BY RECOURSE TO IRRADIATION IN GROUNDNUT (ARACHIS HYPOGAEA L.). P.S. Reddy, M.V. Reddi, B. Thammi Raju and S. Mahaboob Ali. *Oléagineux* 32(2), 59–63 (1977). The effect of irradiation with 40 Kr gamma rays, on six genotypes of groundnut viz., Ah. 817 (Spanish), E. C. 21137-1 (Valencia), 69-102, M.K. 37 (both Virginia bunch) and M.13 and Robout 33-1 (both Virginia runner), was studied. The germination of seeds and survival of seedlings were drastically reduced in the treated cultures of Virginia bunch and Virginia runner groups while the genotypes of Spanish and Valencia groups suffered less damage. In the M_2 generation of Ah.817, E.C.21137-1 and Robout 33-1, mutants falling under seven morphological groups were observed. The mutation rate per M_1 plant progeny ranged from 43.04 to 52.23 p. 100. The range, mean and coefficient of variability were studied for thirteen morphological attributes in the mutants. Significant variation was observed in several traits, suggesting the possibility of creating desired genetic variability in groundnut by recourse to irradiation. The mutants with improved economic characters are under further investigation.

PROCESS FOR MEASURING TRI-, DI-, AND MONOGLYCERIDES. E.S. Chang (Miles Labs., Inc.). *U.S. 4,014,744.* In the process for measuring triglycerides in a fluid by saponifying the glycerides with ethanol-potassium hydroxide, there is claimed the improvement of carrying out the saponification at 35–40 C.

MARGARINE FAT BLEND. H.R. Kattenberg and C. Poot (Lever Bros. Co.). *U.S. 4,016,302.* The fat blend contains 30–80% palm based fat selected from hydrogenated palm oil, unhydrogenated palm oil, and solid and liquid fractions of palm oil. 15–85% of the palm based fat is co-randomized with one or more non-palm based fats and liquid oils of which at least 90% of the triglycerides contain fatty acids of mean chain length 44/3 and higher, to provide 25–98% of co-randomized constituents of the fat blend. The fat blend has a ratio of 1,3-dipalmitoyl-2-cis-mono- and polyunsaturated fatty acid triglycerides to 1,2-dipalmitoyl-3-cis-mono- and polyunsaturated fatty acid triglycerides of less than 2.8. The content of fatty acid triglycerides having three saturated fatty acids of mean chain length 44/3 or higher is greater than the content of dipalmitoyl-cis-mono- and polyunsaturated fatty acid triglycerides minus 8%.

HIGH SURFACE AREA CATALYST COMPOSITIONS. J.H. Tebben and C.A.M. Weterings (Stamicarbon B.V.). *U.S. 4,014,818.* A supported nickel catalyst composition for hydrogenating oils, fats, and fatty acids comprises silica as the supporting material and free metallic nickel. The silica is prepared by acidifying alkali water glass followed by spray drying of the silica. The carrier is mixed with water and a water soluble nickel salt. An insoluble nickel salt is formed on the carrier by increasing the concentration of hydroxyl ions in the solution after which the nickel compound is reduced to form the catalyst.

NICKEL CATALYST. J.H. Tebben and C.A.M. Weterings (Stamicarbon B.V.). *U.S. 4,014,819.* A process for preparing a nickel catalyst precipitated on a silica carrier comprises measuring the pH of a mixture of the silica carrier in water, adding a water soluble nickel salt and urea to the mixture to precipitate an insoluble nickel salt on the carrier at 50 C followed by reduction of the nickel. The amount of urea added to the mixture of silica, water, and soluble nickel salt satisfies the equation $U = f \sqrt{Ni}$. U = urea concentration, Ni = nickel ions concentration, f = a factor varying between 75/pH and 175/pH, and pH = the pH value of the suspension of the silica in the water. In the finished catalyst, the specific nickel surface area is between 120 and 180 m^2/g.

DETERMINATION OF STEROLS IN FATS AND OILS. T. Tamura et al. (College of Science and Technology, Nihon University. Tokyo) *Yukagaku* 25(12), 39–45 (1976). Methods for the determination of sterols in edible oils and fats were studied. The sterols were isolated and analysed by the method of thin layer chromatography or digitonin precipitation, coupled with gas liquid chromatography, respectively, with using cholesterol or β-sitosterol as an internal standard. Quantitative determination of sterols was made by cutting off the peaks of cholesterol and phytosterol on the recorded papers from the gas chromatograms recorded with and without the presence of the internal standard, and followed by calculation of the changes in the peak weight caused by the addition of the standard. Recovery experiments were carried out by eight collaborators (totalling 10) with samples of medium-chain triglyceride added with a known concentration of cholesterol and phytosterol. Mean recovery rate was over 81.4%, and it was found that even 10 mg of cholesterol contained in 100 g of oil or fat was determined with a relatively good reproducibility. Both the methods of the thin layer chromatography and the digitonin precipitation coupled with gas liquid chromatography gave satisfactory results.

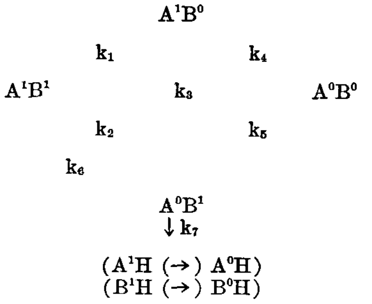
ANALYSIS OF TOCOPHEROL DIMERS BY HIGH-SPEED LIQUID CHROMATOGRAPHY. T. Fujitani (Fukuyama Branch School, Hiroshima University, Fukuyama), *Yukagaku* 25(12), 46–8 (1976). A high-speed liquid chromatography with n-hexane and diisopropyl ether solvent, #3040 column packing and a UV monitor (295 nm) permits a rapid and reliable method for the analysis of tocopherol dimers. The distinct separation of compounds was achieved with a mixture of n-hexane: diisopropyl ether 98:2.

A RAPID METHOD FOR THE DETERMINATION OF ISOLATED TRANS ISOMERS IN FATS AND OILS BY IR SPECTROPHOTOMETRIC METHOD. M. Fujita, K. Suzuki, S. Maruzeni and Y. Murase (Food, Oil & Fat Laboratories, Asahi Denka Co., Ltd. Yokyo) *Yukagaku* 25(12), 49–51 (1976). The trans isomers present in fats and oils can be determined by the rapid liquid-film method from measurements of the infrared absorption at two wavelengths, one due to trans conformation of the double bond and the other due to ester group. The ratio of the two absorbances has a linear relationship with the trans isomer content. This method thus provides a simple determination of trans isomer without weighing in accuracy or messing up an exact volume.

THERMAL OXIDATION OF TOCOPHEROLS IN SATURATED AND UNSATURATED TRIGLYCERIDES. Y. Fujitani, H. Ando, E. Uuki, and Y. Ishikawa (Fukuyama Branch School, Hiroshima University, Fukuyama), *Yukagaku* 25(12), 52–5 (1976). The relation between the degree of unsaturation of triglyceride and thermal oxidation of tocopherols was examined with synthesized saturated and unsaturated triglycerides (1-lauroyl-2,3-dipalmitin (LaPP), 1-lauroy-2,3-dilinolein (LaLL) and trilinolein (LLL)). When triglycerides, in which γ-tocopherol was added at a concentration of about 0.07%, were heated in an oil bath controlled at 180 C under the condition of specific surface area 0.45 cm^2/g, the decreasing velocity of -tocopherol concentration, which was determined by both a colorimetry based on Emmerie-Engel reaction and a gas chromatography, in unsaturated triglyceride was slower than that in saturated triglyceride. Thermal oxidation of α- and δ-tocopherols in unsaturated triglyceride was also lower than than that in saturated triglyceride. This fact confirmed that the stability of tocopherol in the fats is strongly affected by the degree of unsaturation of triglycerides in the thermal oxidation process of fats.

HYDROGENOLYSIS OF C-O BOND OF THE ALKOXY GROUP IN THE CATALYTIC REDUCTION OF OLEYL OLEATE. S. Maruzeni, M. Okamoto and Y. Murase (Food, Oil & Fat Laboratories, Asahi Denka Co., Ltd., Tokyo), *Yukagaku* 25(11), 31–6 (1976). In the catalytic reduction of oleyl oleate by palladium on carbon catalyst, it has been found that hydrogenolysis of C-O bond of alkoxy group occurs besides the hydrogenation of double bonds. The hydrogenolysis occurs only when the esters being reduced possess unsaturated alkoxy group. The whole reactions which occurred are illustrated: in which A^1B^1 = oleyl oleate, A^1B^0 = stearyloleate, A^0B^1 = oleyl stearate, A^0B^0 = stearyl stearate, A^1H = oleic acid, A^0H = stearic acid, $B'H$ = n-octadecene and B^0H = n-octadecane. The rate equation of the hydrogenolysis is expressed as first order with respect to the reactants:

$$\frac{d}{dt}([A^1H]+[A^0H]) = k_6[A^1B^1] + k_1[A^0B^1]$$



in which the rate constant k_1 seems to be greater than k_6. The reaction temperature has a marked effect on the hydrogenolysis, the higher the temperature the greater the extent of hydrogenolysis. Besides the palladium catalyst, rhodium, platinum, ruthenium and nickel catalysts have also been tried for the catalytic reductions of oleyloleate. Of all these catalysts, palladium has an excellent hydrogenolytic activity as shown below:

$$\text{palladium} \gg \text{rhodium} > \text{platinum} > \text{ruthenium} \sim \text{nickel}$$

The activity of ruthenium and nickel are almost nil. The order of the activities is identical with that of the double bond migration in the general catalytic reduction of olefins.

EVALUATION OF HEAT TREATED FRYING OILS. I. THIN LAYER CHROMATOGRAPHY COMBINED WITH UV-DENSITOMETRY OF SOYBEAN OIL FOR FRYING VARIOUS FOOD ITEMS. C. Urakami, H. Doi, S. Toriyama, Y. Asano, and S. Oka (Osaka City University, Osaka), *Yukagaku* 25(11), 22–30 (1976). Soybean oils were heated at 180 C 5 hr/day up to 20–30 hr by frying the following food items with an approximately equal surface area; potato, chicken, soybean curd, mackerel, whale meat, and green pepper. Amounts of water depleted from each food item was kept at a level of 25 m;/hr/500 g oil. Polar (P) and apolar (Ap) fractions were separated by TLC by applying either oil itself or its fatty acid methyl esters (the former is called the TG and the latter the FAMe method) and both fractions were monitored directly on the plate by an UV dual wavelength thin layer chromatoscanner at 230 nm. Absorbances (expressed in terms of grams of oil or FAMe used for the chromatography) of P fractions increased with increase in heating time, while those of Ap remained fairly constant at low levels. Ratios of P/Ap for fresh oils remained less than 1 by both methods. At 20 hr of heating (which is considered to be a maximum useful life of the oil under the experimental conditions) the ratios by the TC and FAMe method were 4–7 and 2–4, respectively, depending on the freshness of oils used. Of the two methods, the TG method was found to be more convenient and an amount of sample necessary for a single analysis was only 0.2 mg and the time required for examination of 2–4 samples/plate was 1–2 hr.

STUDIES ON THE BROWN DISCOLORATION OF HEATED PHOSPHOLIPIDS. III. THE BROWNING REACTION OF LECITHIN. F. Tomioka and T. Kaneda (Dept. of Food Chemistry, Yohoku University, Sendai), *Yukagaku* 25(11), 42–6 (1976). In previous papers the authors reported that browning products yielded by heating of lecithin (PC) were polymerized compounds formed of PC by aldol condensation. In this paper, catalysts and catalytic effect of the browning reaction of PC were investigated. Phosphorus and/or nitrogen containing compounds yielded by heating of PC were fractionated by solvents extraction and silicic acid column chromatography and their catalytic effects on the brown discoloration were examined. The results indicate that choline and/or phosphoric acid in PC accelerated the browning reaction. From the results obtained by the heating of PC with different solvents, it was suggested that browning reaction was accelerated mainly under anion catalytic reaction while action also showed some catalytic effect. Similar properties were noticed from both heated PC and synthetic conjugated dienone with phosphorylcholine. These results suggest that main condensing agent in browning reaction of PC is phosphorylcholine group in PC.

EVALUATION OF HEAT TREATED FRYING OILS. II. COMPONENTS IN SUBFRACTIONS OF POLAR TRIGLYCERIDES FROM HEAT TREATED SOYBEAN OIL. H. Doi and C. Urakami (Faculty of the Science of Living, Osaka City University, Osaka), *Yukagaku* 25(12), 17–27 (1976). Studies were conducted to find components involved in the UV-active (at 233 nm) polar triglyceride fractions, which had been used previously for evaluation of heat treated frying oils. Polar triglyceride fractions prepared from 20–30 hr heat treated soybean oils by frying varied food items were first fractionated on a Bio-beads column; major fractions were F2 with a molecular weight range of 4,000–22,000 (8–41% in oil samples, depending on food items used) and F3 with 2,200–600 (3–21%). These two fractions prepared from oils by frying whale meat, mackerel, and moist cotton balls were further fractionated by silicagel column chromatography; a major fraction (7–12% in oil samples from F2 and 1–3% from F3) was least UV-active, in general, followed by the most UV-active fractions (2–7% from F2 and 1–3% from F3). A ratio of polar fatty acid esters (PFA) to apolar esters from these UV-active subfractions was approximately 1:2. GC-MS of PFA demonstrated the presence of the following types of compounds: Short chain esters having at their terminal ends a diol-keto group, a triol, a dicarbonyl-hydroxy or -keto; 12,13-epoxyoctadecanoate, 9,12-epoxyoctadecanoate, and a small amount of 9,13-epoxyoctadecanoate; and mixtures of cyclic monomeric compounds having polar functional groups.

PRINCIPAL TENDENCIES IN THE TECHNICAL PROGRESS IN THE REFINING OF THE VEGETABLE OILS. A.G. Sergueyev et al. *Troudy VNIIZHa* 32, 3–12 (1974). After the new results of the fundamental work on the refining of vegetable oils (natural and hydrogenated) are described, the authors consider some new tendencies in the methods of refining which are being elaborated. These are: the hydration which includes separators and an apparatus for drying the phosphatide residue; neutralization and bleaching in the miscella; distilling deacidification process for hydrogenated fats in the margarine factories; improvement of the installation for deodorization; the process of soapstock decomposition. (Rev. Fr. Corps Gras)

ABOUT THE COMPOSITION AND SOME PROPERTIES OF THE PHOSPHOLIPIDS OF PRE-PRESSED SUNFLOWERSEED OILS. T.A. Danilova et al. *Troudy VNIIZHa* 32, 13–5 (1974). A study, by thin layer chromatography and spectroscopy, of the composition and of some properties of the phospholipids of pre-pressed sunflowerseed oils has been done. The results show that during hydration and winterization, the share of phosphatidylinositols increases, while the contents of phosphatidylcholines, phosphatidylethanolamines, and a group of unidentified components with $R_f = 0.96$, decrease. It was noticed that the principal difficulties occur during the hydration of the sunflowerseed oils if the phosphatidylinositols bonded to calcium and to magnesium were present. (Rev. Fr. Corps Gras)

SOME ASPECTS OF THE USE OF PHOSPHORIC AND CITRIC ACIDS IN THE REFINING OF VEGETABLE OILS. S.M. Volotovskaya et al. *Troudy VNIIZHa* 32, 24–9 (1974). The treatment of hydrated oil with a 20% solution of citric acid allows the elimination of a certain quantity of phosphoric matters which remain in the oil after degumming. During the washing process, the action of citric acid solution during neutralization decreases the quantity of water necessary for washing of the oil. The oil deodorized in the presence of citric acid has better stability during the storage. During the treatment of the oil with phosphoric acid, the destruction of pigment complex occurs, which has as a result an important clearing up of the oil. (Rev. Fr. Corps Gras)

SPECIFICATION OF THE METHOD FOR THE UNSAPONIFIABLE MATTER DETERMINATION IN EDIBLE VEGETABLE OILS. L.T. Prokhorova et al. *Troudy VNIIZHa* 32, 35–41 (1974). Based on the results of the study, a method for the determination of the total content of unsaponifiable matters in edible vegetable oils is recommended. Contrary to the standard method, the following is proposed: 1) the use of diethyl ether instead of petroleum ether for the extraction of unsaponifiable matters; 2) the washing of the ether extract in distilled water instead of 50% alcohol solution. (Rev. Fr. Corps Gras)

ABOUT THE POSSIBILITY OF THE USE OF BENZIDINE VALUE TO EVALUATE THE QUALITY OF SUNFLOWERSEED OIL. T.B. Morozova et al. *Troudy VNIIZHa* 32, 51–4 (1974). During the technological treatment of the seeds, an increase of 3 to 3.5 times of the carbonyl compounds in the oil is observed. To obtain a prepressed oil with a benzidine value of less than 3, it is necessary to have the seeds with a benzidine value of less than 1. Having in mind the differences in composition and in the treshold of the concentration of perception of taste and odor of the carbonyl compounds, it is impossible to establish a correlation between the benzidine value and the organoleptic evaluations of the oils obtained by different processes and refined by different methods. (Rev. Fr. Corps Gras)

DISTRIBUTION OF THE UNSAPONIFIABLE MATTER IN THE PRODUCTS OF THE TREATMENT OF THE OILSEEDS. L.T. Prokhorova et al. *Troudy VNIIZHa* 32, 42–4 (1974). Determination of the content of the unsaponifiable matters in sunflower seeds, cottonseeds, soybeans and their by-products, shows the distribution of unsaponifiable matters in all these products. The same results were obtained by calculation done in regard to the yield of production. It was established that during the technological process, 70–90% of the unsaponifiable matters contained in the seeds go into the oils, up to 20% remain in the lipids of the meal of extraction, and 3–7% in the lipids of the hull eliminated during the production. (Rev. Fr. Corps Gras)

INFLUENCE OF THE DEGREE OF OXIDATION OF THE SUNFLOWERSEED OIL ON ITS APTITUDE FOR THE HYDROGENATION AND ON THE QUALITY OF THE OBTAINED HYDROGENATED FAT. T.B. Morozova et al. *Troudy VNIIZHa* 32, 55–60 (1974). Peroxide compounds (peroxide value 0.25–2.4% I_2) do not influence the aptitude for hydrogenation of sunflowerseed oils and the essential values of edible hydrogenated fats (color, stability, acid value, fatty acid composition, trans-isomers). However, these compounds have an influence on the quantity and the nature of secondary oxidation products which are formed during hydrogenation of the oil. The hydrogenated fats obtained from the oil with a higher oxidation degree can be recognized by an increased content of carbonyl compounds and polymers. (Rev. Fr. Corps Gras)

COMPARATIVE DETERMINATION OF COPPER AND IRON IN SUNFLOWERSEED OILS BY COLORIMETRIC AND SPECTROPHOTOMETRIC METHODS. A.N. Mironova et al. *Troudy VNIIZHa* 32, 60–5 (1974). A comparative examination of copper and iron in sunflowerseed oils by colorimetric and spectrophotometric methods was done. The results show that both methods give comparable results and that both can be used for the determination of these metals in the vegetable oils. (Rev. Fr. Corps Gras)

OXIDATIVE PROCESSES DURING THE TREATMENT OF OILS WITH BLEACHING EARTHS. A.N. Mironova et al. *Troudy VNIIZHa* 32, 92–101 (1974). During the treatment of oils with bleaching earths, the conversion of primary oxidation products occur, resulting in not only the formation of isomers of linoleic acid with conjugated double bonds, but also of carbonyl compounds. As the bleaching earths are weak against the carbonyl compounds with three conjugated double bonds, the quality of the bleached oils must be evaluated by peroxide and carbonyl values and by the content of the compounds with three conjugated double bonds. (Rev. Fr. Corps Gras)

PROPERTIES AND COMPARATIVE BIOLOGICAL EVALUATION OF A HYDROGENATED FAT, REFINED BY THE METHOD OF ALKALI NEUTRALIZATION AND BY DISTILLING DEACIDIFICATION. A.G. Sergueyev et al. *Troudy VNIIZHa* 32, 66–70 (1974). Two samples of the same hydrogenated fat (obtained by hydrogenation of a mixture of cottonseed and sunflowerseed oils) were refined by two methods. For the experiments, two lots of 10 t were used. In one, the hydrogenated fat was neutralized with a solution of sodium hydroxide, while in the other, it was treated with a solution of citric acid. The oils obtained by these different methods were deodorized by the same technique at 212C. The acid value of the fat not treated with alkali decreased during deodorization from 0.42 to 0.086. The biological evaluation has been done with white rats. The results show no difference in the quality of the two fats refined by these different methods. (Rev. Fr. Corps Gras)

ABOUT THE NATURE OF MATTERS RESPONSIBLE FOR THE COLOR OF DIFFICULT TO REFINE COTTONSEED OILS. A.N. Mironova et al. *Troudy VNIIZHa* 32, 102–8 (1974). One of the causes of the presence of a gray-green color in neutralized cottonseed oils is the formation, during the neutralization, of some derivatives of the gossypol complex with pheophytin, insoluble in the alkali. From the neutralized cottonseed oils, with a color of 11–16 red units and with a gray-green color, it is possible to obtain oils with a normal color if the following technological processes are used: a) treatment with 1.5% or more of bleaching earth (Czech); b) alkali neutralization, followed by bleaching with 1.0–1.5% of the activated bleaching earth; c) bleaching with 0.5% of the activated earth, followed by alkali neutralization. (Rev. Fr. Corps Gras)

STUDY OF THE ESSENTIAL CHEMICAL PROCESSES OF MODIFICATION OF THE QUALITY OF PHOSPHATIDES DURING THEIR STORAGE. V.L. Savelyeva et al. *Troudy VNIIZHa* 32, 108–12 (1974). The study was done on two samples of concentrated phosphatides with 1.7 to 4.6% moisture. The results show that if water content doesn't exceed 3%, the storage is ensured. Hydrolysis can be slowed if the storage is realized at low temperatures. (Rev. Fr. Corps Gras)

STUDY OF THE KINETICS OF ADSORPTION OF PIGMENTS DURING BLEACHING OF SOYBEAN OIL MISCELLA. V.V. Klioutchkine et al. *Troudy VNIIZHa* 32, 116–21 (1974). An equation was obtained which describes the kinetics of adsorption and which has practical application. The process of adsorption is divided in two periods: the first one irregular, and the second one regular. The influence of the dimensions of the granules of the adsorbant, and of temperature and concentration of the oil in the miscella on the effectiveness of the process was studied. Under the optimal conditions, the bleaching process in the miscella is about three times faster than in the oil only. (Rev. Fr. Corps Gras)

ELIMINATION OF SOAP FROM THE NEUTRALIZED COTTONSEED OIL. B. Ya. Sterline et al. *Troudy VNIIZHa* 32, 122–6 (1974). Cottonseed oil, after neutralization and bleaching in the process of alkali treatment, has a relatively important content of metals which has an influence on the behavior of the oil during the storage and the subsequent hydrogenation. Best results in soap residue elimination were obtained if a citric acid solution is used and if the refining of the oil in miscella is applied. (Rev. Fr. Corpa Gras)

VARIATIONS AND ACTION OF LIPASE IN THE PRODUCTION OF VEGETABLE OILS. A.M. Goldovski et al. *Maslozir. Prom.* 1976 (4), 3–8. The lipolytic activity of oilseeds increases in the kernel in the following order: rapeseed, linseed, soybean, sunflower seed, peanut, cotton seed, castor. During the treatment of the seeds, their lipolytic activity decreases; the inactivation of the lipase is particularly important during the cooking before prepressing. The subsequent operations give a smaller inactivation, but it increases much more during the solvent elimination from the extraction meal. (Rev. Fr. Corps Gras)

Extraction of oil from sunflower seeds in the suspended state. N.P. Ikhno et al. *Maslozir. Prom.* 1976(4), 8–11. Using an apparatus with intensive action, the speed of extractraction in the suspended state is increased in comparison with that of the installations of existing extraction (for example ND-1250, de Smet, Olier, Lurgi). The degree of extraction of the oil from the oilseed increases as the ratio between the solvent and the raw material is increased and as the dimension of the particles of the latter diminishes. The apparatus with intensive action permits the realization of the direct extraction from sunflower seeds. (Rev. Fr. Corps Gras)

Influence of diacetyl on the accented characteristic of lactic aroma in the margarine. L.I. Shmeleva et al. *Maslozir. Prom.* 1976 (5), 12–4. Experiments have been done on the semi-pilot installation of the VNIIZH and under the same conditions as in the production, in order to study the influence of the quantity of diacetyl in the margarine on its organoleptic characteristics. It was established that the margarine has taste and flavor very accented when the average content of diacetyl is 2 mg/kg. This concentration of diacetyl can be considered as sufficient for the biological aromatization of the margarine. (Rev. Fr. Corps Gras)

Aromatizer for the margarine. P.A. Artamonov et al. *Maslozir. Prom.* 1976 (5), 44. USSR cert. patent no. 456600. The aromatizer product permits the improvement of the quality of margarine and gives it the taste and flavor of butter. This is possible to attain if in the margarine composition enter the milk fat, diacetyl delta-decalactone, and dodecalactone, making a liposoluble solution. Aromatizer has higher organoleptic characteristics, and it is thermostable and keeps the flavor of the margarine for a prolonged period of time. (Rev. Fr. Corps Gras)

Catalyst for the hydrogenation of oils and fats. A.G. Sergueyev et al. *Maslozir. Prom.* 1976 (5), 44. USSR cert. patent no. 468650. To improve the stability and filterability of catalyst based on nickel and copper, deposited on a thermostable powder support, a perlite is used as the support. This perlite must contain at least 60% of the particles which measure 100–250 microns and at most 3% of particles which measure less than 60 microns. The powder perlite is obtained by thermal treatment of the raw perlite at 1200–1400 C followed by fractionation. (Rev. Fr. Corps Gras)

Gas chromatographic resolution of polyunsaturated wax esters based on their degree of unsaturation on Silar 10c. Tou Takagi and Yutaka Itabashi (Department of Chemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan) *J. Chromatog.* **15**, 121 (1977). Wax esters of C28–C44 chain-lengths, and containing 0–7 double bonds, were characterized with equivalent chain lengths [ECL] obtained by GC using a cyanosiloxane, Silar 10C. The ECL of the unsaturated wax esters is significantly dependent upon the column temperature, and selection of an appropriate column temperature permitted adequate resolution of critical pairs differing in the degree of unsaturation or the position of the double bonds.

Detection of the presence of BHA by a rapid spectrofluorimetric screening procedure. S. Dilli and K. Robards. (Department of Analytical Chemistry, School of Chemistry, University of New South Wales, Kensington, N.S.W. 2033, Australia) *Analyst* (London) **102**, 201–5 (1977). A rapid screening procedure for detecting BHA in miscellaneous materials such as foodstuffs is presented. It is based on the sensitive fluorimetric detection of BHA following its isolation from complex sample matrices by steam distillation. Because of the sensitivity achieved, only small samples are required and time-consuming extractions of the antioxidant are eliminated. The rationale for the procedure, and some of its limitations, are discussed.

^{13}C-NMR of double and triple bond carbon atoms of unsaturated fatty acid methyl esters. J. Bus, I. Sies and M. S. F. Lie Ken Jie (Unilever Res., Vlaardingen, The Netherlands) *Chem. Phys. Lipids* **18**, 130–44 (1977). The carbon magnetic resonance spectra of many fatty acid methyl esters with *cis* and *trans* double bonds and triple bonds at various positions and in many differtnt combination have been investigated. The influence of the ester group on double and triple bonds in the fatty acid chain depends strongly on the positions of these bonds. For a given position the influence is constant, even if one or more other double or triple bonds on each other, complete assignments are possible and spectra of various types of unsaturated esters can be predicted with high accuracy (± 0.1 ppm).

A Raman spectroscopic study of the aerosol OT-water system. R. Faiman, I. Lundstrum and K. Fontell (Lipid Chem. Lab. and Res. Lab. of Electronics, Chalmers Univ. of Technol., Gothenburg, Sweden) *Chem. Phys. Lipids* **18**, 73–83 (1977). A detailed Raman spectroscopic study of the bis-(di-2-ethylheyxl)sodium sulphosuccinate (Aerosol OT)-water system has been carried out at ambient temperature (20 ± 2° C). Marked changes were observed in the relative intensity of the band at 1460 cm^{-1} when the concentration of Aerosol OT was varied. Depolarisation ratio measurements on the viscous isotropic cubic phase indicate that this intense band at 1460 cm^{-1} is largely asociated with the antisymmetric methylene rocking/deformation modes. Moreover, this was the only spectral region to vary with Aerosol OT concentration. A plot of I_{1460}/I_{1734} versus Aerosol OT concentration indicated that the most striking changes in the intensity of the 1460 cm^{-1} band occurred in the regions where large changes or anomalies have been previously observed in the observed X-ray spacings for one-dimensional swelling, in the conductivity and in the optical birefringence.

Raman spectroscopic studies of different forms of cholesterol and its derivatives in the crystalline state. R. Faiman (Lipid Chem. Lab., Univ. of Goteborg, Rannvagen 6, S-402 20 Goteborg, Sweden) *Chem. Phys. Lipids* **18**, 84–104 (1977). A Raman spectroscopic study has been carried out on a number of cholesterols and cholesterol derivatives in the crystalline state, in order to obtain some empirical correlations between the Raman spectra and structure of each cholesterol form. Although the Raman spectra of the various cholesterols are highly complex it was found that three regions of the spectrum yield considerable information about the crystalline chain packing in each form. A study of two branched chain aerosol derivatives, bis(di-2-octyl)sodium sulphosuccinate and its isomer bis(di-2-ethylhexyl)sodium sulphosuccinate, indicate that branched chain amphiphiles are good Raman spectroscopic models for the cholesterols, similar to previous Raman spectroscopic studies which have found straight chain amphiphiles to be good models for more complex phospholipids.

Fatty acids. part 50. ^{13}C nuclear magnetic resonance studies of olefinic fatty acids and esters. F.D. Gunstone, M.R. Pollard, C.M. Scrimgeour and H.S. Vedanayagam (Dept. of Chem., Univ. of St Andrews, Fife KY169ST, Scotland) *Chem. Phys. Lipids* **18**, 115–29 (1977). The ^{13}C-NMR spectra of 48 *cis* alkenoic acids and esters (C_8–C_{20}), 18 *trans* alkenoic acids and esters (C_9–C_{18}), and 26 polyenoic acids and esters (C_{18-22}) are reported and interpreted. The characteristic features of such spectra which permit structural assignments to be made are discussed.

Analogs of natural lipids. IV. Synthesis and properties of cyclopentanoid analogs of phosphatidic acid. A.J. Hancock, M.H. Stokes, and H.Z. Sable (Dept. of Biochem., Case Western Reserve Univ. Sch. of Med, Cleveland, OH 44106) *J Lipid Res.* **18**, 81–92 (1977). A new series of phosphatidic acid analogs has been synthesized in which the glycerol moiety of diacylglycerophosphoric acid is replaced by each of the three isomeric cyclopentane-1,2,3-triols (1,3/2, DL-1,2/3, and 1,2,3/0). Of the seven possible configurational and positional phosphatidic acid analogs of this series, five isomers have been obtained and characterized by spectroscopic methods and microanalysis. Four of the five isomers are 1-(or 3-)phosphoryl derivatives, while the fifth is a 2-phosphate. In addition to their intrinsic interest as conformationally restricted acidic lipids, the analogs are now available as starting materials for the synthesis of the more complex acidic and amphoteric lipids required for our exploitation of these cyclopentanoid analogs as unique probes for the study of lipid-lipid and protein-lipid interactions.

Prooxidant and antioxidant effects of ascorbic acid and metal salts in a β-carotenelinoleate model system. J. Kanner, H. Mendel and P. Budowski (Div. of Food Tech., Agr. Res. Org., Volcani Ctr., P.O.B 6, Bet Dagan 50-200, Israel) *J Food Sci.* **42**, 60–4 (1977). The interacting effects of ascorbic acid and metal ions on carotene oxidation were studied in an aqueous carotene-linoleate solution at pH 7. Ascorbic acid at concentrations up to 10^{-3}M was a prooxidant. Fe^{3+} and, to a lesser extent Co^{2+}, acted synergistically with ascorbic acid, the prooxidant effect increasing with metal concentration. Cu^{2+} formed a prooxidant system with ascorbic acid only at low metal concentration, but as the copper concentration was raised, inversion of activity occurred and the copper-ascorbic acid system exerted a stabilizing action on carotene. Prooxidant effects were enhanced and antioxidant effects weakened in the presence of added linoleate hydroperoxides. The latter were unstable in the presence of ascorbic acid and especially ascorbic acid + Cu^{2+}. Ascorbic acid itself became unstable in the presence of Cu^{2+}. Oxygen depletion, brought about by the rapid oxidation of ascorbic acid, may be partly responsible for the carotene-stabilizing effect of the Cu^{2+}-ascorbic acid couple. It is postulated that additional stabilization results from the radical-scavenging properties of copper or of a copper chelate formed by ascorbic and/or dehydro-ascorbic acid.

RELATIVE AUTOXIDATIVE AND PHOTOLYTIC STABILITIES OF TOCOLS AND TOCOTRIENOLS. J. Lehmann and H.T. Slover (Lipid Nutr. Lab., Nutr. Inst. ARS, USDA, Beltsville, Md. 20705) *Lipids* **11**, 853–7 (1976). The relative stabilities of selected individual tocols and tocotrienols and of equimolar mixtures of either α- plus γ- or α- plus δ- tocopherols were determined in methyl myristate and methyl linoleate during autoxidation and photolysis. Solution containing 0.05% of the appropriate tocopherol(s) or tocotrienols were subjected to UV light (254 nm) or to a flow of 4.3 ml/min of oxygen, both at 70 C. Tocopherols (T) and tocotrienols (T-3) were determined by gas chromatography without preliminary separation or purification. Tocopherols were much more stable during autoxidation in methyl myristate than they were in methyl linoleate. In mixtures, there was no significant protection of α-tocopherol by either γ- or δ-tocopherol under any of the conditions used. However, α-tocopherol was highly effective in protecting γ- and δ-tocopherols in methyl myristate during both photolysis and autoxidation and in methyl linoleate during photolysis. During autoxidation in methyl linoleate, α-tocopherol protection of γ- and δ-tocopherols after 24 hr was slight though measurable.

FATTY ACIDS, PART X. RAMAN SPECTRA OF ALL DIMETHYLENE INTERRUPTED METHYL *CIS, CIS*-OCTADECADIENOATES AND OCTADECADIYNOATES. M.S.F. Lie Ken Jie and C.H. Lam (Dept. of Chem., Univ. of Hong Kong, Pokfulam Rd., Hong Kong) *Chem. Phys. Lipids* **18**, 105–14 (1977). The Raman spectra of all the dimethylene interrupted methyl *cis,cis*-octadecadienoates and octadecadiynoates have been studied. The Raman band positions and their relative intensities for the $\nu(C{\equiv}C)$, $\nu(C{=}C)$, $\nu(C{=}O)$, $\nu({=}C{-}H)$ and $\delta(CH_2)$ modes are recorded. The height intensity of the bands arising from $\nu(C{=}C)$ relative to $\nu(C{=}O)$ provides a means of determining the number of *cis*-ethylenic bonds in a mono-ester. In the acetylenic series, the intensity of the bands arising from $\nu(C{\equiv}C)$ relative to $\nu(C{=}O)$ failed to indicate with certainty the number of acetylenic bonds in the monoesters studied, due to the weak intensity of the band due to $\nu(C{=}O)$. However a better correlation between the relative intensities of the $\nu(C{\equiv}C)$ and $\delta(CH_2)$ bands is established instead. An attempt to correlate the areas under the bands due to $\nu(C{\equiv}C)$, $(C{=}C)$, $(C{=}O)$ and $\delta(CH_2)$ failed to produce any significant results. The Raman spectra of the methyl octadec-*cis*-10-en-5-ynoate and methyl octadeca-5, 10-diynoate are also recorded.

OBSERVATIONS ON FREE FATTY ACIDS OF SKIM MILK. O.W. Parks, C. Allen and D.G. Cornell (Eastern Regional Res. Ctr., Philadelphia, Penn. 19118) *J. Dairy Sci.* **60**, 24–8 (1977). Negligible amounts of free fatty acids with greater than twelve carbon atoms are in the dialysate of skim milk obtained by vacuum dialysis. The 6- through 12-carbon free fatty acids exist in equilibrium between the dialyzable and nondialyzable fractions of skim milk at 23 C. The percentage of the 4- through 12-carbon free fatty acids of skim milk in the aqueous phase decreases with increasing molecular weight (av. six determinations: 4 carbon 102.1 ± 10.7%; 6 carbon 93.1 ± 8.6%; 8 carbon 83.6 ± 5.1%; 10 carbon 58.6 ± 7.8%; 10:1 carbon 64.2 ± 5.6%; and 12 carbon 19.6 ± 4.5%).

STABILIZATION OF CHICKEN FAT. A.S. Pereira, D.E. Pratt and W.J. Stadelman (Animal Sci. Dept., Purdue Univ., West Lafayette, Ind 47907) *Poult. Sci.* **56**, 166–73 (1977). This work was designed to determine various antioxidant combinations which result in improved storage and frying stability of chicken fat. Fresh skimmed chicken fat from commercial poultry cooking was used. Chicken fat was treated with six combinations of citric acid, butylated-hydroxy anisole, butylated-hydroxy toluene, and propyl gallate at levels permitted to be used in foods. Various sample and control groups were stored at 20° C. and at 60° C. and evaluated weekly for thiobarbituric acid (T.B.A.) numbers and odor scores. Significant treatment effects were observed for T.B.A. numbers at 20° C. and at 60° C., but not for average odor scores. Such scores confirmed that chicken fat, even when partially oxidized, does not have a disagreeable odor. The most improvement in stability of chicken fat during storage resulted from a combination of citric acid, butylated-hydroxy anisole (BHA) and butylated-hydroxy toluene (BHT). Chicken fat was treated with butylated anisole + butylated-hydroxy toluene and/or silicone and was heated and held at 180° C. for 7.5 hours daily for 5 days. Significant treatment effects existed only for peroxide values.

FATTY ACIDS OF THE SEED OILS OF ALPINE CRUCIFERAE AND OTHER ALPINE SPECIES. C.M. Scrimgeour (Dept. of Chem., Univ. of St. Andrews, St. Andrews, Fife KY169ST) *Lipids* **11**, 877–879 (1976). A few *Cruciferae* seed oils do not contain erucic acid but are instead rich in linolenic acid. These oils are characteristic of alpine species, and the fatty acid composition of such oils may be an adaption to an alpine habitat.

SYNTHESIS OF METHYL 16-TRIDEUTERIOHEXADECANOATE. A.P. Tulloch (Nat'l. Res. Council of Canada, Prairie Regional Lab., Saskatoon, Saskatchewan S7N 0W9, Canada) *Chem. Phys. Lipids* **18**, 1–6 (1977). Methyl 16-trideuteriohexadecanoate has been prepared in high isotopic purity and in 29% overall yield, from methyl 7-oxo-16-heptadecenoate. The oxo group was reduced with sodium cyanoborohydride and the CD_3 group was introduced by reduction with lithium aluminum deuteride, first of the ester group to the alcohol and then of the derived mesylate. The cargoxyl group was formed by oxidative cleavage of the double bond.

RADIATION RESPONSE OF VITAMIN A IN AQUEOUS DISPERSIONS. B. Bhushan and U.S. Kumta (Biochem. and Food Tech. Div., Bhabha Atomic Res. Ctr., Trombay, Bombay–400 085, India) *J. Agric. Food Chem.* **25**, 131–5 (1977). The radiation destruction of vitamin A acetate was monitored in isooctane, coconut oil, and aqueous dispersions. The *G*-(-vit. A), i.e. the number of vitamin A molecules destroyed per 100 eV of energy absorbed in lipid solvents and aqueous preparations, increased with the concentrations of vitamin A used. In the freely dissolved state, as in isooctane or coconut oil, the extent of destruction of vitamin A was more or less identical. However, a marked reduction in the radiation destruction of vitamin A was observed in aqueous dispersions at all concentrations except at 1×10^{-4} M. Incorporation of sugars, starch, and egg albumin in aqueous preparations offered considerable protection to vitamin A from radiation damage which could be discerned even at the lowest concentration (1×10^{-4} M). The protective influence of aqueous dispersion as noted for vitamin A was also observed for β-carotene, vitamin A alcohol, and ubiquinone-30. The significance of the above findings in radiation processing of foods has been discussed.

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KINETIC MODIFICATIONS OF THE ACETYLCHOLINESTERASE AND (CA^{2+} + MG^{2+})-ATPASE IN RAT ERYTHROCYTES BY CHOLESTEROL FEEDING. B. Bloj, M.G. Galo, R.D. Morero and R.N. Farias (Inst. de Quimica Biol., Facultad de Bioquimica, Quimica y Farmacia, Univ. Nacional de Tucumán, Chacabuco 461, San Miguel de Tucumán, Tucumán, República Argentina) *J. Nutr.* **106**, 1827–34 (1976). The influence of cholesterol on the membrane-bound acetylcholinesterase and (Ca^{2+} + Mg^{2+})-ATPase was studied in erythrocytes of five groups of male rats fed different fat-supplemented diets. Two groups of rats were fed essential fatty acid (EFA) sufficient diets with 5% lard or corn oil as the dietary fat, and two groups were fed EFA-deficient diets: a basic, fat-free diet and the same diet supplemented with 5% hydrogenated beef fat. One additional group of rats was fed a stock diet. The enzymes from a membrane with a low fatty acid fluidity (e.g. derived from rats fed a lard-supplemented diet) were not altered by cholesterol feeding. The changes were noticeable after 24 hours of cholesterol feeding.

CALCINOGENIC FACTOR IN SOLANUM MALACOXYLON: EVIDENCE THAT IT IS 1,25-DIHYDROXYVITAMIN D_3-GLYCOSIDE. R.H. Wasserman, J.D. Henion, M.R. Haussler, and T.A. McCain (Dept. of Phys. Biol., N.Y. St. Col. of Vet. Med., Ithaca 14853) *Science* **194**, 853–4 (1976). After glycosidic cleavage of the water-soluble vitamin D-like principle of the calcinogenic plant *Solanum malacoxylon*, the active lipophilic portion was purified by column chromatography and analyzed by combined gas chromatography and mass spectrometry. It was identified as 1,25-dihydroxyvitamin D_3, the active form of vitamin D. Thus this active matabolite of vitamin D exists in the plant world, and its presence probably accounts for pathologic calcification in grazing animals ingesting *Solanum malacoxylon.*

High-field ^{13}C NMR studies of certain normal and abnormal human plasma lipoproteins. J.A. Hamilton, N.J. Oppenheimer, R. Addleman, A.O. Clouse, E.H. Cordes, P.M. Steiner and C.J. Glueck (Dept. of Chem., Indiana Univ., Bloomington, Ind. 47401) *Science* **194**, 1424–7 (1976). High-field (63.4 kilogauss) Fourier transform nuclear magnetic resonance spectroscopy of ^{13}C in natural abundance has geen used to study the structural organization and molecular dynamics of constituent lipids of normal human very-low-density lipoproteins (VLDL) and low-density lipoproteins (LDL). The same method was used to study the abnormal β-VLDL of two type III hyperlipoproteinemia patients having markedly differing ratios of VLDL cholesterol to triglyceride (0.3 and 0.6, respectively). Resolution obtained at 63.4 kilogauss has made possible the assignment of several additional resonances of cholesterol ring carbon atoms, not resolved in earlier studies at lower fields, in the VLDL spectra.

Lateral diffusion in planar lipid bilayers. P.F. Fahey, D.E. Koppel, L.S. Barak, D.E. Wolf, E.L. Elson and W.W. Webb (School of Applied and Engineering Physics and Dept. of Chem., Cornell Univ., Ithaca, N.Y. 14853) *Science* **195**, 305–6 (1977). Direct measurements by fluorescence correlation spectroscopy of lateral diffusion coefficients of fluorescent lipid analogs in lipid bilayer membranes indicate self-diffusion coefficients $D > 10^{-7}$ square centimeters per second for various lipid systems above their reported transition temperatures. Cholesterol in egg lecithin at mole ratio of 1:2 reduces D by about twofold, while retained hydrocarbon solvent can increase it by two- to threefold.

Lateral transport of a lipid probe and labeled proteins on a cell membrane. J. Schlessinger, D. Axelrod, D.E. Koppel, W.W. Webb and E.L. Elson (Dept. of Chem. and School of Applied and Engineering Physics, Cornell Univ., Ithaca, N.Y. 14853) *Science* **195**, 307–9 (1977). Diffusion coefficients (D) of a lipid probe and labeled proteins on L-6 myoblast membranes have been measured giving D (protein) $\sim 2 \times 10^{-10}$ square centimeter per second and D (lipid probe) $\sim 9 \times 10^{-9}$ square centimeter per second. Some of the membrane proteins are immobile, but the lipid probe diffuses freely over macroscopic distances. Cytochalasin B slows protein but not lipid probe diffusion.

Mechanism of lipolysis induced by electrical stimulation of the hypothalamus in the rabbit. A. Kumon, A. Takahashi, T. Hara, and T. Shimazu (Dept. of Neurochem., Psych. Res. Inst. of Tokyo, Setagaya-Ku, Tokyo, Japan) *J. Lipid Res.* **17**, 551–8 (1976). Electrical stimulation of the ventro-medial hypothalamus of the rabbit elevated plasma glycerol concentration. This elevation was suppressed by treatments of the animals with hexamethonium and propranolol, or by adrenalectomy, but was not suppressed by treatments with atropine and phentolamine. These results would indicate that the effect of electrical stimulation of ventromedial hypothalamus is mainly mediated by catecholamine(s) liberated from the adrenal medulla and acts on β-receptor of adipose tissue.

Effects of catecholamines on the lipolysis of two kinds of fat cells from adult rabbit. A. Kumon, T. Hara, and A. Takahashi (Dept. of Neurochem., Psych. Res. Inst. of Tokyo, Setagaya-Ku, Tokyo, Japan) *J. Lipid Res.* **17**, 559–64 (1976). The administration of various catecholamines and adrenocorticotropic hormone to adult rabbit elevated plasma glycerol concentration. These catecholamines also induced the in vitro lipolysis of isolated interscapular fat cells but could not bring about the lipolysis of epididymal ones, while adrenocorticotropic hormone induced the lipolyses of both kinds of fat cells. It may be speculated from these results that catecholamines liberated endogenously in adult rabbit cannot act on all systemic adipose tissues but have lipolytic effects on a part of them.

Sterol content of the Myxomycetes Physarum polycephalum and P. flavicomum. E. Bullock and C.J. Dawson (Dept. of Chem., Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada) *J. Lipid Res.* **17**, 565–71 (1976). The sterol content of two Myxomycetes, ***Physarum polycephalum*** and *P. flavicomum* has been examined. The sterols of the two species are apparently identical, the two major sterols in each being poriferasterol and 22-dihydroporiferasterol. Three minor sterols are probably Δ^5-ergostenol, ergostanol, and poriferastanol. The triterpenoids of the two species differ in that, though lanosterol was identified in both, 22-dihydrolanosterol was indicated only in *P. flavicomum.* The occurrence of lanosterol together with a typical mixture of plant sterols is somewhat unusual.

Ionic requirements for the active ileal bile salt transport system. K. Gallagher, J. Mauskopf, J.T. Walker, and L. Lack (Dept. of Physiol. and Pharm., Duke Univ. Med. Ctr., Durham, N.C. 27710) *J. Lipid Res.* **17**, 572–7 (1976). Taurocholate transport by everted ileal gut sacs was studied in physiological media containing graded amounts of sodium ions. Significant uphill transport of taurocholate was observed when the bulk of NaCl was replaced by osmotic equivalents of mannitol or choline chloride. Seventy-seven percent of control transport activity was observed when 36 milliequivalents per liter of Na$^+$ were present in the incubation medium with mannitol acting as the isosmotic replacement, and 74% of the control transport was retained when 31 milliequivalents per liter of Na$^+$ were present in the incubation medium with choline chloride acting as the osmotic replacement. These results are in agreement with the idea that Na$^+$ has a physiological role in intestinal bile salt transport, and that the affinities of the anionic bile salt and the sodium cation for the transport system appear to be cooperative in that one enhances the binding of the other.

Phospholipid removal during degradation of rat plasma very low density lipoprotein in vitro. S. Eisenberg and D. Schurr (Lipid Res. Lab., Dept. of Med. B, Hadassah Univ. Hosp., Jerusalem, Israel) *J. Lipid Res.* **17**, 578–87 (1976). The hydrolysis of glycerophospholipids in very low density lipoprotein by enzyme(s) released into circulation after the injection of heparin to rats was studied. [^{32}P]Lysolecithin was formed rapidly from [^{32}P]lecithin when very low density lipoprotein, labeled biosynthetically with ^{32}P, was incubated with postheparin plasma. Analysis of the results has demonstrated that phospholipids are removed from VLDL by two pathways: hydrolysis of glycerophospholipids by the heparin-releasable phospholipase activity (> 50%) and transfer to high density lipoproteins (< 50%). The tissue origin of the postheparin phospholipase was studied in plasma obtained from intact rats and supradiaphragmatic rats using specific inhibitors of the extrahepatic lipase system (protamine sulfate and 0.5M NaCl). The phospholipase activity could be ascribed to both the hepatic and extrahepatic lipase systems. It is concluded that hydrolysis of glycerophospholipids is the major mechanism responsible for the removal of phospholipids from very low density lipoprotein during the degradation of the lipoprotein.

Insulin binding and insulin response of adipocytes from rats adapted to fat feeding. C. Ip, H.M. Tepperman, P. Holohan, and J. Tepperman (Dept. of Pharm., St. Univ. of N.Y., Upstate Med. Cen., Syracuse, N.Y. 13210) *J. Lipid Res.* **17**, 588–99 (1976). The effect of fat feeding on adipocyte insulin binding was examined to expand a study of adaptive changes in plasma membrane functions. Cells from rats fed a high fat (L) diet for five to seven days bound less insulin and showed a decreased response to insulin (glucose oxidation) compared to those from rats fed a high glucose (G) diet. Both high and low affinity sites were influenced; the extent of the binding difference increased as increasing concentrations of insulin were present in the assay medium. Diet did not change hormone degradation or the capacity of phospholipase C to increase binding. Concanavalin A effects on fat cells were also decreased by L diet both in inhibition of insulin binding and its insulin-like effect on glucose oxidation. Spermine, which had no effect on insulin binding, also had a smaller insulin-like effect on glucose oxidation by L cells than by G cells. Serum insulin was significantly lower (30 ± 3.7 μU/ml) in L than in G (43 ± 3.1 μU/ml) groups. Dietary fat produces alterations in fat cells that decrease insulin binding as a part of a complex overall adaptation to the diet.

Circadian distribution of bile acid in the enterohepatic circulatory system n hamsters. K.J. Ho (Dept. of Path., Med. Cen., Univ. of Ala. in Birmingham, Birmingham, Ala. 35294) *J. Lipid Res.* **17**, 600–4 (1976). The distribution of bile acid in the enterohepatic circulatory system at different times of the day was determined in 48 hamsters exposed to a rigid light schedule (6 AM to 6 PM) and fed, ad libitum, for 4 weeks. In each portion of the enterohepatic circulatory system, the relative amount of bile acid was determined 24 hours after an intraperitoneal administration of [^{3}H]taurocholic acid by comparing the radioactivity recovered from that portion with the total radioactivity remaining in the entire system. A circadian fluctuation of the relative bile acid content (percent of total) was observed in serum, liver, gallbladder, and intestinal contents. The patterns of such rhythmic change varied in various segments of the intestinal tract but correlated well with the time sequence of the movement of bowel content. Rhythms in the serum and liver were intimately related to the intestinal absorption of bile acid. Due to its small capacity, the gallbladder played only a minor role in the regulation of such a rhythm.

COMPARISON OF METABOLISM OF FREE FATTY ACID BY ISOLATED PERFUSED LIVERS FROM MALE AND FEMALE RATS. C. Soler-Argilaga and M. Heimberg (Dept. of Pharm., Univ. of Mo. Sch. of Med., Columbia, Mo 65201) *J. Lipid Res.* **17**, 605–15 (1976). Livers from normal, fed male and female rats were perfused with different amounts of [^{14}C]-oleate under steady state conditions, and the rates of uptake and utilization of free fatty acid (FFA) were measured. The uptake of FFA by livers from either male or female rats was proportional to the concentration of FFA in the medium. The rate of uptake of FFA, per g of liver, by livers from female rats exceeded that of the males for the same amount of FFA infused. The incorporation by the liver of exogenous oleic acid into triglyceride, phospholipid, and oxidation products was proportional to the uptake of FFA. Livers from female rats incorporated more oleate into triglyceride (TG) and less into phospholipid (PL) and oxidation products than did livers from male animals. Livers from female rats secreted more TG than did livers from male animals when infused with equal quantities of oleate. A major conclusion to be derived from this work is that oleate is not metabolized identically by livers from the two sexes, but rather, per gram of liver, livers from female rats take up and esterify more fatty acid to TG and oxidize less than do livers from male animals; livers from female animals synthesize and secrete more triglyceride than do livers from male animals when provided with equal quantities of free fatty acid.

EFFECT OF EPINEPHRINE ON THE OXIDATIVE DESATURATION OF FATTY ACIDS IN THE RAT. I.N.T. de Gomez Dumm, M.J.T. de Alaniz, and R.R. Brenner (Inst. de Fisiologia, Facultad de Ciencias Med., Univ. Natl. de la Plata, Calle 60 y 120, La Plata, Argentina) *J. Lipid Res.* **17**, 616–21 (1976). The effect of epinephrine on the oxidative desaturation of fatty acids by liver microsomal preparations of rats has been studied. Administration of epinephrine produced a significant decrease in desaturation of [1-^{14}C]linoleic acid to γ-linolenic acid and of [1-^{14}C]α-linolenic acid to octadeca-6,9,12,15-tetraenoic acid 12 hr after the injection. Lower doses produced a lesser effect on the Δ6-desaturation activity. Epinephrine administration modified the V_{max} of linoleic acid desaturation but not the K_m. There was also a slight increase in palmityl desaturation activity. The effect of epinephrine on Δ6-desaturation activity was postulated to be mediated through an enhancement of the intracellular cyclic AMP levels that lead to an increase of a glucose metabolite. This metabolite would inhibit Δ6-desaturation activity.

A BIOSYNTHETIC METHOD FOR THE PREPARATION OF HIGH SPECIFIC ACTIVITY ^{32}P-LABELED PHOSPHOLIPIDS. W.D. Marggraf (Friedrich Miescher Lab. der Max Planck Gesellschaft, Spemannstrasse 37–39, 74 Tubingen, West Ger.) *J. Lipid Res.* **17**, 622–8 (1976). ^{32}P-Labeled phospholipids with specific activities up to 400 mCi/mmole as well as [^{32}P]CDP-choline were prepared by cultivation of mouse fibroblasts or mouse Ehrlich ascites cells in the presence of [^{32}P]orthophosphate. The method was also used to prepare [methyl-^{3}H]choline-labeled glycerophospholipids from [^{3}H]choline. The yields and the specific activities of the phospholipids were significantly lower when preparations of ox white blood cells were used.

METABOLISM OF GLYCEROL MONOETHERS IN CULTURED LIVER CELLS AND IMPLICATIONS FOR MONOGLYCERIDE PATHWAYS. C.G. Mackenzie, O.K. Reiss, E. Moritz, and J.B. Mackenzie (Dept. of Biochem., Univ. of Colo. Sch. of Med., Denver, Colo. 80220) *J. Lipid Res.* **17**, 629–36 (1976). A comparative study has been made of the assimilation and metabolism of *rac*-1 and 2-[9,10-^{3}H]-octadec-9-enylglycerol in a clone of epithelial-like cells isolated from rabbit liver. Based on cell protein content, the free glycerol ether isomers attained equal cellular concentrations. As shown by isolation and degradation experiments, however, the incorporation of radioactive 1-monoether was appreciably higher than that of radioactive 2-monoether in both the triacylglycerol and phospholipid fractions. The 1-monoether, unlike the 2-monoether, was also a significant source of esterified fatty acids in both lipid fractions. In addition, the 1-monoether, but not the 2-monoether, was an active precursor of plasmalogens, particularly ethanolamine plasmalogen. In contrast to the 1-monoether, the 2-monoether was a more active precursor of triacylglycerols than it was of phospholipids. The results indicate that in the rabbit liver cells the pathway of complex lipid synthesis from 1-monoether was via 1-alkyl-*sn*-glycerol-3-phosphoric acid and from 2-monoether via 1-alkyl-2-acyl-*sn*-glycerol.

ALIPHATIC MEDIUM CHAIN TRICARBOXYLIC ACIDS IN RAT URINE. B. Eliasson, S. Lindstedt, and G. Steen (Dept. of Clin. Chem., Univ. of Gothenburg, Sahlgren's Hosp., S-413 45 Gothenburg, Sweden) *J. Lipid Res.* **17**, 637–46 (1976). Three aliphatic acids have been found in rat urine. They have been identified as 6-carboxy-5-undecenedioic acid, 6-carboxy-5-dodecenedioic acid, and 6-carboxy-5-tridecenedioic acid. The carbon skeleton structure was determined by mass spectra of the hydrogenated methyl esters. The double bond position was determined after osmium tetroxide oxidation followed by trifluoroacetylation and mass spectrometry and by infrared spectrometry. The compounds were present in the urine when the rats were fed on pellets but disappeared when they received sucrose and water. The acids were not present in the pellets, and a metabolic relation to compounds of longer chain length, possibly mycolic acids, is likely.

ACYL SPECIFICITY IN TRIGLYCERIDE SYNTHESIS BY LACTATING RAT MAMMARY GLAND. C.Y. Lin, S. Smith, and S. Abraham (Bruce Lyon Mem. Res. Lab., Children's Hosp. Med. Cen. of N. Calf., Oakland, Calf. 94609) *J. Lipid Res.* **17**, 647–56 (1976). We have studied the specificity of the acyl-CoA: diglyceride acyltransferase reaction in lactating rat mammary gland to provide a rational explanation at the enzyme level for the nonrandom distribution of fatty acids in milk fat triglycerides. Acyl-CoA:diglyceride acyltransferase activity was measured using various diglyceride and radioactive acyl-CoA substrates; products were identified as triglycerides by thin-layer and gas-liquid chromatography. Most of the enzymatic activity was located in the microsomal fraction and showed a broad specificity for the acyl donors tested (C_{10}, C_{12}, C_{14}, C_{16}, C_{18}, and $C_{18:1}$ CoA esters). We have previously shown that in the microsomal fraction from lactating rat mammary gland, the acyltransferase activities concerned with the conversion of *sn*-glycero-3-phosphate to diacylglycerophosphate show a very marked specificity for long chain acyl-CoA's. Therefore, we conclude that the predominant localization of long chain fatty acids in the 1 and 2 positions, and of shorter chain fatty acids in the 3 position of the glycerol backbone, results at least in part from the specificities of the mammary gland acyltransferases.

EFFECTS OF FREE FATTY ACIDS ON THE ENZYMIC SYNTHESIS OF DIACYL AND ETHER TYPES OF CHOLINE AND ETHANOLAMINE PHOSPHOGLYCERIDES. A. Radominska-Pyrek, J. Strosznajder, Z. Dabrowiecki, T. Chojnacki, and L.A. Horrocks (Inst. of Biochem. and Biophys., Polish Academy of Sci., ul. Rakowiecka 36, 02-532 Warsaw, Poland) *J. Lipid Res.* **17**, 657–62 (1976). Activities of ethanolaminephosphotransferases (EC 2.7.8.1) and choline phosphotransferases (EC 2.7.8.2) in microsomal fractions from brains and livers of mature rats are increased several fold by the addition of 1,2-diacyl-*sn*-glycerols or 1-alkyl-2-acyl-*sn*-glycerols. Oleic acid added with diacylglycerols stimulated further the synthesis of lecithins by liver microsomes, confirming the work of Sribney and Lyman. With alkylacylglycerols, oleic and stearic acids were inhibitory and linoleic acid was even more inhibitory for the synthesis of both 1-alkyl-2-acyl-*sn*-glycero-3-phos-phorylcholines and the corresponding ethanolamine compounds with microsomes from both tissues. Free fatty acids without added diglycerides had mixed effects. These results are best explained by postulating the presence of two isoenzymes each for ethanolaminephosphotransferase and cholinephosphotransferase of which only one is affected by free fatty acids. Regulation of the phosphotransferases by free fatty acids may determine the proportion of CDP-choline and CDP-ethanolamine used for synthesis of diacyl and alkylacyl types of these phosphoglycerides.

CHOLESTEROL METABOLISM IN GROUPS OF RHESUS MONKEYS WITH HIGH OR LOW RESPONSE OF SERUM CHOLESTEROL TO AN ATHEROGENIC DIET. D.A. Eggen (Dept. of Path., La. St. Univ. Med. Cen., New Orleans, La.) *J. Lipid Res.* **17**, 663–73 (1976). Cholesterol metabolism has been studied in two groups of five rhesus monkeys each that were selected from the upper and lower sextile in the distribution of serum cholesterol concentration while being fed an atherogenic diet. This diet consisted of a basal commercial monkey food supplemented with saturated fat and cholesterol. To determine differences that might be related to the difference in serum cholesterol concentration, parameters of whole body cholesterol metabolism were measured while the animals were fed the supplemented diet and again while they were fed the basal diet. Serum cholesterol and triglyceride concentrations were greater in the high-responding (HI) than in the low-responding (LO) groups during both diet periods. Percent of luminal cholesterol absorbed was also greater in the HI than in the LO group during both diet periods. The increase in fecal excretion of endogenous neutral steroids during the period when the atherogenic diet was fed was similar in the two groups; however the increase in excretion of bile acids was greater in the HI than in the Lo group.

ARTIFACTS PRODUCED DURING ACID-CATALYZED METHANOLYSIS OF STEROL ESTERS. J.K.G. Kramer and H.W. Hulan (Animal Res. Inst., Res. Branch, Agr. Canada, Ottawa, Ontario, Canada K1A OC6) *J. Lipid Res.* 17, 674–7 (1976). Sterol esters were transesterified within 1 hr. using either acid or base catalysts. Acid-catalyzed methanolysis of sterol esters with HCl, H_2SO_4, or BF_3 leads to the formation of two artifacts derived from the sterol portion of the molecule; they were identified as dehydrated and methoxylated derivatives of sterols. These two artifacts were not produced using a base-catalyzed methanolysis with $NaOCH_3$.

EFFECT OF UNSATURATED LIPIDS ON THE BILE FLOW AND BILIARY EXCRETION OF CHOLESTEROL AND BILE SALTS IN RATS. R. Paul and J. Ganguly (Dept. of Biochem., Indian Inst. of Sci., Bangalore-560012, India) *Chem. Phys. Lipids* 17, 315–23 (1976). When rats were fed safflower oil or coconut oil for 30 days, or soyalecithin (EPL) or egg phospholipids for 7 days, the rates of bile flow, concentration of cholesterol in the bile as well as unsaturation in the biliary phospholipids were markedly higher in the animals receiving the more unsaturated lipids. It is concluded that feeding of lipids containing polyunsaturated fatty acids effects an increase in the unsaturation of the biliary phospholipids and thereby causes increased excretion of cholesterol through the bile.

EFFECT OF STAGE OF LACTATION ON THE DISTRIBUTION AND COMPOSITION OF PHOSPHOLIPIDS IN MILK PRODUCTS. T.K. Kuchroo (Haryana Milk Foods, Pehowa, Kurukshetra, India) and K.M. Narayanan (National Dairy Res. Inst., Karnal, India) *J. Food Sci. Technol.* 13(5), 246–8 (1976). The distribution of phospholipids in cream and butter was influenced by the stage of lactation and species of milk used. The average proportions of phospholipids transferred from colostrum to cream and from cream to butter were 67 and 66% respectively in the case of buffaloes, and 60 and 64% respectively in case of cows. The proportion of phospholipid transferred from milk to cream and from cream to butter were found to decrease as the lactation progressed. The composition of phospholipid classes of cream, butter, butter-milk and skim-milk were almost the same as that of milks from which they were prepared.

EPIDERMAL PROSTAGLANDIN AND HISTAMINE IN UV-INDUCED ERYTHEMA REACTION. G.P. Mathur and A.S. Wadia (Hindustan Lever Res. Ctr., Andheri, Bombay) *Indian J. Med. Res.* 64, 1799–1806 (1976). Maximal increases occurred in epidermal histamine and more so in prostaglandin of albino rats within 15 min of exposure to erythemal (1 MED) UV-dosage. Topical application of acetyl salicylic acid (ASA) solution (0.5–5%) 1 hr prior to irradiation prevented these increases. In 6 human subjects topical application of 5% ASA solution 15 min prior to irradiation afforded complete protection. ASA is suggested to inhibit the biosynthetic release mechanism of skin histamine and prostaglandin.

POSITIONAL DISTRIBUTION OF FATTY ACIDS IN PHOSPHATIDYLETHANOLAMINE OF VIBRIO CHOLERAE 569 B (INABA) AT DIFFERENT GROWTH CONDITIONS. S. Raziuddin (Dept. of Biochemistry, Haffkine Inst., Bombay, India) and S.D. Ambegaokar (Animal Health Div., Vaccine Project, Bharatiya Agro-Industries Foundation, Urulikanchan, Poona-30, India) *Indian J. Biochem. Biophys.* 13(4), 376–7 (1976). The fatty acid composition of phosphatidylethanolamine, the major and dominant phospholipid of *Vibrio cholerae* 569 B (Inaba), was quantitated at different stages of growth cycle at 37 and 27°C. Palmitic acid, $C_{16:1}$ and $C_{18:1}$ fatty acids were the major fatty acids in both the positions (1 and 2) of phosphatidylethanolamine.

STUDIES ON ACYLATION OF LYSOLECITHIN IN CHICKEN INTESTINE. B.R. Lokesh, A. Madhava Rao and S.K. Murthy (Dept. of Biochemistry, Indian Inst. of Science, Bangalore 560012, India) *Indian J. Biochem. Biophys.* 13(4), 371–5 (1976). The enzymatic acylation of lysolecithin to lecithin is shown to occur in the brush border-free particulate fraction of the small intestines of neonatal chicken. It requires ATP, coenzyme A and Mg^{2+} or Mn^{2+} for maximal activity. The system is specific for oleic acid. The fatty acid incorporated into lysolecithin is shown to occupy exclusively, the β-position. The fatty acid composition at the α-position of lysolecithin does not seem to influence the rate of acylation.

STUDIES ON LIPOPOLYSACCHARIDE AND PROSTAGLANDIN E_1-INDUCED HYPERTHERMIA ON RABBITS: PART I—BIOCHEMICAL CHANGES IN LIVER AND MUSCLE. R. Selvam and K.R. Shanmugasundaram (Dept. of Biochemistry, P.G. Inst., of Basic Medical Sciences, Taramani Campus, Univ. of Madras, Madras 600 036, India) Indian *J. Biochem. Biophys.* 13(4), 378–83 (1976). Intravenous administration of either bacterial lipopolysaccharide or prostaglandin E_1 into rabbits caused a rise (3–5°F) in rectal temperature. When the same treatment was given to aspirin-pretreated rabbits, the increase in the rectal temperature was observed with prostaglandin E_1 but not with lipopolysaccharide. The serum enzyme activities were not changed in the pyrogens-treated animals. But the concentration of blood glucose in the pyrogens-treated rabbits was significantly decreased, while that of lactic acid increased. Among the liver cell constituents, only the level of glycogen was drastically decreased in the pyrogenes-treated animals.

INHIBITION OF SEEDLING GROWTH BY AN IONIC DETERGENT. D. Ghosh, A.K. Biswas and S. Mukherji, (Dept. of Botany, Univ. of Calcutta, Calcutta 700019, India) *Indian J. Exp. Biol.* 15, 160–2 (1976). Effects of an ionic detergent, sodium dodecyl sulphate, on the germination and seedling growth of rice (*Oryza sativa* L.) and mungbean (*Phaseolus aureus* L.) were studied. In rice, germination was increasingly inhibited at concentrations above 0.05% and inhibition of seedling growth started at the lowest concentration. In contrast, mungbean germination was not affected by the detergent and there was a stimulatory effect on mungbean seedling growth below 0.05% and above this level an inhibitory effect. Inhibition of rice seedling growth by this detergent could be overcome by EDTA, GA_3, c-AMP and organic acids, while glutathione, ascorbic acid, cysteine and cations, viz. K, Ca were ineffective. Soluble protein contents, turbidity of the homogenates and heat coagulability of cytoplasmic proteins increased. Fat contents decreased and free fatty acids increased following detergent treatment.

EFFECT OF FRACTION 'A' OF COMMIPHORA MUKUL (GUGGULU) ON MONGOLIAN GERBILS MERIONES UNGUICULATUS. M.M.S. Ahuja and S.C. Malhotra (Dept. Pathology, All India Inst. of Medical Sciences, New Delhi 110016, India) *Indian J. Exp. Biol.* 15, 143–5 (1977). Spontaneous hypercholesterolemia and hyperglyceridemia were induced in male gerbils with stock diet alone. However, atherosclerotic formation was not observed in the vascular tissues (aorta and heart) histopathologically up to 18 months. Gum guggulu fraction 'A' was effective as an hypolipidaemic agent. Its effectivity in prevention of atherosclerosis could not be validated as no spontaneous atherosclerosis developed during the period of observation for 48 weeks in this species.

A SIMPLE METHOD FOR SIMULTANEOUS FRACTIONATION OF LIPOPROTEINS & PROTEINS BY AGAROSE-GEL ELECTROPHORESIS. D.S. Kanekar and S.P. Taskar (Cardio-vascular & Thoracic Centre Laboratory, K.E.M. Hospital & Seth G.S. Medical College, Parel, Bombay 400012, India) *Indian J. Exp.* 15, 131–2 (1977). Combined fractionation of lipoproteins and proteins by agarose-gel electrophoresis on the same slide is advantageous in detecting proteins as well as lipoproteins abnormalities without duplication of the procedure and for verifying the positions of α, β and pre- β lipoproteins as they correspond to α_1, α_2, and β proteins respectively. A simple method is developed in which proteins and lipoproteins are separated on agarose-gel on microscopic slide and stained by two different stains, namely Sudan-black for lipoproteins and Ponceau-S for proteins. The slide can be scanned by any densitometer for quantitative results.

THE LIPASE-COLIPASE SYSTEM IN FAT DIGESTION. C. Chapus et al. (Centre de Biochimie et de Biologie Moléculaire, Marseille 13274). *Rev. Fr. Corps Gras* 23, 651–5 (1976). Pancreatic lipase is especially well adapted for its function which is to hydrolyze at a very high rate water-insoluble dietary triglycerides. Its catalytic abilities are increased more than 500-fold after absorption to an interface which may be the substrate interface or an "inert" interface. The interfacial absorption of lipase is hindered by the presence of anionic detergents such as bile salts and soaps. This difficulty is overcome by a small pancreatic protein, the colipase which can bind to interfaces in the presence of detergents and serve as an anchor for lipase. Besides its obvious interest in gastroenterology and general nutrition, the lipase-colipase system provides a good example of protein-lipid interaction and of protein-protein interaction mediated by a lipid.

Detergent-resistant phospholipase A of Escherichia coli K-12 purification and properties. M. Nishijima, S. Nakaike, Y. Tamori and S. Nojima (Department of Health Chemistry, Faculty of Pharmaceutical Sciences, University of Tokyo) *Eur. J. Biochem.* 73, 115–124 (1977). Detergent-resistant phospholipase A, which is tightly bound to the outer membranes of *Escherichia coli* K-12 cells, was purified approximately 2,000-fold to near homogeneity by solubilization with sodium dodecylsulfate and butan-1-ol, acid precipitation, acetone fractionation and column chromatographies on Sephadex G-100 in the presence of sodium dodecylsulfate and on DEAE-cellulose in the presence of Triton X-100. The final preparation showed a single band in the sodium dodecylsulfate gel system. The enzyme hydrolyzes both the 1-acyl and 2-acyl chains of phosphatidylethanolamine or phosphatidylcholine. It also attacks 1-acyl and 2-acylglycerylphosphorylethanolamine. Thus, this enzyme shows not only phospholipase A_1 and lysophospholipase L_1 activities but also phospholipase A_2 and lysophospholipase L_2 activities. The enzyme lost its activity completely on incubation at 80°C for 5 min at either pH 6.4 or pH 8.0. It was stable in 0.5% sodium dodecylsulfate at below 40°C. The enzyme was inactivated on incubation for 5 min at 90°C in 1% sodium dodecylsulfate/1% 2-mercaptoethanol/4 M urea. The native and inactivated enzymes showed different protein bands with R_F values corresponding to M_r 21000 and M_r 28000 respectively, in a sodium dodecylsulfate gel system. Triton X-100 seemed to protect the enzyme from inactivation. The purified enzyme was fully active on phosphatidylethanolamine in the presence of 0.0002% or 0.05% Triton X-100. The enzyme requires Ca^{2+}. From its properties this enzyme seems to be identical with the enzyme purified from crude extracts of *Escherichia coli* B by Scandella and Kornberg. However, it differs from the latter in its positional specificity and susceptibility to sodium dodecylsulfate. Possible explanation of the difference of positional specificity of the two preparations is also described.

Affinity chromatography of lipoxygenases. J.C. Allen, C. Eriksson and J.R. Galpin (Department of Biochemistry, The Medical College of Saint Bartholomew's Hospital, London, and the Swedish Institute for Food Preservation Research, Göteborg) *Eur. J. Biochem.* 73, 171–7 (1977). A number of aminohexyl agarose derivatives of unsaturated fatty acids have been prepared and evaluated as materials for the affinity chromatography of soybean and pea lipoxygenases. A practical method for a one-stage purification of soybean lipoxygenase-1, with a purification factor of 16, is described, using either linolenate or docosa-4,7,10,13,16,19-hexaenoate as ligands. Results show that alleged competitive inhibitors do not cause sharp elution from the affinity column, and that there is an increasing specificity of binding and sharpness of elution as the proportion of unsaturation in the ligand is increased. These results are discussed in terms of the relative importance of the types of bonding involved in enzyme-substrate binding.

The application of primary alcohol ethoxysulfates in laundry detergents. H. Stupel (Shell Chemical Co.), D.H. Scharer, and L. Kravetz (Shell Development Co., Houston). *Soap, Cosmet., Chem. Spec.* 53(1), 39–46 (1977). The detergency of four types of commercially available surfactants in phosphate-built and unbuilt systems in various water hardnesses was investigated. It had previously been found that alcohol ethoxylates and alcohol ethoxysulfates (AEOS) were significantly superior to alcohol sulfates and linear alkyl benzene sulfonate (LAS). The purpose of the presently-reported study was to determine the optimum size of the hydrophobe (alcohol chain length) and hydrophile (number of EO) in alcohol ether sulfate. The structural effects were investigated with regard to sebum and clay detergency of a high active matter no-phosphate heavy duty liquid. In addition, the influence of concentration and water hardness on the fiber detergency of optimum AEOS was determined. It was found that (1) the optimum hydrophobe is a C_{12}-C_{15} alcohol; (2) the optimum number of EO is three in most cases; (3) AEOS performs significantly better than LAS in water of increasing hardness; (4) AEOS performs significantly better than LAS in decreasing detergent concentrations; and (5) a C_{12}-C_{15} 3 EO SO_3Me molecule is an excellent surfactant for laundry detergents.

Manufacture of free-flowing particulate heavy duty synthetic detergent composition. E.J. Kenney, F.R. Smith, Jr., and W.A. DiSalvo (Colgate-Palmolive Co.). *U.S. 4,006,110.* The method comprises spraying onto a base particulate detergent composition maintained in motion 1–6% of a normally solid nonionic detergent in liquid state at 40–90 C. The nonionic detergent is selected from higher alkoxy poly-lower alkoxy lower alkanols and nonyl or higher alkyl aryloxy poly-lower alkanols and is present in the product at 1/15–1/4 the level of the anionic detergent. The base particles consist of anionic sulf(on)ate synthetic organic detergent, sodium silicate, and adjuvants. The ratio of sulf(on)ate to silicate is 3:1–1:3. The particles are all within the 6–140 mesh range with less than 5% passing through a 200 mesh sieve.

Colorimetric determination of laundering effects. Part I. R. Griesser (Ciba-Geigy, Ltd., Basle). *Soap, Cosmet., Chem. Spec.* 53(1), 54–8, 68–70 (1977). This paper considers cleaning, cleaning and tinting, cleaning and fluorescent whitening, and all three parameters as they affect laundering. Tinting is defined as making small additions of blue or violet dyes. Before laundering, the bleached cotton used in the tests was pretreated in one of the following ways: artificially soiled, padded with water only, tinted, fluorescent whitened, tinted and fluorescent whitened. The overall aim of the study was to identify, by means of a special experimental design, each of the superimposed parameters. Of particular interest was the effect of soil residues and tinting dyes on the operations which followed. Results were evaluated by whiteness calculations, reflectance/emission curves, and plotting color points in the CIE and Hunter color spaces. In this first part of the paper, data from experiments for all five pretreatments are given and discussed.

Metabolism of triacylglycerol in mycobacterium smegmatis. H. Nakagawa, Y. Kashiwabara, and G. Matsuki (National Institute for Leprosy Research, Higashimurayama, Tokyo 189) *J. Biochem.* (Tokyo) **80**, 923–8 (1976). ***Mycobacterium smegmatis*** cells incorporated [1-^{14}C]oleic acid into triacylglycerols (TG) from the medium more rapidly than shorter chain fatty acids, caprylic and butyric acids. This incorporation was inhibited more strongly by 10^{-3} M N-ethylmaleimide than by 10^{-3} M KCN. [^{14}C]TG in the bacterial cells was utilized when the cells were in poor nutritional conditions, such as phosphate buffer (pH 7.0) containing oleic acid. Accumulation of TG was observed in the cells at late stages of growth. Diglyceride acyltransferase [EC 2.3.1.20] activity was detected in a cell-free extract from this bacterium. The pH optimum of this enzyme was between pH 7 and 9. F^- and Tween 20 showed remarkable enhancing and inhibitory effects, respectively.

Further studies on the mechanism of adrenaline-induced lipolysis in lipid micelles. Y. Saito, N. Matsuoka, H. Okuda, and S. Fujii (Department of Enzyme Physiology, Institute for Enzyme Research, School of Medicine, Tokushima University, Tokushima, Tokushima 770, and Department of Medical Biochemistry, School of Medicine, Ehime University, Matsuyama, Ehime 790) *J. Biochem.* (Tokyo) **80**, 929–34 (1976). Lipase [EC 3.1.1.3] depleted lipid micelles, in which lipolysis was not elicited by adrenaline, were prepared from lipid micelles. When these lipase-depleted lipid micelles incubated with adipose tissue extract containing lipase activity, adrenaline-induced lipolysis was restored to almost the same level as that of native lipid micelles. Adrenaline-induced lipolysis was not restored when the lipase-depleted lipid micelles were homogenized or sonicated. Various tissue extracts from kidney, lung, liver, and pancreas, and post-heparin plasma, which contained lipase activity, restored adrenaline-induced lipolysis in lipase-depleted lipid micelles.

Structure and synthesis of a lipid-containing bacteriophage. Effects of lipids containing cis or trans fatty acids on the reconstitution of bacteriophage PM2. N. Tsukagoshi, R. Schäfer, and R.M. Franklin (Department of Structure Biology, Biocenter, University of Basel) *Eur. J. Biochem.* 73, 469–76 (1977). Infectious PM2 virus particles could be reconstituted *in vitro* from a mixture of nucleocapsid, phospholipids containing *cis* fatty acids, and proteins I and II. The presence or absence of acyl phosphatidylglycerol, a minor lipid component of the virion, did not affect the reconstitution of infectious particles, even though it was incorporated into the particles when present. When phosphatidylglycerol was completely replaced by acyl phosphatidylglycerol in the reconstitution mixture, no infectious particles were formed. Lipids containing either *cis* or *trans* fatty acids were also used for reconstitution *in vitro* of the lipid-containing bacteriophage PM2. Regardless of the ratio of phosphatidylglycerol to phosphatidylethanolamine in the reconstitution mixture, infectious particles were formed and had almost the same phospholipid composition when lipids containing *cis*-palmitoleic acid were used; no infectious particles were obtained when lipids containing *trans*-palmitoleic acid were used. In the latter case, virus-like particles were, however, formed. Reconstituted particles containing *cis* fatty acids were infectious when tested on wild type *Pseudomonas* BAL-31 as well as on the unsaturated fatty acid auxotroph grown in the presence of either *cis* or *trans*-palmitoleic acid. Reconstituted particles containing *trans* fatty acids were not infectious on any of these cells. When *trans* fatty acids as well as *cis* fatty acids were present in the reconstitution mixture, then there was a lower yield of infectious particles. Particles with either *cis* or *trans* fatty acids had all four viral proteins and adsorbed to BAL-31 host cells in a specific manner.

THE INTERACTION OF PHOSPHOLIPID MEMBRANES AND DETERGENTS WITH GLUTAMATE DEHYDROGENASE. 1. KINETIC STUDIES. M. Nemat-Gorgani and G. Dodd (Department of Molecular Sciences, University of Warwick) *Eur. J. Biochem.* **74**, 129–37 (1977). The interaction of beef liver glutamate dehydrogenase with cardiolipin from both beef liver mitochondria and beef heart mitochondria, with phosphatidylcholine from both beef liver mitochondria and egg-yolk, and with beef grain phosphatidylserine was investigated by steady-state kinetic methods. The phosphatidylcholine did not inhibit the enzyme under a wide range of conditions. The cardiolipins and phosphatidylserine inhibited the enzyme. The inhibition by these lipids was found to diminish with time if the lipids were prepared and the reaction was studied in either phosphate or Tris buffers, but in zwitterionic buffers these lipid brought about a rapid, reversible inhibition which remained stable with time for at least 150 min. The kinetic type of the inhibition was difficult to determine because of variation between lipid sonicates. Complex mixed types of inhibition were found with cardiolipin, and with phosphatidylserine the inhibition approximated to a non-competitive interaction with $K_{i(app)}$ values varying between (0.9–6.1) × 10^{-6} M. The extent of inhibition decreased with increasing pH and with increasing ionic strength. Basic proteins, such as cytochrome *c*, show a higher affinity for the anionic membranes and can dissociate the enzyme·lipid complexes. Cosonicates of the cardiolipin and phosphatidylcholine inhibited the enzyme, the extent of inhibition increasing in proportion to the amount of acidic lipid. Sodium dodecylsulphate causes a time-dependent inhibition of the enzyme. The kinetics of this effect and its variation with detergent concentration were studied. The relationship of these observations to the structure and function of the enzyme is discussed. It is suggested that their apparent regulation of the enzyme by oestrogens and other small molecules is due to their binding *in vitro* at sites on the enzyme designed for binding cardiolipin, when the enzyme is functioning *in vivo*. The association of the enzyme oligomer *in vitro* may, for similar reasons, be an artifact.

CHANGES IN PROTEINS AND AMINO ACIDS IN DEVELOPING SOYBEAN SEED AND EFFECT OF PHOSPHORUS NUTRITION. A.C. Kapoor and Y.P. Gupta. (Division of Agricultural Biochemistry, Indian Agricultural Research Institute, New Delhi-110012, India) *J. Sci. Food Agric.* **28**, 113–20 (1977). Two varieties of soybean (Bragg and Punjab-I) grown in pot culture with three levels of phosphorus were studied for the changes in protein content, ether extract, amino acids and protein fractions during the development of the seed, and the effect of phosphorus nutrition thereon was also studied. The non-protein nitrogen, which formed a substantial portion of total nitrogen at early milky stage, decreased and true protein increased as the seed matured, but crude protein did not seem to alter much during the seed development, whereas ether extract gradually increased with maturity. The concentrations of free amino acids such as lysine, hydroxy-proline and tryptophan decreased whereas those of glutamic acid and alanine increased as the seed approached maturity. However, the total concentration of methionine and tryptophan in the protein of the seed was not much affected by maturity. The albumin fraction decreased from the early milky stage to the maturity stage. Glutelin rapidly increased from the early milky stage to mid-milky stage and sharply declined at the mature stage whereas the glycinin fraction rapidly increased from mid-milky to the mature stage of seed development. The prolamine fraction did not vary during seed development. Phosphorus application increased crude protein and true protein and decreased ether extract but had little effect on amino acids and protein fractions.

THE INTERACTION OF PHOSPHOLIPID MEMBRANES AND DETERGENTS WITH GLUTAMATE DEHYDROGENASE. 2. FLUORESCENCE AND STOPPED-FLOW STUDIES. M. Nemat-Gorgani and G. Dodd (Department of Molecular Sciences, University of Warwick) *Eur. J. Biochem.* **74**, 139–47 (1977). Both the anionic detergent sodium dodecylsulphate and the cationic detergent cetyltrimethylammonium bromide quenched the protein fluorescence of glutamate dehydrogenase. The anionic compound was more effective and brought about 50% quenching at a detergent concentration of 0.4mM. The zwitterionic amphiphile, lysolecithin, did not quench the protein fluorescence and neither did the short-chain detergent *n*-hexylsulphonate, which under the range of concentrations examined (< 1mM) does not form micelles. The zwitterionic phospholipid, phosphatidylcholine, did not quench the protein fluorescence but the anionic phospholipids, phosphatidylserine and cardiolipin, induced a reversible quenching of the enzyme fluorescence. These observations confirm the specificity of the phospholipid–enzyme interactions as deduced from the kinetic studies of the preceding paper. The degree of quenching brought about by the phospholipids decreased with increasing ionic strength and increasing pH and could be substantially reduced by basic proteins. An electrostatic contribution to the interaction is inferred from these results. The binding of the anionic phospholipids to the enzyme is manifested in a further enhancement of the fluorescence of a 1-anilinonaphthalene-8-sulphonate·enzyme complex. The presence of substrates and allosteric effectors affect the interaction of the lipids with the enzyme as indicated by the magnitude of this increase in fluorescence. The enhancement of fluorescence of NADH when bound to the enzyme was not affected by the binding of the lipids. The complex formed between the enzyme and phosphatidylserine/phosphatidylcholine can be solubilized in isooctane. The photolability of the aqueous protein when subjected to irradiation at 280 nm is suppressed in the isooctane-soluble complex. Phosphatidylserine bring about a rapid ($t_{1/2}$ is about 150 ms at a lipid concentration of 0.75 mM) dissociation of the linear aggregates formed between the enzyme oligomers. A model of the enzyme·lipid-membrane complex, consistent with these results, is proposed. It is suggested that the enzyme is an allotopic protein and that the dissociation of the enzyme *in vitro* may involve binding sites on the protein which are designed for interaction with the cardiolipin of the inner mitochondrial membrane, when the enzyme is in the mitochondrial matrix.

STUDY OF THE LONG CHAIN BASES OF SPHINGOMYELIN OF ENTOMOPHTHORA CORONATA. C. DeBievre and F. Mariat (Service de Mycologie, Inst. Pasteur, 25 rue du Dr. Roux, Paris 15 eme, France) *Biochim. Biophys. Acta* **486**, 179–82 (1977). Sphingomyelin was isolated from a strain of *Entomophthora coronata*, a fungus pathogenic for humans, after hydrolysis, the long chain bases were converted to their dinitrophenyl (N_2pH) derivatives and the aldehydes prepared by oxidizing these compounds with periodic acid. The aldehydes were studied by gas chromatography. Twelve different aldehydes were identified, the chain distribution ranging from C_{14} to C_{17}. The prominent chains were unsaturated. Straight and branched chains were found. The most abundant parent base which formed 52% of the total aldehyde was a 1,3-dihydroxy-2-aminohexadecene.

DETERMINING FAT, PROTEIN, AND LACTOSE IN MILK FROM COWS FED FORMALDEHYDE PROTECTED SUNFLOWER-SOYBEAN SUPPLEMENT. W.L. Dunkley, A.A. Franke and L.M. Smith (Dept. of Food Sci. and Tech., Univ. of California, Davis, Calif. 95616) *J. Dairy Sci.* **60**, 45–52 (1977). To determine whether feeding cows protected lipid supplement influences reliability of analyses of milk composition, we measured fat, protein, and lactose in milk produced by two groups of six Holstein cows, one fed a conventional hay-concentrate ration and one a ration containing protected sunflower-soybean supplement. Analyses were of 36 samples from each group collected biweekly over 12 wk. The three constituents were measured by an Infrared Milk Analyzer. Reference methods were Babcock test for fat, Udy dye-binding for protein, and a polarimetric method for lactose. Thus, agreement between infrared and reference methods was closer for cows fed conventional rations than for those fed protected lipid supplement. For cows fed the supplement, the low fat by infrared was attributed to an increase in the mean molecular weight of the fatty acids. Changes in fatty acid composition of milkfat when cows are fed protected sunflower-soybean supplement causes errors in estimation of fat by infrared analysis unless the instrument is calibrated specially for the milk.

INTERACTIONS OF TOCOPHEROLS AND UBIQUINONES WITH MONOLAYERS OF PHOSPHOLIPIDS. B. Maggio, A.T. Diplock and J.A. Lucy (Dept. of Biochem. and Chem., Royal Free Hosp. Schl. of Med., Univ. of London, 9 Hunter St., London WC1N 1BP, U.K.). *Biochem. J.* **161**, 111–21 (1977). The peneration of α-tocopherol and seven of its derivatives, and five compounds in the ubiquinone series, having differing chain lengths, into monolayers at the air/water interface of 11 different synthetic phospholipids and cholesterol was investigated; the properties of mixed monolayers of the tocopherols and of ubiquinones with phospholipids were also studied. There was relatively little interaction between the tocopherols and cholesterol, or between the ubiquinones and phospholipids. The possible significance of the observed interactions between α-tocopherol and polyunsaturated phospholipids is discussed in relation to the biochemical actions of α-tocopherol *in vivo*. It is suggested that fluidity of the lipid bilayer in membranes containing polyunsaturated phospholipids may allow α-tocopherol to interact in a dynamic manner with a number of phospholipid molecules.

FUNCTIONAL AND ORGANOLEPTIC EVALUATION OF LOW CHOLESTEROL EGG BLENDS. R.C. Baker and J.M. Darfler (Dept. of Poultry Sci., Cornell Univ., Ithaca, NY. 14853) *Poult. Sci.* **56**, 181–6 (1977). The advice of the A.M.A. and many doctors, in order to decrease the chances of coronary heart disease and atherosclerosis, is to reduce intake of dietary cholesterol. Inasmuch as egg yolk is one of the primary sources, much research has been done to reduce cholesterol levels in egg yolk by alterations in the diet of the laying hen or by breeding, and to eliminate it by reformulating the egg yolk. It would seem that a much simpler approach to reduction of cholesterol in an egg product would be to use less than natural proportions of egg yolk to egg white. This study is an evaluation of some functional properties and organoleptic characteristics of blends of eggs containing down to the equivalent of one tenth the normal amount of egg yolk. Results show that blends of eggs containing as low as one fourth the normal amount of egg yolk, with protein and lipid raised to the content of normal egg by the addition of dried egg albumen and corn oil, respectively, made scrambled eggs, custards and cakes made from a cake mix that were as acceptable as those made from whole egg. Lower proportions of egg yolk in the blends produced less acceptable products. Whole egg sponge cakes were unsuccessful, showing drastic decreases in volume (as measured by rapeseed displacement) as the proportion of egg yolk was decreased.

CHOLESTANE SPIN LABEL STUDY OF FILIPIN ACTION ON LIPID PLANAR MULTIBILAYERS. C. Flick and E. Gelerinter (Phys. Dept. and Liquid Crystal Inst., Kent State Univ., Kent, Ohio 44242) *Chem. Phys. Lipids* **18**, 62–72 (1977). EPR spectra of a cholestane probe dissolved in egg yolk lecithin and lecithin-cholesterol planar multibilayers were observed as a function of the filipin dose. The probe is structurally similar to cholesterol; its normal position when dissolved is with the long axis approximately along the bilayer normal. Both cholesterol-containing and cholesterol-free samples showed spectral components characteristic of bilayer fragmentation (tilted domains) which increased with dose. Furthermore, the cholesterol-free spectra indicated that some of the probe was frozen with the long molecular axis perpendicular to the slide normal. The frozen spectral component increased with dose. Spectra from a fatty acid probe did not have this feature. We interpret this as due to probe complexed with filipin (in place of cholesterol) in accordance with the filipin-cholesterol aggregate model of deKruijff and Demel. An ultraviolet study of filipin-probe interaction indicates that the probe is capable of complexing in just such a manner but has less affinity for the drug than cholesterol. Spectra from the cholestane probe in liposomes were also observed.

STRUCTURE OF CEREBROSIDE IN ASPERGILLUS ORYZAE. Y. Fujino and M. Ohnishi (Dept. of Agr. Chem., Oihiro Uni, Obihiro, Hokkaido, Japan) *Biochim. Biophys. Acta* **486**, 161–71 (1977). Structural studies on cerebroside isolated from *Aspergillus oryzae* were carried out using mainly gas-liquid chromatography-mass spectrometry. The major component fatty acids were 2-hydroxystearic and 2-hydroxy-*trans*-octadecenoic acid; branched 17?-methyl nonadecasphingadienine isomers were the predominant long-chain bases. The component sugar was only glucose. The structure of the major cerebrosides was assumed to be *N*-2′-hydroxystearoyl-1-*O*-glucosyl-17?-methyl sphingadienine and *N*-2′-hydroxyoctadecenoyl-1-*O*-glucosyl-17?-methyl sphingadienine and *N*-2′-hydroxyoctadecenoyl-1-*O*-glucosyl-17?-methyl sphingadienine.

EFFECTS OF α-TOCOPHEROL ANALOGS OF LYSOSOME MEMBRANES AND FATTY ACID MONOLAYERS. K. Fukuzawa, K. Hayashi and A. Suzuki (Faculty of Pharmaceutical Sci., Univ. of Tokushima, Shomachi, Tokushima, Japan) *Chem. Phys. Lipids* **18**, 39–48 (1977). The surface pressures of α-tocopherol analogs, fatty acids, and their mixtures were measured in their spread monolayers at an air-water interface. The surface pressure-area isotherms for the mixed monolayers of α-tocopherol and either stearic acid, oleic acid or linoleic acid deviated positively from those calculated on the basis of the additivity rule, and the magnitude depended on the length of the phytyl side chain in α-tocopherol and on the degree of unsaturation of the fatty acid chains. Lysosome membranes of mouse liver were stabilized by addition of α-tocopherol. A decrease in the length of the phytyl side chain in α-tocopherol reduced its ability to stabilize lysosome membranes. A good correlation was obtained between the extent of stabilizing activity of α-tocopherol analogs on lysosome membranes and the degree of positive deviation of the surface pressure for their mixtures with fatty acids.

MAGNETIC RESONANCE STUDIES OF THE BINDING SITE INTERACTIONS BETWEEN PHOSPHORYLCHOLINE AND SPECIFIC MOUSE MYELOMA IMMUNOGLOBULIN. A.M. Goetz and J.H. Richards (Church Lab. of Chem. Biol., Div. of Chem. and Chem. Engineering, Calif. Inst. of Technol., Pasadena, Calif. 91125) *Biochemistry* **16**, 228–32 (1977). The interaction of phosphoryl[*methyl*-^{13}C]choline has been investigated using ^{13}C and ^{31}P nuclear magnetic resonance (NMR) spectroscopy. Upon binding to antibody, upfield shifts of 0.7 and 1.5 ppm are observed for the hapten ^{13}C and ^{31}P resonances, respectively, and both spectra are in the "slow" exchange limit. Linewidth analysis indicates some immobilization of the phosphate group but essentially unrestricted methyl group rotation for the bound hapten. Hapten-antibody dissociation rate constants of 10 and 38 s^{-1} are calculated from ^{13}C and ^{31}P NMR spectra, respectively, suggesting the possibility of differential dissociation rates for the two opposing ends of the phosphorylcholine molecule. The NMR data are entirely consistent with the known x-ray structure of the M603 Fab′-phosphorylcholine complex.

MOLECULAR EXCLUSION ELECTROPHORESIS OF HUMAN SERUM LIPOPROTEINS: PATTERNS IN CONTROL AND ISCHAEMIC HEART-DISEASE POPULATIONS. J. Green and S. Carney (Dept. of Med., Univ. of Melbourne, Repatriation General Hosp., Heidelberg, Victoria, Australia) *Clin. Sci. Mol. Med.* **52**, 75–82 (1977). Electrophoresis of pre-stained lipoproteins on acrylamide-gel gradients has been carried out on serum from populations of control subjects and patients with ischaemic heart disease. The technique resolves components intermediate in position and, by inference, in size, between very-low-density and low-density lipoproteins. The presence and intensity of central bands show positive correlation with serum cholesterol and triglyceride values, but many patients showing the phenomenon have normal lipid values. Of patients with ischaemic heart disease 31% showed central band components and had normal lipid values.

MICROVISCOSITY OF LIPID DOMAINS IN HUMAN SERUM LIPOPROTEINS. A. Jonas (Dept. of Biochem., School of Basic Med. Sci., Univ. of Illinois, Urbana, Ill. 61801) *Biochim. Biophys. Acta* **486**, 10–22 (1977). Microviscosities for the hydrophobic lipid regions of human serum lipoproteins and for dispersions of lipids extracted from the lipoproteins have been determined using fluorescence polarization measurements with 1,6-diphenyl-1,3,5-hexatriene, a rod-like molecule, as the main fluorescent probe. Additional microviscosity measurements were carried out on LP-X, an abnormal human lipoprotein characteristic of cholestasis. Perylene, a disc-shaped fluorescent probe, was used with intact human lipoproteins in order to confirm relative microviscosity values measured with 1,6-diphenyl-1,3,5-hexatriene and to estimate the anisotropy of the lipid domains. Logarithmic plots of microviscosity against the inverse of absolute temperature, over the range of 0–40° C, gave no indication of phase transitions and yielded activation energy values for all human lipoproteins and for isolated lipids.

OXIDATION OF MYOGLOBIN IN VITRO MEDIATED BY LIPID OXIDATION IN MICROSOMAL FRACTIONS OF MUSCLE. T-S. Lin and H.O. Hultin (Dept. of Food Sci. & Nutr., Univ. of Massachusetts, Amherst, Mass. 01002) *J. Food Sci.* 42, 136–40 (1977). Enzymic lipid peroxidation of a microsomal fraction prepared from chicken leg muscle led to the oxidation of oxymyoglobin to metmyoglobin when the former was incubated in vitro with the microsomal peroxidation system. Similar oxidation of pigment was observed in the presence of linolenate hydroperoxide. On prolonged incubation of myoglobin with the peroxidizing microsomal fraction, some destruction of the pigment occurred. Incubation with either BHA or a mixture of glutathione and glutathione peroxidase inhibited much of the pigment oxidation.

THE OCCURRENCE AND DISTRIBUTION OF OCTADECAPENTAENOIC ACID IN A NATURAL PLANKTON POPULATION. A POSSIBLE FOOD CHAIN INDEX. P. Mayzaud, C.A. Eaton and R.G. Ackman (Dept. of Environment, Marine Ecol. Lab., Bedford Inst., Dartmouth, NS, Canada B2Y 3C4) *Lipids* 11, 858–62 (1976). It is shown that marine dinoflagellates under natural conditions synthesize the unusual fatty acid octapentadecaenoic ($18{:}5\omega3$). This acid is very likely a characteristic of certain groups of phytoplankters and is not an artifact from artificial culture conditions. Various species of herbivorous copepods as well as contemporary carnivorous chaetognaths living in the same environment present traces of this fatty acid. The decreasing quantity of $18{:}5\omega3$ on moving up the food chain, and its absence in certain species, makes it a possible ecological tracer.

POTATO DISCOLORATION IN RELATION TO ANATOMY AND LIPID COMPOSITION. N.I. Mondy and T.O. Mueller (Div. of Nutr. Sci., Cornell Univ., Ithaca, N.Y. 14853) *J Food Sci.* 42, 14–8 (1977). Chippewa and Katahdin potatoes were examined for susceptibility to enzymatic darkening in relation to lipid content. Comparisons were made between the bud and stem regions of Katahdin tubers for 3 consecutive years and between Chippewa and Katahdin tubers for 1 yr. Enzymatic darkening was always greater and lipid content lower in the stem than the bud region. This relationship was exhibited by both the pith and cortex tissues. The phospholipid fraction followed the same trend as crude lipid, being higher in the bud than the stem end. Chippewa potatoes had a greater crude lipid and phospholipid content than Katahdin potatoes and were less susceptible to enzymatic darkening. The lipid content of the tuber, although present in relatively small amount, is important in determining cellular integrity and resistance to bruising.

LOCALIZATION OF A SOURCE OF MARINE ODD CHAIN-LENGTH FATTY ACIDS. 11. SEASONAL PROPAGATION OF ODD CHAIN-LENGTH MONOETHYLENIC FATTY ACIDS IN A MARINE FOOD CHAIN. M. Paradis and R.G. Ackman (Dept. of Environment, Fisheries and Marine Service, Halifax Lab., Halifax, Nova Scotia B3J 2R3, Canada) *Lipids* 11, 871–6 (1976). The unusual occurrence of elevated levels of odd chain length fatty acids (OCFA) in smelt taken during winter months in Jeddore Harbour, Nova Scotia, is due to the dietary intake of large numbers of the amphipod *Pontoporeia femorata* (Kroyer). Sampling over two winters confirms that the seasonal peak period for this amphipod in stomachs is mid-December to the end of February. The distributions of monoethylenic isomers are compared to distinguish exogenous and endogenous smelt dietary features in terms of the geographically limited phenomenon of high OCFA levels and the essential absence of biological activity for these acids.

LOCALIZATION OF A MARINE SOURCE OF ODD CHAIN-LENGTH FATTY ACIDS. 1. THE AMPHIPOD PONTOPOREIA FEMORATA (Kroyer). M. Paradis and R. G. Ackman (Dept. of the Environment, Fisheries and Marine Service, Halifax Lab., Halifax, Nova Scotia B3J 2R3, Canada) *Lipids* 11, 863–70 (1976). The amphipod *Pontoporeia femorata* (Kroyer) contains approximately equal amounts of odd chain length and even chain length fatty acids. Mature males of this species are released into the waters of Jeddore Harbour during winter months as the result of a regular reproductive cycle and become food for smelt *Osmerus mordax* moving into the harbor in preparation for spring spawning runs, thus accounting for the previously reported unusual fatty acid composition of these smelt. The exceptionally high levels of odd chain length fatty acids in *P. femorata* occur at all stages of maturity in both sexes of the animal and are found in *P. femorata* in other locations.

CAPACTANCE STUDIES OF SYNTHETIC PHOSPHOLIPID LANGMUIR FILMS. W.L. Procarione and J.W. Kauffman (Dept. of Materials Sci. and Engineering, Northwestern Univ., The Tech. Inst., Evanston, Ill 60201) *Chem. Phys. Lipids* 18, 49–61 (1977). Synthetic phosphatidylcholine Langmuir films have been incorporated into metal-insulator-metal (MIM) thin film junctions. The capacitance characteristics of these junctions have been studied as a function of temperature, the number of lipid layers in the insulating layer, and the length of the hydrocarbon chains of the lipid molecule. The thickness of the oxide layer on the base aluminum electrode has been determined to be $\geqslant$ 11 A, and its effects on the capacitance characteristics have been considered in some detail. Indications of phase transitions in the temperature dependence of the capacitance imply that the basic lamellar arrangement of the lipid molecules is retained even after the samples are subjected to a dehydrating vacuum annealing process. An examination of the effects of varying the hydrocarbon chain length and salt content of the subphase during sample fabrication showed that capacitance characteristics of the MIM junction are very sensitive to small structural changes in the insulating layer.

LECTIN-RECEPTOR INTERACTIONS IN LIPOSOMES. II. INTERACTION OF WHEAT GERM AGGLUTININ WITH PHOSPHATIDYLCHOLINE LIPOSOMES CONTAINING INCORPORATED MONOSIALOGANGLIOSIDE. W.R. Redwood and T.G. Polefka (Dept. of Biochem. and Med., Col. of Med. and Dent. of N. Jersey, N. Jersey Med. Sch., Newark, N.J. 07103) ***Biochim. Biophys. Acta*** **455**, 631–43 (1976). Bovine brain gangliosides incorporated into phospholipid liposomes provide receptors for wheat germ agglutinin. Purified monosialogangliosides were mixed with egg phosphatidylcholine, and unilamellar liposomes were generated. Addition of wheat germ agglutinin induced the liposomes to fuse, and gel filtration analysis revealed that the lectin was incorporated into the fused liposomes. The fusion process was studied by following the changes in the 90° light scattering. Upon addition of wheat germ agglutinin, the vesicles appeared to fuse to form larger vesicles, corresponding to dimers and trimers of the initial vesicles. Inhibition studies with a variety of monosaccharides indicated that the sialic acid moieties present in the ganglioside acted as the lectin-receptor sites. This was confirmed by the observation that wheat germ agglutinin did not interact with phosphatidylcholine vesicles containing desialyated ganglioside.

MITOCHONDRIAL AND MICROSOMAL PHOSPHOLIPIDS OF MORRIS HEPATOMA 7777. R.C. Reitz, J.A. Thompson and H.P. Morris (Dept. of Biochem., Univ. of North Carolina, Chapel Hill, N.C. 27514) *Cancer Res.* 37, 561–7 (1977). The phospholipids of both mitochondrial and microsomal membranes from normal liver, host liver, and Morris hepatoma 7777 were isolated, separated, and quantitated. The total as well as the individual fatty acid concentrations and compositions were determined. The total phospholipids isolated from tumor mitochondria were increased by about 50%, and the fatty acid compositions were markedly altered, compared with mitochondria from other normal or host liver. The polyenoic acids were decreased, and there was a concomitant increase in the monoenes. When the respiratory control was determined, the tumor mitochondria exhibited a significant decrease in this parameter. The tumor microsomal membrane fraction, on the other hand, contained about 50% less phospholipid than the controls.

CONVERSION OF 9-D- AND 13-L-HYDROPEROXYLINOLEIC ACIDS BY SOYBEAN LIPOXYGENASE-1 UNDER ANAEROBIC CONDITIONS. J. Verhagen, A.A. Bouman, J.F.G. Vliegenthart and J. Boldingh (Lab. of Organic Chem., Univ. of Utrecht, Croesestraat 79, Utrecht, Netherlands) *Biochim. Biophys. Acta* 486, 114–20 (1977). Soybean lipoxygenase-1 reacts with both 9-D- and 13-L-hydroperoxylinoleic acids under anaerobic conditions. Approximately 40% of the hydroperoxide is converted into oxodienes, absorbing at 285 nm. Concomitantly, more polar compounds are formed, tentatively identified as being mainly epoxy-hydroxy-octadecenoic acids. When oxygen is present, the reaction is strongly inhibited, until in a very slow reaction the oxygen has been depleted. This accounts for the occurrence of a lag period.

SPICULATED ERYTHROCYTES OF CHOLESTEROL-FED GUINEA PIGS: CHANGES OF MORPHOLOGY, COMPOSITION, AND OSMOTIC FRAGILITY. C. Aswad and R. Ostwald (Dept. of Nutr. Sci., Univ. of Calif., Berkeley, Calif. 94720) *Pro. Soc. Exp. Biol. Med.* **153**, 505–10 (1976). We have studied the sequential changes of cholesterol content and morphology in RBC of cholesterol-fed GP and the effects of these changes on their energy metabolism and osmotic fragility. The results suggest that spurring of GP RBC is not accompanied by obvious alterations in their energy metabolism and may be the end result of sequential shape transformations associated with cholesterol-loading, and neither the morphological abnormalities nor the decreased osmotic fragility of cholesterol-loaded RBC is directly related to the development of the hemolytic anemia. ●

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