ACS Tall Oil topics announced

Seventeen talks ranging from 20 to 40 minutes each will be presented during a symposium on Tall Oil, Oleoresins, and Naval Stores-Derived Products at the American Chemical Society Meeting in New Orleans March 20-25, 1977.

The talks will be given March 23 and 24. J.W. Rose is symposium chairman.

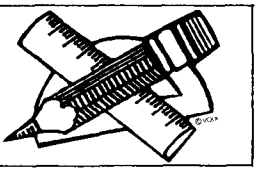
Titles and presenting authors scheduled are: World Naval Stores–Past, Present, Future by W.L. Clever; The Cyclical Nature of the Naval Stores Industry, D.F. Stauffer; Naval Stores Situation in Brazil, R.M. Viegas Assumpçaõ; Research Progress on Environmental Contaminants Relative to Naval Stores Industry, I.H. Rogers; Conclusions of NAS-CORRIM report on Naval Stores, W.G. Glasser; Composition and Properties of Oleoresin of *Pinue merkussii* de Vriese from Indonesia, G. Weissmann.

Current and Potential Uses of Rosin, H.I. Enos Jr.; Current and Potential Uses of Turpentine, J.M. Derfer; Cationic Polymerization of Alpha-Pinene Oxide and Beta-pinene Oxide by Unique Oxonium Ion-carbenium Ion Sequence, E.R. Ruckel; Evolution of Turpentines, E. Zavarin; Composition and Uses of Tall Oil Fatty Acids, E.E. McSweeney.

Factors Affecting Tall Oil Quality, J. Drew; Alteration of Components during Technical Reocvery and Refining of Crude Tall Oil, B. Holmbom; The Analysis of the *cis-trans* Isomer Distribution in Fatty Acids Mixtures by High Pressure Liquid Chromatography, H.E. Sparks; Discovery of Chemical Induction of Lightwood, D.R. Roberts; Paraquat-induced Lightwood Research with Northern and Western Conifers at the U.S. Forest Products Laboratory, A.H. Conner; and Investigation of Southern Pine Foliage, W.B. Clarke.

The Tall Oil sessions will be held at the Marriott Hotel. Registration and housing information is available from the Meetings and Expositions Department, American Chemical Society, 1155 16th St. NW, Washington, D.C. 20036. •

Abstracts



• Fats and Oils

INFLUENCE OF METHOD OF PREPARATION OF SUNFLOWERSEED FOR TREATMCNT, ON THE HYDRATION OF PHOSPHATIDES IN THE EXTRACTED OILS. L.A. Mhitar'janc et al. *Maslo-zhir. Promst.* **1975**(12), 6–9. The formation of hydrophilic properties of phosphatides can be regulated by the intensity of thermal treatment of seeds. The minimal heating of seeds, which assures the obtainment of oil with a maximum of easily hydrated phosphatide fractions, is 70–75C for the unripe seed, 75–80C for the freshly harvested mature seed, and 85–90C for ripe seeds which were stored. The freshly harvested seeds will be heated directly during the drying process, and then they will be directed either to treatment or to storage. (Rev. Fr. Corps Gras)

ESTERIFICATION OF FATTY ACIDS BY THE ALCOHOLS. M. Mirzabaeva et al. *Maslo-zhir. Promst.* **1975**(12), 16–7. Interesterification of distilled fatty acids from cottonseed oil soapstock with glycerol and trimethylolpropane was done in the presence of a new stationary catalyst, aluminum-nickel-zinc 50:30:20. It was found that the process was terminated in 1.5 to 2 hours at 195C. Acidity value of the interesterification product was 5–6. The proposed catalyst keeps its activity for 50 hours and after regeneration, it agin has its initial activity. (Rev. Fr. Corps Gras)

CHOICE OF A TECHNIQUE FOR VITAMIN A ACETATE AND DL-α-TOCOPHEROL DETERMINATION. S. Bycvarova. *Maslo-sapunea Prom.* **12**, 1–9 (1975). The existing methods for vitamin A acetate and dl-α-tocopherol determination are reviewed. In this paper, a modified technique for simultaneous determination of both vitamins is given. The method was successfully applied for determination of these vitamins in sunflowerseed oil. (Rev. Fr. Corps Gras)

INFLUENCE OF SOME PARAMETERS OF DEODORIZATION ON THE QUALITY OF SOYBEAN OIL. B. Ostric-Matijasevic et al. *Bilten: Biljna ulja i masti* **1974**(3–4), 9–12. During deodorization of soybean oil, a decrease of anisidine value occurs. The value decreases as temperature increases. The color of the oil is also influenced by the temperature and the time of deodorization: the higher the temperature and the longer the time, the lighter the color becomes. The results of organoleptic evaluation of the oil show that the best results are obtained if the oil is deodorized at 200C for 60 min. or at 220C for 40 min. (Rev. Fr. Corps Gras)

LIPOLYTIC MODIFICATIONS OF BEEF TALLOW IN BRANCH UNDER THE ACTION OF A PERMANENT MAGNETIC FIELD. Ju. A. Lapshev. *Pishch. Tekhnol.* **1975**(6), 74–6. The dynamics of accumulation of free fatty acids in the tallow in branch depends on the value of the magnetic induction and on the time of the action of a permanent magnetic field on the substrate. Application of a permanent magnetic field on the fresh tallow in branch from mesentericus gives a stabilizing effect regarding the development of lipolytic processes for 2 hours from the moment of its extraction from the animal. (Rev. Fr. Corps Gras)

ANTIOXIDANT AND ANTIRADICAL ACTIVITY OF TOCOPHEROLS. R. Kh. Khafizov et al. *Pishch. Tekhnol.* **1975**(6), 139–43. Very effective inhibitor of oxidation, the tocopherol reacts with free radicals with a high velocity of reaction of 7, and its stochiometric coefficient of inhibition (3–3.5) indicates an antiradical activity of some products of conversion of tocopherol. The antioxidant activity of this product depends on its concentration: until $C = 3 \cdot 10^{-4}$ mole/l, the induction period is directly correlated to the quantity of the inhibitor. (Rev. Fr. Corps Gras)

THE RESIDUE FROM AQUEOUS EXTRACTION OF FRESH COCONUTS: AN ALALYSIS. R.D. Hagenmaier, M. Glissendorf and K.F.

(Continued on page 119A)

• Abstracts . . . . . (Continued on page 118A)

Mattil, Phillippine J. Coconut Studies 1(1), 37–40 (1976). Coconut residue is the insoluble material left after extraction of coconut milk from comminuted coconut endosperm. White coconut residue contains 21% crude fiber on moisture and oil free basis. The carbohydrates in the residue hydrolyze to give 74% mannose, 21% dextrose and 5% unidentified. Dried residue readily absorbs and holds water. Rat feeding studies suggest that coconut residue has no caloric value, and consumption of residue contributes significantly to feces weight. The data suggest that coconut residue might serve as a bulking agent or as a source of dietary fiber when used as an ingredient in processed foods.

OXIDISED LIPIDS—PROTEINS BROWNING REACTION. 4. EFFECT OF THE DEGREE OF AUTOXIDATION OF THE LIPIDIC PHASE ON THE FORMATION OF THE LIPOSOLUBLE PIGMENTS. B.A. El-Zeany (Analytical Chemistry Department, Faculty of Pharmacy, Cairo) *Grasas Aceites (Seville)* **27**, 233–6 (1976). Mixtures of autoxidised fish oil methyl esters and egg-albumin were stored at 60° C in the dark and under nitrogen. The rate of formation of the liposoluble brown pigments was proportional to the initial peroxide contents of the samples. No correlation was found between liposoluble pigments and the initial content of benzidine active substances. The role of hydroperoxides in the production of liposoluble pigments was discussed.

COMPREHENSIVE EVALUATION OF FATTY ACIDS IN FOODS. IX. FOWL. G.A. Fristrom and J.L. Weihrauch (Consumer and Food Economics Inst., ARS, USDA, Hyattsville, Md.). *J. Am. Diet. Assoc.* **69**, 517–22 (1976). This article is another in the series of compilations of fatty acid data gathered from the post-1960 literature. In one table, fatty acid composition data for light meat, dark meat, and skin of commercial chickens are given. In another table, total lipid and fatty acid composition data are given for different tissues, both raw and cooked, from broiler-fryers, roasters, and stewing hens. Similar data are given for turkeys 16–24 weeks old. The studies on chicken and turkey tissues were sufficiently numerous that the fatty acid composition data may be considered as reliable representation of market birds. Data are also given for duck, goose, partridge, pheasant, pigeon, and quail, but the information on which they are based was quite limited. These data should therefore be viewed as provisional guides.

SULFONATED LUBRICATING AGENTS FOR LEATHER AND FURS. G. Dieckelmann, J. Plapper, H. Baumann, and W. Stein (Henkel & Cie). *U.S. 3,988,247*. The process consists of the steps of: (a) chlorinating a partially unsaturated fatty acid compound selected from the group consisting of esters of naturally occurring higher fatty acids with alcohols selected from alkanols, alkanediols, alkanetriols, alkanetetraols, and alkanehexaols and also naturally occurring fats, oils, and waxes at room temperature until the double bonds of the fatty acid are chlorinated; (b) reacting the compound at 40–100 C under UV irradiation for a time sufficient to attain a chlorine content of 20–45%; (c) sulfonating the compound at 80–85 C for a time sufficient to attain an SO_3 content of 40–150 mol percent based on the chlorinated fatty acid compound; and (d) forming a water-emulsifiable alkali metal, ammonium, or lower alkyl-ammonium salt of the compound.

SUNSCREENING METHOD USING RICE BRAN OIL. C.C. Loo (Carnation Co.). *U.S. 3,988,436*. A method of protecting the skin against ultraviolet radiation having a wave length of 2950 to 3150 Å consists of applying rice bran oil to the skin to be protected in an amount sufficient to absorb the radiation at the indicated wave lengths.

HARD FAT PRODUCT. L.S.R. Bengtsson (AB Karlshamns Oljefabriker) *U.S. 3,991,088*. A rapid melting hard fat product, mainly for use in margarine fat blends, is produced by hydrogenating rapeseed oil with an erucic acid content of less than 5% to an I.V. of 30–70 and then randomly interestifying it with 10–50% cocount oil. The resulting product has a slip melting point between 30 and 45 C, dilatations of more than 30 mm^3/g at 20 C but less than 15 mm^3/g at 40 C, and a difference in dilatations of at least 30 mm^3/g between the values at 35 C and 20 C.

LITHIUM SOAP LUBRICATING GREASE. H.D. Grasshoff (Deutsche Texaco Ag.). *U.S. 3,988,248*. The grease comprises 5–20% of a lithium soap of a hydroxy fatty acid, 0.1–3% of lithium tetraborate, and the remainder lubricating oil. It is made by a process consisting of mixing the lithium soap with a major amount of the base oil, dehydrating, adding lithium tetraborate, heating to about 240 C, adding the remaining portion of the base oil, cooling, and homogenizing.

SOME INVESTIGATIONS INTO PRODUCTION OF GLYCERIN MONOOLEATE AND INSPECTION METHODS. L. Petrov (SEA Pharmaceutical Base for Perfumery and Cosmetic Res., Plovdiv, Bulgaria). *Seifen, Ole, Fette, Wachse.* **102**(16), 467–9 (1976). The conditions for production of glycerin monooleate are examined. This product is of particular interest to the cosmetics and pharmaceutical industry. It was shown that direct esterification of oil acid and glycerolysis of suitable oils does not involve any difficulties. Inspection methods are carefully examined.

POWDER PHOSPHATIDES FROM INDIAN SOYBEAN OIL. G. Kristappa, A.G. Azemoddin and S.D. Thirumala Rao (Oil Technol. Res. Inst., Anatpur). *Paintindia.* **26**(8), 21–2 (1976). Preparation of powder phosphatides from Indian soybean oil, centrifuging and drying the gums and acetone-segregation of glycerides from the latter resulting in light yellow powder is described.

SEQUENTIAL NATURE OF THERMAL REACTION OF STEARIC ACID WITH SOME 1,2-DIAMINES. R.N. Butler, C.B. O'Regan and P. Moynihan. *J. Chem. Soc, Perkin Trans. I* **1976**, No 4, 386–9. The thermal reactions of stearic acid with ethane-1,2-diamine, bis(2-aminoethyl)amine and 2-(2-aminoethylamino)ethanol, with a heavy hydrocarbon oil as solvent, were investigated. The reactions proved general and followed a sequential pattern of salt formation, acylation of the amine, and cyclisation of the amide to imidazoline, each successive step taking place at a higher temp. The amounts of water formed during the reaction were consistent with the foregoing scheme. (World Surface Coatings Abs. No. 410)

APPROXIMATE CALCULATION OF DOUBLE BOND DISTRIBUTION IN ISOMERISED METHYL OLEATE AND ITS APPLICATION TO HYDROGENATION OF LINOLEIC ACID. Y. Kubota. *Fette, Seifen, Anstrichm.* **78**(3), 118–23 (1976). The double bond distribution of methyl oleate isomerised by iodine has been calculated and the results used in consideration of the relation between the distribution of the monoene fraction in hydrogenated linoleic acid and the hydrogenation mechanism. (In English) (World Surface Coatings Abs. No. 410)

THIN-LAYER AND GAS CHROMATOGRAPHY OF TOCOPHEROLS. W.U. Dompert and H. Beringer. *Fette, Seifen, Anstrichm.* **78**(3), 108–11 (1976). The unsaponifiable fraction of the oil is separated by TLC on silica gel, the zones corresponding to tocopherols removed, the tocopherols converted to trimethylsilyl ethers and analysed by GLC using an SE-30 column. Recovery for a wide range of oilseeds was about 60%. (World Surface Coatings Abs. No. 410)

STUDIES IN ACIDOLYSIS. M.M. Chakrabarty, D. Bhattacharyya and A.K. Gayen. *Fette, Seifen, Anstrichm.* **77**, 468–72 (1975). Acidolysis of a natural triglyceride oil with free fatty acids of different chain length has been studied to find out the degree of interchange of fatty acids, the mode of distribution of the free acids incorporated in the triglyceride molecules and the glyceride composition of the oil after acidolysis. The results, as determined by GLC and pancreatic lipase hydrolysis, indicate that the degree of interchange of fatty acids depends on the chain length of the free acids, and the incorporation of the free acids in the glyceride molecules occurs in a purely random manner. Glyceride compositions of the oils are also randomly rearranged after the acidolysis reaction. (World Surface Coatings Abs. No. 408)

INFRARED SPECTROSCOPY FOR STUDY OF AUTOXIDATION OF OILS AND FATS. K. Bencze. *Fette, Seifen, Anstrichm.* **78**, 23–30 (1976). An extensive review is given of the use of IR spectroscopy to follow the autoxidation of oils and fats. The important diagnostic regions are: 4000–2000 wave numbers for OH and CH groups; 2000–1500 for carbonyl groups and double bonds; 1500–1000 for chain length, degree of branching, methylene groups and ester groups; and 1000–600 for steric configuration. (World Surface Coatings Abs. No. 408)

GERBER METHOD FOR DETERMINING FAT CONTENT OF MILK WITHOUT CENTRIFUGING. A.S. Rangi (Department of Food Science and Technology, Punjab Agricultural University, Ludhiana) *J. Food Sci and Tech.* **13**, 70–2 (1976). A modification of the Gerber method for determining fat content of milk without centrifuging is described. The butyrometer tube after mixing

the contents was held in hot water at 87 ± 2° C for 30 min before recording the fat content. This compensated the deficiency in the fat level which closely corresponded with the value obtained by centrifuging. Comparisons were made of the fat contents of 227 milk samples analysed by the two methods. The coefficients of correlation between the fat values, were +0.971 and +0.998 respectively for cow and buffalo milk.

STUDIES ON POLYMERIZATION OF SAFFLOWER OIL IN AN EUTECTIC SALTBATH. PART II. A.E. Rheineck and S.N. Koley (Polymers and Coatings Department, College of Chemistry and Physics, North Dakota State University, Fargo, North Dakota). *J. Indian Chem. Soc.* **111**, 386–90 (1976). In the present investigation, safflower oil was passed through an eutectic saltbath consisting of 54.5% KNO_3 and 45.5% $NaNO_3$ (m.p. 218°) at temperatures varying from 300°–320°. In some cases 0.2% lead oleate (as lead) on oil weight was used as catalyst. The following are the new findings in this new type of bodied oil: (a) The bodied safflower oils of viscosities 0.84–2.4 stokes were obtained within a short time of contact; (b) the bodied oils are heterogeneous and separate into two layers on standing. The bodied mass were separated into two fractions using two volumes of dry acetone at room temperature and were analyzed. The free fatty acids were extracted and analyzed by GLC. Only the results of the analyses of the acetone soluble fractions are described in this paper. The methyl esters of the acetone soluble fractions were prepared and analyzed by GLC in DEGS and Apiezon-L columns. The esters were also distilled under vacuum and analyzed. The free fatty acids and the esters of acetone soluble fractions contain acids of variable and fractional carbon numbers. So it appears that a number of new fatty acids are produced by the contact of molten salts.

AUTOXIDATION AND ANTIOXIDANTS. D.N. Rampley and J.A. Hasnip (28 Lower Herne Road, Herne Bay, Kent CT6 7NA and Blundell-Permoglaze Ltd, Sculcoates Lane, Hull HU5 1RC). *J. Oil Color Chem. Assoc.* **59**, 356–62 (1976). The mechanism of hydrocarbon autoxidation is considered with particular reference to the degradation of polymers under the action of heat and light; it is shown that the first step is the formation of a hydroperoxide, which initiates a chain reaction. The chemistry of antioxidants is reviewed with reference to four modes of action: ultraviolet absorbers, metal scavengers, chain terminators and peroxide decomposers. Special consideration is given to the protection of polyvinyl chloride against degradation by heat and light.

DETERMINATION OF TRANSITION TEMPERATURES ON SODIUM STEARATE USING GAS CHROMATOGRAPHY. S.P. Wasik (Institute for Materials Research, National Bureau of Standards, Washington, D.C. 20234). *J. Chromatogr. Sci.* **14**, 516–8 (1976). A gas chromatographic method is presented for detecting structural changes in a solvent by observing the solubility behavior of a "probe" solute molecule. The transition temperatures of solid and liquid sodium stearate were determined at this point on the log Vg *vs* 1/T plot where the slope changes abruptly. The observed transition temperatures were compared with differential scanning calorimetry measurements on the same compound and the results of other investigators using different physical methods.

THERMAL REACTION OF METHYL OCTADECADIENOATES IN THE PRESENCE OF IODINE. ON THE FORMATION OF METHYL OCTADECENOATE. Y. Kubota and T. Hashimoto (National Chemical Laboratory for Industry, Tokyo). *Yukagaku* **25**(7), 393–8 (1976). Thermal reaction of methyl linoleate in the presence of iodine was carried out under various conditions, and the relation between the amount of the methyl linoleate decreased and the amounts of methyl octadecenoates and of the methyl conj. octadecadienoates formed was investigated. The reactions of methyl linoleate with hydrogen iodide and of methyl 9,11-octadecadienoate with hydrogen iodide were carried out, and the double bond distributions of methyl octadecenoates formed by the reactions were analyzed, respectively. The results indicated that in the case of methyl linoleate, methyl octadecenoates were mainly obtained by 1, 2-addition of hydrogen iodide to conj. dienes formed by the isomerization of methyl linoleate and subsequent displacement of iodo group with hydrogen.

• Biochemistry and Nutrition

COMPARISON OF BIOTRANSFORMATION AND LIPID PEROXIDATION ACTIVITY OF MICROSOMAL FRACTIONS ISOLATED BY Ca^{2+}-BINDING AND GEL FILTRATION ON SEPHAROSE 2B AND THEIR ELECTRON MICROSCOPIC EXAMINATION. H. Kovárová (Department of Chemistry and Biochemistry, Faculty of Medicine, Charles University, 500 38 Hradec Králové). *Collect. Czech. Chem. Commun.* **41**, 2812–5 (1976). Rat liver microsomal fractions were isolated by methods of Ca^{2+}-binding and gel filtration on Sepharose 2B. The values of biotransformation activity (oxidative demethylation of amidopyrine) and lipid peroxidation activity of fractions obtained by both methods are identical and in agreement with the values reported for standard microsomes. The presence of Ca^{2+}-ions is without effect on these microsomal functions. The microsomal fraction obtained by gel filtration on Sepharose 2B showed a significantly increased activity of glucose-6-phosphatase as compared to the standard and Ca^{2+}-bound microsomal fractions. Electron microscopic examination has shown that this fraction is an exceptionally pure "smooth" fraction free of either vesicles of the rough endoplasmic reticulum or of free ribosomes.

EFFECTIVE METHOD FOR ACTIVITY ASSAY OF LIPASE FROM CHROMOBACTERIUM VISCOSUM. Y. Horiuti, H. Koga and S. Gocho (Research Laboratory, Toyo Jozo Co., Ltd., Mifuku, Ohito-cho, Tagata-gun, Shizuoka 410–23). *J. Biochem. (Tokyo)* **80**, 367–70 (1976). A method was devised for activity assay of the lipase [triacylglycerol acyl-hydrolase, EC 3.1.1.3] excreted from *Chromobacterium viscosum* into the culture medium; olive oil emulsified with the aid of Adekatol 45-S-8 (a nonionic detergent, the ethoxylate of linear *sec*-alcohols having chain lengths of 10–16 carbon atoms) was used as the substrate. This method was specifically effective for *Chromobacterium* lipase activity assay, and was approximately twice as sensitive as the conventional method, in which polyvinyl alcohol is used for the emulsification of the substrate.

DIETARY CONTROL OF TRIGLYCERIDE AND PHOSPHOLIPID SYNTHESIS IN RAT LIVER SLICES. N. Iritani, S. Yamashita and S. Numa (Department of Medical Chemistry, Kyoto University, Faculty of Medicine, Sakyo-ku, Kyoto, Kyoto 606). *J. Biochem. (Tokyo)* **80**, 217–22 (1976). The effect of dietary manipulation on the synthesis of triglycerides and phospholipids was investigated by determining the incorporation of labeled long-chain fatty acid or glycerol into these lipids in liver slices derived from normally fed, fasted, and fat-free refed rats. Triglyceride synthesis was affected markedly by the dietary regime of the animal; the lowest rates were measured with fasted rats, and the highest ones with fat-free refed rats. In contrast to triglyceride synthesis, phospholipid synthesis occurred at virtually constant rates regardless of the dietary conditions. Addition of large amounts of fatty acid to the incubation mixture resulted in a marked stimulation of triglyceride synthesis, whereas phospholipid synthesis was affected to a much smaller extent. These results indicate that the synthesis of triglycerides and that of phospholipids are controlled independently, and that the availability of fatty acid in the cell contributes to the control of triglyceride synthesis.

THE MECHANISM OF C-5(6) DOUBLE BOND INTRODUCTION IN THE BIOSYNTHESIS OF CHOLESTEROL BY RAT LIVER MICROSOMES. CONSIDERATION OF A MECHANISM SIMILAR TO THE OXIDATION OF O-DIPHENOLS. V.V.R. Reddy and E. Caspi (Worcester Foundation for Experiment Biology, Shrewsbury, Massachusetts). *Eur. J. Biochem.* **69**, 577–82 (1976). The dehydrogenation of cholest-7-en-3β-ol to cholesta-5,7-dien-3β-ol by rat liver microsomal acetone powder has been known to involve the abstraction of 5α and 6α hydrogens, which were found in the water of the medium. It was proposed by other investigators that an enzyme-oxygen-metal complex may be involved in this dehydrogenation. This could then result in the reduction of the molecular oxygen to hydrogen peroxide. We have evaluated the possibility of the formation of hydrogen peroxide in the course of the transformation of 5α-[3α-^{3}H]cholest-7-en-3β-ol to [3α-^{3}H]cholesta-5,7-dien-3β-ol by a rat liver microsomal acetone powder in the presence of NAD^+ and O_2. Hydrogen peroxide was not detected in the reaction mixture even though the sensitivity of the H_2O_2 detection method exceeded four times the calculated amount of hydrogen peroxide which could be produced in this reaction. We have determined that the reaction is mitigated by a metal-dependent enzyme complex and the process requires the presence of EDTA. The involvement of a metal-enzyme complex is supported by the observation that the desaturation is inhibited by 2,2′-dipyridyl, 1,10-phenanthroline and diethyldithiocarbamate. The reaction was also inhibited by horse radish peroxidase which suggested the participation of an enzyme-metal-

oxygen complex. It was found that NADH promoted the dehydrogenation better than NAD^+. Attempts to dehydrogenate enzymatically 5α-[3α-^{3}H]cholestan-3β-ol failed. This tends to indicate the specificity of the enzyme system for 5α-cholest-7-en-3β-ol. The free radical inhibitors diphenylamine, *N*-methylaniline and *p*-cresol exhibited a stimulatory effect on the reaction. Based on these results, a tentative mechanism for the dehydrogenation of cholest-7-en-3β-ol is proposed.

CHEMICAL AND ENZYMATIC TRANSFORMATIONS OF PROSTAGLANDIN ENDOPEROXIDES: EVIDENCE FOR THE PREDOMINANCE OF THE 15-HYDROPEROXY PATHWAY. A. Raz, M. Schwartzman and R. Kenig-Wakshal (Department of Biochemistry, The George S. Wise Center of Life Sciences, Tel-Aviv University). *Eur. J. Biochem.* **70**, 89–96 (1976). Cyclic prostaglandin endoperoxides prostaglandin G_2 and H_2 are intermediates formed in the biosynthesis of prostaglandins from arachidonic acid. These endoperoxides can be converted chemically or enzymatically to prostaglandins E_2, D_2 and $F_{2\alpha}$. The effects of several reducing compounds on the chemical and enzymatic transformations of prostaglandins G_2 and H_2 were studied in order to determine the possible existence of two alternative enzymatic pathways for the conversion of prostaglandin G_2 to prostaglandins. The chemical transformation of prostaglandin H_2 to prostaglandins by cleavage of the 9, 11-cycloendoperoxide ring was unaffected by the presence of reduced glutathione, heme or tryptophan while hydroquinone and mercaptoethanol promoted the chemical reduction to prostaglandin $F_{2\alpha}$. In contrast the enzymatic transformation of prostaglandin H_2 to prostaglandins by a solubilized prostaglandin synthetase from sheep vesicular gland was unaffected by hydroquinone or mercaptoethanol, but was markedly stimulated by reduced glutathione to yield mainly prostaglandin E_2. Prostaglandin G_2 transformation to prostaglandins involves cleavage of the 9, 11-endoperoxide ring and a reduction of the 15-hydroperoxy group. The chemical reduction in buffer of the 15-hydroperoxy group is not affected by the presence of reduced glutathione, hydroquinone, heme or tryptophan. In contrast, the enzymatic reduction of the 15-hydroperoxy group is catalyzed by the solubilized prostaglandin synthetase and is further stimulated by reduced glutathione and hydroquinone. Results are presented which indicate that the enzymatic conversion of prostaglandin G_2 to prostaglandins can proceed *via* two alternative pathways, one involving the intermediate formation of prostaglandin H_2 and the other the formation of 15-hydroperoxy prostaglandins. The latter pathway appears to be the major pathways for the enzymatic conversion of prostaglandin G_2 to prostaglandins.

THE GLYCOSPHINGOLIPIDS OF RAT SUBLINGUAL AND SUBMAXILLARY GLANDS. A. Slomiany, C. Annese and B.L. Slomiany (Dept. of Biochem., New York Med. College, Valhalla, N.Y. 10595). *Biochim. Biophys. Acta* **441**, 316–26 (1976). Glycosphingolipids have been isolated from rat sublingual and submaxillary glands by the procedure involving lipid extraction, column fractionation and thin-layer chromatography. The major neutral glycosphingolipids in rat sublingual and submaxillary glands were monohexosylceramide, dihexosylceramide, tetrahexosylceramide and pentahexosylceramide. Both types of glands exhibited a low content of trihexosylceramide. The fucose-containing glycosphingolipids were not found. The distribution of acidic and neutral glycosphingolipids was similar in the sublingual and submaxillary glands, except for the tertahexosylceramide and sulfatides. Sublingual glands contained 1.5 and 3.0 times as much tetrahexosylceramide and sulfatides, respectively, as did submaxillary glands. The glycosphingolipids of submaxillary and sublingual glands showed large similarity in fatty acid composition. The fatty acid composition of gangliosides resembled each other, but differed remarkably from those of sulfatides and neutral glycosphingolipids in the docosanoate content.

THE POLYPEPTIDE AND THE PHOSPHOLIPID COMPONENTS OF AXON PLASMA MEMBRANES. G.K. Chacko, G.M. Villegas, F.V. Barnola, R. Villegas and D.E. Goldman (Dept. of Biochem. and Physiol., Med. College of Penn., Philadelphia, Penn. 19129) *Biochim. Biophys. Acta* **443**, 19–32 (1976). The axon plasma membrane fraction isolated from garfish olfactory nerve was analyzed for its polypeptide composition by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. There were present over 20 well-resolved polypeptide components in this membrane, and eleven of them, with an apparent molecular weight range of 22,000–130,000, accounted for most of the membrane proteins. None of the major polypeptide species present in the membrane appeared to be glycoprotein. Based on electrophoretic mobility on sodium dodecyl sulfate-polyacrylamide gel, eight of the major polypeptides found in garfish nerve membrane appeared to be also present in the axon plasma membrane isolated from lobster walking leg nerve. Assays for acetylcholinesterase in axon plasma membrane fractions isolated from different nerve sources showed a wide variation, ranging from a specific activity of 2.4 for garfish nerve to 312.5 for lobster nerve membrane.

25-HYDROXYCHOLECALCIFEROL LEVELS IN BEDOUINS IN THE NEGEV. S. Shany, J. Hirsh and G. Berlyne (Soroka Med. Cntr. and Ben Gurion Univ. of the Negev, Beersheba, Israel) *Am. J. Clin. Nutr.* **29**, 1104–7 (1976). 25-Hydroxycholecalciferol (25-HCC) levels were measured in 31 bedouin females and eight bedouin male tribesmen and compared with the levels in Jewish males and females in Beersheba. In nonpregnant bedouin women the mean 25-HCC level was 25.4 ng/ml ± 9.78. In pregnant bedouin women the mean was 23.4 ng/ml ± 8.52. In bedouin males the mean level was 25.7 ng/ml ± 3.03. In Jewish females, both pregnant and nonpregnant, the levels were higher (32.7 ng/ml ± 6.02 and 44.3 ng/ml ± 9.24). Jewish males had levels of 32.8 ng/ml. No bedouin had plasma levels below 10 ng/ml, and there was no evidence to suggest deficiency of vitamin D in bedouin males or females.

SWINE AORTIC SMOOTH MUSCLE IN TISSUE CULTURE. SOME EFFECTS OF PURIFIED SWINE LIPOPROTEINS ON CELL GROWTH AND MORPHOLOGY. B.G. Brown, R. Mahley and G. Assmann (Sec. on Exper. Ather. and the Mole. Disease Branch, Nat. Heart and Lung Inst., Nat. Insts. of Health, Bethesda, Maryland) *Cir. Res.* **39**, 415–24 (1976). Smooth muscle cells (SMC) were grown from inner media explants of swine aorta and used as a model for studying the role of lipoproteins in atherogenesis. These cultured cells retain the characteristics of SMC through multiple passages. Cell growth curves, in time, were obtained by using standard counting techniques. There was no difference between nomo- and hyperlipidemic lipoproteins with respect to cell growth rate. Factors present in the ultracentrifugal bottom, and factors appearing during the platelet release reaction, were shown to contribute to the SMC growth response. Morphological alterations characteristic of intimal foam cells occurred in SMC grown in VLDL at triglyceride levels in excess of 15 mg per 100 ml. Thus there are distinct parallels between SMC response in this model in vitro and atherogenesis in vivo.

ASSESSMENT OF EFFECT OF STARVATION, GLUCOSE, FATTY ACIDS AND HORMONES ON α-DECARBOXYLATION OF LEUCINE IN SKELETAL MUSCLE OF RAT. H.S. Paul and S.A. Adibi (Gastroent. and Nutr. Unit of Montefiore Hosp., Univ. of Pittsburgh School of Med., Pittsburgh, Penn. 15213) *J. Nutr.* **106**, 1079–88 (1976). The present investigations of rates of oxidation of [U^{14}C] or [1-^{14}C]leucine by homogenates of gastrocnemius muscle of fed and starved rats have indicated that $^{14}CO_2$ production is mainly the result of α-decarboxylation of leucine in this tissue. This incomplete oxidation was not the result of impaired tricarboxylic acid cycle since the oxidation of palmitate proceeded to completion within the experimental conditions. In the subsequent studies, the effect of altered nutrition and metabolic factors on α-decarboxylation of leucine by gastrocnemius muscle homogenates was investigated. Starvation increased the rate of α-decarboxylation of leucine. Addition of insulin, epinephrine, glucagon and cyclic AMP within a wide range of concentrations to the incubation medium did not significantly affect the rate of decarboxylation of leucine. These studies indicate a complex interrelationship between the metabolism of leucine and that of fatty acids.

MECHANISM AND SITE OF SMALL INTESTINAL UPTAKE OF VITAMIN D_3 IN PHARMACOLOGICAL CONCENTRATIONS. D. Hollander (Div. of Gastroenterol., Wayne State Univ., and Harper Hosp., Detroit, Mich., and Albany Med. Col., Albany, N.Y.) *Am. J. Clin. Nutr.* **29**, 970–5 (1976). The site and mechanism of initial uptake of 1,2-^{3}H vitamin D_3 in pharmacological concentrations was investigated using everted rat small bowel sacs incubated in a micellar medium. The mean ± SE uptake rates of the vitamin at 300 μM incubation solution concentration by proximal, medial, and distal small bowel segments were 6.7 ± 0.26, 7.8 ± 0.54, and 3.3 ± 0.20 nmole/min/100 mg tissue, respectively. Incubation with the addition of 10^{-3}M 2,4-dinitrophenol, or 10^{-3}M KCN, or under nitrogen atmosphere did not change ($P > 0.05$) the above rates of absorption. Incremental increases in the concentration of vitamin D in the incubation medium up to 1200 μM resulted in a linear increase in the uptake rate indicating lack of saturation kinetics. In all the above experiments, greater rate of uptake

of the vitamin occurred in the proximal and medial small bowel than the distal small bowel ($P < 0.01$). The above experiments indicate that vitamin D_3 in this range of concentrations is taken up by the enterocytes by a nonsaturable passive diffusion mechanism showing no evidence for carrier mediation. The rate of intestinal uptake is highest in the proximal and medial segments of the small bowel.

PHOSPHOLIPID CONTENT, COMPOSITION AND BIOSYNTHESIS DURING FETAL LUNG DEVELOPMENT IN THE RABBIT. S.A. Rooney, T.S. Wai-Lee, L. Gobran and E.K. Motoyama (Yale Univ. Lung Res. Cntr. and Depts. of Peds. and Anethesiology, Yale Univ. Sch. of Med., New Haven, Conn. 06510). *Biochim. Biophys. Acta* 431, 447–58 (1976). The phospholipid content and composition of lung wash and lung tissue as well as the activities of the enzymes involved in the synthesis of phosphatidylcholine and phosphatidylglycerol (the major surface active components of pulmonary surfactant) were studied in the rabbit during fetal lung development. During fetal lung development the activities of choline kinase and cholinephosphate cytidyltransferase changed little, cholinephosphotransferase decreased while lysophosphatidic acid acyltransferase and lysolecithin acyltransferase increased. There was a postnatal increase in the activities of cholinephosphate cytidyltransferase, cholinephosphotransferase and both acyltransferases. The amount of phosphatidylglycerol, as a percentage of the total phospholipid, in lung wash and lung tissue as well as the activity of pulmonary glycerolphosphate phosphatidyltransferase did not change appreciably during development.

BIOSYNTHESIS OF PHOSPHOGALACTOLIPIDS AND DIPHOSPHATIDYLGLYCEROL IN A MEMBRANE FRACTION OF BIFIDOBACTERIUM BIFIDUM VAR. PENNSYLVANICUS. J.H. Veerkamp (Dept. of Biochem., Univ. of Nijmegen, Geert Grooteplein Noord 21, Nijmegen, The Netherlands) *Biochim. Biophys. Acta* 441, 403–11 (1976). A particulate fraction from Bifidobacterium bifidum var. pennsylvanicus catalyzes the synthesis of phosphogalactolipids and diphosphatidylglycerol from phosphatidylglycerol. The phosphogalactolipids result from a transfer of the sn-glycerol 1-phosphate unit from phosphatidylglycerol to the (acylated) monogalactosyldiacylglycerols.

LOCALIZATION OF NEUTRAL GLYCOSPHINGOLIPIDS IN HUMAN PLASMA. F.A.J.T.M. Van Den Bergh and J.M. Tager (Lab. of Biochem., B.C.P. Jansen Inst., Univ. of Amsterdam, Plantage Muidergracht 12, Amsterdam, Netherlands) *Biochim. Biophys. Acta* 441, 391–402 (1976). The localization of the neutral glycosphingolipids glucosylceramide, lactosylceramide, trihexosylceramide and globoside in human plasma was investigated. Glycosphingolipids were isolated and analysed by gas-liquid chromatography. After Sephadex gel chromatography of human plasma, about 75% of the glycosphingolipids were found in the fraction containing most of the lipoproteins. After fractionation of the lipoproteins by ionic precipitation, 15–25% of each glycosphingolipid was found in the very low-density lipoprotein + chylomicron fraction, 30–45% in the low density lipoprotein fraction and 40–50% in the high density lipoprotein fraction. After fractionation of lipoproteins by density-gradient ultracentrifugation, 15% of each glycosphingolipid was found in the very low-density lipoprotein + chylomicron fraction and 85% in the low density and high density lipoprotein fractions. No glycosphingolipids could be detected in the ultracentrifugal residue which contains the bulk of the albumin.

A NEW RAT LIVER PHOSPHOLIPID EXCHANGE PROTEIN. C. Lutton and D.B. Zilversmit (Div. of Nutr. Sci., and Section of Biochem., Molecular and Cell Biol., Cornell Univ., Ithaca, N.Y. 14853) *Biochim. Biophys. Acta* 441, 370–9 (1976). The soluble fraction from several mammalian tissue homogenates is known to stimulate phospholipid exchange between cell membrane fractions or artificial vesicles. All phospholipid exchange proteins purified to date exhibit an acidic isoelectric point. The distribution of basic and acidic exchange proteins differs markedly in various tissues and animal species. About 50 and 35% of phosphatidylcholine exchange activity from rat liver and rat intestine respectively are due to basic phospholipid exchange proteins. In contrast, no basic exchange protein was found in beef heart and only a small amount in beef liver. In the latter organ, less than 10% of phosphatidylcholine exchange activity was due to a basic phospholipid exchange protein fraction.

LIPOPROTEIN LIPASE AND UPTAKE OF CHYLOMICRON TRIACYLGLYCEROL AND CHOLESTEROL BY PERFUSED RAT MAMMARY TISSUE. O. Zinder, C.R. Mendelson, E.J. Blanchette-Mackie and R.O. Scow (Section on Endocrinology, Lab. of Nutr., and Endocrinology, Natl. Inst. of Arthritis, Bethesda, Md. 20014) *Biochim. Biophys. Acta* 431, 526–37 (1976). The role of lipoprotein lipase in the uptake of chylomicron triacylglycerol and cholesterol from blood was studied in perfused inguinal-abdominal mammary tissue of rats lactating 10–15 days. Lipoprotein lipase activity in the tissue was reduced, from 0.47 to 0.10 units/g, by removing the anterior pituitary gland from lactating rats 2 days before the experiment. Perfused mammary tissue of normal lactating rats also took up 15% of the chylomicron cholesterol infused, whereas the tissue of hypophysectomized lactating rats took up less than 1%. The findings demonstrated that chylomicron cholesterol is taken up with triacylglycerol by lactating mammary tissue, and that uptake of both lipids is markedly suppressed when lipoprotein lipase activity is low, as in tissue of hypophysectomized rats.

THE EFFECT OF INTERMITTENT CARBON MONOXIDE EXPOSURE ON EXPERIMENTAL ATHEROSCLEROSIS IN THE RABBIT. R.F. Davies, D.L. Topping and D.M. Turner (Tobacco Res. Council Lab., Harrogate, Yorkshire, Great Britain) *Atherosclerosis* 24, 527–36 (1976). Twenty-four female New Zealand White rabbits were fed commercial diet plus 2% cholesterol. Twelve of these animals were exposed to carbon monoxide for 4 hours per day, seven days per week for 10 weeks. The carbon monoxide exposure was such that the mean blood carboxy-haemoglobin was raised to approximately 20% during each exposure period. Twelve control animals breathed atmospheric air under the same conditions of confinement as the carbon monoxide-exposed group. No significant differences in the plasma levels of cholesterol, triglycerides or glutamate oxalacetate transaminase were observed between the two groups during the experiment. These findings, are discussed with particular reference to the claim that the causal agent in tobacco smoke associated arterial disease in carbon monoxide.

STIMULATION OF PROLIFERATION IN STATIONARY PRIMARY CULTURES OF MONKEY AORTIC SMOOTH MUSCLE CELLS. PART 2. EFFECT OF VARYING CONCENTRATIONS OF HYPERLIPEMIC SERUM AND LOW DENSITY LIPOPROTEINS OF VARYING DIETARY FAT ORIGINS. K. Fischer-Dzoga and R.W. Wissler (Dept. of Path. and Specialized Cntr. of Res. on Ather., Univ. of Chicago, Chicago, Ill. 60637) *Atherosclerosis* 24, 515–25 (1976). The outgrowth of medial explants of thoracic aorta from Rhesus monkeys was used to study the influence of hyperlipemic serum on cell proliferation. After 5–6 weeks of rapid growth in BME plus 10% normal serum, the cultures reach a stationary phase during which they show little mitotic activity. When it replaces 5% of the normal serum in the media, hyperlipemic serum induces another proliferative phase in the cultures, as measured by [^{3}H]thymidine incorporation and increase in culture area. Normal LDL has no effect, even when concentrated to increase its cholesterol level in the media. Thus it appears that hyperlipemic LDL has a stimulatory effect on arterial smooth muscle cells which does not depend on its higher lipid on cholesterol level.

EFFECT OF THE PHOSPHOLIPID VEHICLE ON THE TRANSPORT OF CHOLESTEROL IN RATS. M. Dobiasova, J. Kymla and E. Faltova (Isotope Lab. of the Biol. Insts., and Inst. of Physiol., Czechoslovak Aca. of Sci., Prague-Krc, 140 00, Czechoslovakia) *Atherosclerosis* 24, 421–9 (1976). Rats were injected intravenously with liposomes made of [4-^{14}C]cholesterol with [^{32}P] lysolecithin, or [4-^{14}C]cholesterol with [^{32}P]lecithin. The clearance of both radioactive labels from plasma was observed, as well as their distribution in the organs after 15 and 60 min. At the same time, the esterification of injected [^{14}C] cholesterol and the conversion of [^{32}P]lysolecithin to [^{32}P] lecithin and vice versa were examined. [^{14}C]Cholesterol administered with lysolecithin was cleared from the plasma at a higher rate than with lecithin. Consequently the radioactivity of [^{14}C]cholesterol in the aorta, heart, lung, kidney and liver changed with the applied phospholipid; with lysolecithin it was higher than with lecithin. Lysolecithin itself was distributed among the organs more evenly than lecithin, which accumulated most in the liver. If administered with lysolecithin, [^{14}C]cholesterol was esterified in the plasma in a significantly higher proportion than if administered with lecithin. The antiatherogenous effect of lecithin and the atherogenous effect of lysolecithin are considered on the basis of different transport properties of these phospholipids.

EFFECTS OF DIETARY CARBOHYDRATE, FAT AND PROTEIN ON GROWTH, BODY COMPOSITION AND BLOOD METABOLITE LEVELS IN THE DOG. D.R. Romsos, P.S. Belo, M.R. Bennink, W.G. Bergen

and G.A. Leveille (Depts. of Food Sci. and Human Nutr. and Animal Husbandry, Michigan State Univ., East Lansing, Mich. 48824) *J. Nutr.* **106**, 1452–64 (1976). Six semipurified canned diets ranging in composition from 0 to 62% of energy from carbohydrate and from 20% to 48% of energy from protein were fed to female beagle dogs for 8 months. Additionally, three commercial-type diets were also fed. The effects of these diets on growth, body composition and selected blood metabolite levels in the dogs were studied. The dogs readily consumed each of the nine diets fed. The level of carbohydrate, fat or protein in the diet did not influence body weight gain during the first 16 weeks nor was nitrogen balance affected by the diets. At the end of the 32-week study, dogs fed the high-carbohydrate (62% of energy) diet contained less body fat, but an equal fat-free mass, than did dogs fed lower-carbohydrate (20%–42% of energy) diets with a similar quantity of protein. Consumption of carbohydrate-free diets did not influence postprandial levels of circulating glucose or insulin in the dogs. Plasma cholesterol levels were elevated in dogs consuming the diets high in fat but plasma triglyceride levels were not influenced by the diets fed.

EFFECT OF DIETARY CONTROL AND EXERCISE TRAINING ON DAILY FOOD INTAKE AND SERUM LIPIDS IN POSTMYOCARDIAL INFARCTION PATIENTS. E.W. Watt, J. Wiley and G.F. Fletcher (Depts. of Med., Georgia Baptist Med. Ctr. and Emory Univ. School of Med., Atlanta, Ga. 30322) *Am. J. Clin. Nutr.* **29**, 900–4 (1976). The effects of 12 weeks of exercise training without dietary control (n = 30) and exercise training with dietary control by dietitian counseling (n = 30) on serum cholesterol, serum triglycerides, and total substrate contents were studied in 60 postmyocardial infarction patients. It is concluded that significant reductions in caloric intake and daily dietary cholesterol compliment the effects of exercise training in postmyocardial infarction patients by increasing substrate protein: fat consumption ratio and by reducing serum cholesterol and triglycerides. These effects are not seen with exercise training alone.

SERUM LIPIDS IN ALCOHOLIC PATIENTS WITH AND WITHOUT CIRRHOSIS OF THE LIVER, WITH PARTICULAR REFERENCE TO ENDOGENOUS FAMILIAL HYPERTRIGLYCERIDEMIA. A.J. Patek and S. Earampamoorthy (Med. Service, Boston Vet. Admin. Hospital, and the Dept. of Med., Tufts Univ. Sch. of Med., Boston) *Am. J. Clin. Nutr.* **29**, 1122-6 (1976). The purpose of this study was to determine the frequency of hypertriglyceridemia in alcoholic patients with and without cirrhosis of the liver. It had been observed by others that subjects with endogenous familial hypertriglyceridemia (type IV hyperlipoproteinemia) showed an exaggerated lipidemic response to ingestion of alcohol, and, therefore, might be predisposed to hepatic cirrhosis. Comparison of 40 alcoholic cirrhotics with 40 noncirrhotic alcohol patients showed no increased incidence of hypertriglyceridemia in either group. The findings suggest that the frequency of cirrhosis in the general population is not materially affeced by subjects with this metabolic defect.

MECHANISM OF RAT LIVER MICROSOMAL STEARYL-CoA DESATURASE. STUDIES OF THE SUBSTRATE SPECIFICITY, ENZYME-SUBSTRATE INTERACTIONS, AND THE FUNCTION OF LIPID. H.C. Enoch, A. Catala and P. Strittmatter (Dept. of Biochem., Univ. of Conn. Health Ctr., Farmington, Conn. 06032) *J. Biol. Chem.* **251**, 5095–103 (1976). The three purified proteins which are required for microsomal stearyl-CoA desaturation, NADH-cytochrome b_5 reductase, cytochrome b_5, and desaturase, have been combined with egg lecithin or dimyristyl lecithin vesicles to reconstruct a functional electron transport system capable of utilizing NADH and O_2 in the desaturation of stearyl-CoA. Acyl-CoA derivatives containing 12 to 19 carbon fatty acyl chains are required for desaturase activity while derivatives containing 9 to 20 carbons are capable of binding to the enzyme. Shorter chain acyl-CoA derivatives, free CoA, and free fatty acids do not appear to bind to the enzyme. The decrease observed in the deuterium isotope rate effect below the transition temperature indicates that a step in the reaction sequence other than hydrogen abstraction becomes rate-limiting when the lipid is in the crystalline state. In this system translational diffusion does not emerge as the rate-limiting step.

25-HYDROXYVITAMIN D TRANSPORT IN HUMAN PLASMA. ISOLATION AND PARTIAL CHARACTERIZATION OF CALCIFIDIOL-BINDING PROTEIN. J.G. Haddad and Jean Walgate (Dept. of Med., Washington Univ. School of Med., The Jewish Hosp. of St. Louis, St. Louis, Mo. 63110) *J. Biol. Chem.* **251**, 4803–9 (1976). The binding protein for 25-hydroxycholecalciferol (25-OH-D_3 or calcifidiol) in human plasma has been purified from Cohn Fraction IV. Following *in vitro* labeling with 25-OH-[^{3}H]D_3, the isolation sequence of procedures included: DEAE-cellulose chromatography; gel filtration on Sephadex G-200; chromatography on DEAE-Sephadex; preparative polyacrylamide gel electrophoresis. These procedures resulted in a calcifidiol-binding protein (Cal-BP) which had been purified approximately 170-fold, and which was homogeneous by physical and immunological criteria. This finding supports an earlier report of the identity of calciferol/calcifidiol-binding protein and group-specific component in human serum. The Cal-BP content of human serum is approximately 10^{-5} M, whereas the calcifidiol content is approximately 10^{-7} M. Normally, the dominant moiety of human plasma Cal-BP is the apoprotein.

EFFECT OF TYPE OF DIETARY FAT, CHOLESTEROL AND CHENODEOXYCHOLIC ACID ON GALLSTONE FORMATION, BILE ACID KINETICS AND PLASMA LIPIDS IN SQUIRREL MONKEYS. N. Tanaka, O.W. Portman and T. Osuga (Dept. of Nutr. and Metabolic Diseases, Oregon Reg. Primate Res. Center, Beaverton, Oregon, 97005) *J. Nutr.* **106**, 1123–34 (1976). To explore the effect of type of dietary fat, cholesterol and chenodeoxycholic acid on gallstone formation, bile formation, bile composition, bile acid kinetics and plasma lipids in squirrel monkeys, 39 monkeys were studied using seven different diets. Diet influences bile composition and bile acid kinetics, as well as the incidence of gallstones, in squirrel monkeys.

USE OF LIPID VESICLES AS CARRIERS TO INTRODUCE ACTINOMYCIN D INTO RESISTANT TUMOR CELLS. D. Papahadjopoulos, G. Poste, W.J. Vail and J.L. Biedler (Dept. of Exp. Pathol., Roswell Park Memorial Inst., Buffalo, New York 14263) *Cancer Res.* **36**, 2988–94 (1976). Unilamellar lipid vesicles have been used as a carrier vehicle to enhance the uptake of actinomycin D into an actinomycin D-resistant Chinese hamster tumor cell line (DC-3F/ADX). The DC-3F/ADX cell line is resistant to actinomycin D as a result of its decreased capacity to transport actinomycin D across the plasma membrane and is able to grow in the presence of concentrations of actinomycin D that are cytotoxic for the sensitive parent cell line (DC-3F). Incubation of resistant DC-3F/ADX cells with actinomycin D-containing vesicles produced a 5-fold increase in intracellular drug concentration over that achieved by exposure to identical concentrations of the drug added to the culture medium. These results lend strong support to the hypothesis that cellular resistance to actinomycin D is due to a lower capacity to take up actinomycin D as a result of a reduction in the permeability of the cellular plasma membrane to this drug. The potential value of lipid vesicles for introducing other classes of drugs into cultured cells and their possible use in chemotherapy are also discussed.

FATTY ACID OXIDATION, SUBSTRATE SHUTTLES, AND ACTIVITY OF THE CITRIC ACID CYCLE IN HEPATOCELLULAR CARCINOMAS OF VARYING DIFFERENTIATION. A.I. Cederbaum and E. Rubin (Depts. of Pathol. (A.I.C., E.R.), and Biochem. (A.I.C.), Mount Sinai School of Med. of the City Univ. of New York, New York, N.Y. 10029) *Cancer Res.* **36**, 2980–7 (1976). Fatty acid oxidation, reconstituted substrate shuttles, and the activity of the citric acid cycle were studied in mitochondria isolated from Becker transplantable hepatocellular carcinoma H-252 and host livers, and the results were compared with those obtained with Morris hepatomas 7288CTC and 5123C. Whereas the activities of the malate-aspartate and the α-glycerophosphate shuttles were only slightly lower than those of host livers, the activity of the fatty acid shuttle was much lower in H-252 mitochondria. Oxygen uptake and CO_2 production associated with the oxidation of fatty acids was much lower in tumors H-252 and 7288CTC, compared with host livers, whereas tumor 5123C mitochondria show a high capacity to oxidize fatty acids. The different properties with regard to fatty acid oxidation in Morris hepatoma 5123C, compared with those in Becker H-252 and Morris hepatoma 7288CTC, may reflect the different extent of differentiation in these tumors, the former being a slow-growing, well-differentiated tumor, whereas the latter represent tumors that are less differentiated and of more rapid growth rate.

SPECIFIC, REVERSIBLE INACTIVATION OF PHOSPHOFRUCTOKINASE BY FRUCTOSE-1,6-BISPHOSPHATASE. INVOLVEMENT OF ADENOSINE 5′-TRIPHOSPHATE, OLEATE, AND 3-PHOSPHOGLYCERATE. R.T. Proffitt, L. Sankaran and B.M. Pogell (Dept. of Microbiol., St. Louis Univ. School of Med., St. Louis, Mo. 63104) *Biochemistry* **15**, 2918–25 (1976). Optimal conditions necessary for the reversible inactivation of crystalline rabbit muscle phosphofructokinase by homogeneous rabbit liver fructose-

1,6-bisphosphatase have been studied. Attempts to demonstrate direct interaction between phosphofructokinase and fructose-1,6-bisphosphatase by physical methods were unsuccessful. Nevertheless, our results suggest that, under conditions which approximate the physiological state, the presence of fructose-1,6-bisphosphatase can cause phosphofructokinase to assume an inactive conformation. This interaction may have a significant role *in vivo* in controlling the interrelationship between glycolysis and gluconeogenesis.

EFFECTS OF ETHANOL ON BILE ACID AND CHOLESTEROL METABOLISM. P.J. Nestel, L.A. Simons, and Y. Homma (Dept. of Clin. Sci., The Australian Nat. Univ., Canberra, Australian Capital Territory and Dept. of Med., Univ. of New South Wales, Sydney, New South Wales, Australia) *Am. J. Clin. Nutr.* **29**, 1007–15 (1976). The effects of ethanol on plasma lipid and lipoprotein concentrations and on the fecal excretion of neutral sterols and bile acids were studied in three patients with ethanol-induced hyperlipidemia and in four normolipidemic men. In the three patients, plasma triglyceride and cholesterol concentrations were much higher with ethanol than during periods when ethanol was isocalorically substituted with either carbohydrate or both fat and carbohydrate. In the normolipidemic subjects, plasma lipids especially in very low density lipoproteins, were higher with ethanol consumption only in comparison with a balanced diet but not when compared with carbohydrate-rich diets. Since cholesterol turnover did not appear to be necessarily influenced by ethanol, as judged either by total endogenous sterol excretion or from the slope of the plasma cholesterol specific radioactivity-time curve, the ethanol-induced increase in bile acid excretion may not be analogous to other clinical disorders in which increased bile acid excretion and hypertriglyceridemia are associated with raised sterol production.

METABOLISM OF Δ^7- AND $\Delta^{5,7}$-STEROLS BY PHYTOPHTHORA CACTORUM. B.A. Knights and C.G. Elliott (Botany Dept., Univ. of Glasgow, Glasgow G12 8QQ, U.K.) *Biochim. Biophys. Acta* **411**, 341–6 (1976). Δ^7- and $\Delta^{5,7}$-sterols are converted to the corresponding Δ^5-sterols by *Phytophthora cactorum*. When Δ^7-sterols were supplied to the fungus, Δ^5- and Δ^7-sterols were recovered in an acetone extract of the mycelium, the porportion of Δ^5-sterol being higher in the free sterol fraction than in the esters. When $\Delta^{5,7}$-sterols were supplied, Δ^5-sterols were recovered. No $\Delta^{5,7}$-sterols were found in the mycelium. The initial rate of uptake of the sterols was in the order $\Delta^5 > \Delta^7 > \Delta^{5,7}$.

ACTIVITY AND PROPERTIES OF CTP: CHOLINEPHOSPHATE CYTIDYLYLTRANSFERASE IN ADULT AND FETAL RAT LUNG. W. Stern, C. Kovac and P.A. Weinhold (Veterans Admin. Hosp. and Dept. of Biol. Chem., Univ. of Michigan Med. School, Ann Arbor, Mich.) *Biochim. Biophys. Acta* **441**, 280–93 (1976). Cholinephosphate cytidylyltransferase (CTP:cholinephosphate cytidylyltransferase, EC 2.7.7.15) is located in both the microsomal and supernatant fractions of adult lung when the tissue is homogenized in 0.145 M NaCl. The activity is located predominantly in the supernatant fraction in fetal lung. Cholinephosphate cytidylyltransferase in the supernant from fetal lung is stimulated 4- to 6-fold by the additions of total lung lipid. Serine phosphoglycerides and inositol phosphoglycerides specifically caused stimulation whereas choline phosphoglycerides and ethanolamine phosphoglycerides produced no stimulation. Lysophosphatidylcholine cause some stimulation, but only at high concentrations. A number of detergents were investigated. All produced inhibition exeept for the ampholytic detergent, miranol H2M which was not inhibitory.

EFFECTS OF PHOSPHOLIPID BASE ANALOGUES ON THE SUBCELLULAR MEMBRANE ETHER COMPOSITION OF SUSPENSION CULTURED LM CELLS. F. Schroeder and P.R. Vagelos (Dept. of Biol. Chem., Div. of Biol. and Biomed. Sci., Washington Univ., St. Louis, Mo. 63110) *Biochim. Biophys. Acta* **441**, 239–54 (1976). A strain of mouse fibroblasts, LM cells, was cultured in suspension with a chemically defined medium in the absence of lipid or serum. The subcellular distribution of ether-linked lipids in these cells was determined. *O*-alkyl and *O*-alk-1-enyl glycerolipids were found in plasma membranes, microsomes, and mitochondria. The glyceryl ether diesters from all three membrane fractions were devoid of *O*-alk-1-enyl moieties. Phospholipids contained both *O*-alkyl and *O*-alk-1-enyl ether chains. The distribution of these lipids among the subcellular fractions was not uniform. Microsomes contained the largest quantities of *O*-alkyldiacylglycerols, *O*-alkylacylphosphatides, and *O*-alk-1-enylacylphosphatides. Mitochondria were essentially devoid of *O*-alk-1-enyl phospholipids.

SPHINGOLIPID BASE METABOLISM. PARTIAL PURIFICATION AND PROPERTIES OF SPHINGANINE KINASE OF BRAIN. D.D. Louie, A. Kisic and G.J. Schroepfer, Jr. (Depts. of Biochem. and Chem., Rice Univ., Houston, Tex. 77001) *J. Biol. Chem.* **251**, 4557–64 (1976). The presence of sphinganine kinase in bovine brain has been demonstrated. The product of the action of the brain enzyme on sphinganine has been characterized as sphinganine 1-phosphate by a combination of chemical, enzymatic, and chromatographic techniques. The bovine brain enzyme has been partially purified and appears to exist in multiple forms. The molecular weight of the most highly purified preparation of the enzyme was estimated to be 190,000 by gel filtration. The purified form of the enzyme showed highest activity with ATP but was also active with other purine nucleoside triphosphates. UTP and CTP did not serve as substrates for the enzyme.

TRIACYLGLYCEROL SYNTHESIS IN ISOLATED FAT CELLS. STUDIES ON THE MICROSOMAL DIACYLGLYCEROL ACYLTRANSFERASE ACTIVITY USING ETHANOL-DISPERSED DIACYLGLYCEROLS. R. Coleman and R.M. Bell (Dept. of Biochem., Duke Univ. Med. Center, Durham, N.C. 27710) *J. Biol. Chem.* **251**, 4537–43 (1976). The acyl-CoA:1,2-diacylglycerol acyltransferase (EC 2.3.1.20) activity of isolated fat cells was predominantly (89%) localized to the microsomal subcellular fraction by assays based on the conversion of 1,2-[^{3}H]diacyl-*sn*-glycerol to triacylglycerol using 1 to 4 μg of protein. A complementary assay based on the conversion of [^{3}H]palmitoyl-CoA to triacylglycerol was developed. These methods, 100 to 1000 times more sensitive than those previously employed, were used to characterize the microsomal activity. The choice of dispersing agent for addition of diacylglycerol to the reaction mixture was crucial. Addition of diacylglycerol in ethanol resulted in the highest diacylglycerol acyltransferase activity of the methods tested. Tween 20, which has previously been employed as the dispersing agent, severely inhibited the activity. A broad pH optimum from 7.4 to 8.0 was noted and several salts stimulated the activity more than 2-fold. The activity was unstable at temperatures of 28° and above. Dependences on acyl-CoAs containing 6 to 18 carbon atoms were investigated using bacterial diacylglycerol. Diacylglycerol acyltransferase specific activities were 17-fold higher in microsomes from isolated fat cells than any other tissue examined.

MECHANISM OF ATP HYDROLYSIS BY SARCOPLASMIC RETICULUM AND THE ROLE OF PHOSPHOLIPIDS. H. Nakamura, R.L. Jilka, R. Boland and A.N. Martonosi (Dept. of Biochem., St. Louis Univ. School of Med., St. Louis, Mo. 63104) *J. Biol. Chem.* **251**, 5414–23 (1976). Exchange of sarcoplasmic reticulum phospholipids with dipalmitoyllecithin inhibits the (Mg^{2+} + Ca^{2+})-activated ATPase activity below 40° by inhibition of the decomposition of phosphoprotein intermediate. The rate of phosphoprotein formation and the steady state concentration of phosphoprotein measured by rapid kinetic techniques are affected to a lesser extent. The inhibitory effect of dipalmitoyllecithin on ATPase activity is probably related to the viscosity of the hydrocarbon region of the membrane which inhibits the conformational change leading to calcium translocation and the eventual cleavage of phosphoprotein.

STIMULATION OF GUANYLATE CYCLASE OF FIBROBLASTS BY FREE FATTY ACIDS. D. Wallach and Ira Pastan (Lab. of Mole. Biol., Nat'l. Cancer Inst., Nat'l. Insts. of Health, Bethesda, Maryland 20014) *J. Biol. Chem.* **251**, 5802–9 (1976). The membranous guanylate cyclase of Balb 3T3 fibroblasts was stimulated by a fraction of calf serum extracted by ether. Stimulation was observed with Mg^{2+} as the only bivalent cation in the presence of Lubrol PX. The activator co-chromatographed with free fatty acids, and several of these were found to stimulate guanylate cyclase. Among the saturated fatty acids, myristic acid had the highest activity. Stimulating activity diminished as the hydrocarbon chain of the fatty acid was lengthened or shortened. Introduction of an unsaturated bond enhanced the activation by the longer fatty acids. This pattern of specificity is similar to that observed for the effect of fatty acids on many other membranous functions. Under appropriate conditions fatty acids were found to stimulate guanylate cyclase activity in the absence of Lubrol PX. The relationship among the effects of Mg^{2+}, Mn^{2+}, Lubrol PX, and fatty acids on enzyme activity was examined. On the basis of these studies, it appears that fatty acids stimulate the enzyme by a mechanism different from nonionic detergents or Mn^{2+}.

THE RELATIONSHIP BETWEEN CHAIN ELONGATION OF PALMITOYL-CoA AND PHOSPHOLIPID CONTENT IN RAT LIVER MICROSOMES. Y.

Kawashima, M. Nakagawa, Y. Suzuki and M. Uchiyama (Pharmaceutical Inst., Tohoku Univ., Aobayama, Sendai, Japan) *Biochim. Biophys. Acta* **441**, 173–80 (1976). The relationship between the chain elongation of palmitoyl-CoA and phospholipid content in rat liver microsomes was studied. When liver microsomes were incubated with phospholipase C, microsomal phospholipids were linearly hydrolyzed during 10 min of incubation under the present experimental conditions. Coincident with the decrease in microsomal phospholipid content by phospholipase C treatment, the chain elongation activity also decreased linearly. The decreased chain elongation activity in phospholipase C-treated microsomes was completely or partially recovered by the addition of a sonicated dispersion of phosphatidylcholine, microsomal phospholipids or phosphatidylcholine/phosphatidylethanolamine mixtures. The chain elongation activity of palmitoyl-CoA was inhibited by the addition of steroyl-CoA which is the end-product of this reaction. The inhibitory effect of stearoyl-CoA was partially eliminated by the addition of a sonicated dispersion of phosphatidylcholine. The increase of the chain elongation activity in native and phospholipase C-treated microsomes by the addition of a sonicated dispersion of phosphatidylcholine was not related to the activity of fatty acyl-CoA hydrolase.

PHOSPHOLIPID COMPOSITION OF CULEX QUINQUEFASCIATUS AND CULEX TRITAENIORHYNCHUS CELLS IN LOGARITHMIC AND STATIONARY GROWTH PHASES. H.M. Jenkin, E. McMeans, L.E. Anderson and T.K. Yang (The Hormel Inst., Univ. of Minn., 801 16th Ave. N.E., Austin, Minn. 55912) *Lipids* **11**, 697–704 (1976). *Culex quinquefasciatus* and *Culex tritaeniorhynchus* cells were grown in spinner culture and harvested in logarithmic and stationary phases of growth. The phospholipids were extracted from the cells, and the fatty acid profiles of the phospholipid classes were determined and compared. The major components were phosphatidylcholine and phosphatidylethanolamine, constituting $\geq$ 80% of the phospholipid. The fatty acid profiles of lysophosphatidylcholine, phosphatidylinositol, and cardiolipin showed changes with aging of the Culex cells and between the species. Differences in the percentage composition of the fatty acids were shown in all the phospholipid fractions between the Culex species in the logarithmic phase of growth and all except the phosphatidylinositol and cardiolipin fractions in the stationary phase.

PARTIAL PURIFICATION AND PROPERTIES OF DIGLYCERIDE KINASE FROM ESCHERICHIA COLI. E. Gayle Schneider and E.P. Kennedy (Dept. of Biol. Chem., Harvard Med. School, Boston, Mass. 02115) *Biochim. Biophys. Acta* **441**, 201–12 (1976). Diglyceride kinase (diacylglycerol kinase, E.C. 2.7.1.–), an enzyme localized in the inner membrane of *Escherichia coli*, has been purified about 600-fold. The purified enzyme exhibits an absolute requirement for magnesium ion; its activity toward both lipid and nucleotide substrates is stimulated by diphosphatidylglycerol or other phospholipids. Adenine nucleotides are much better substrates for the enzyme than are other purine or pyrimidine nucleotides. The purified enzyme preparation catalyzes the phosphorylation of a number of lipids, including ceramide and several ceramide and diacylglycerol-like analogs. The broad lipid substrate specificity of diglyceride kinase suggests that this enzyme may function in vivo for the phosphorylation of an acceptor other than diacylglycerol.

KINETIC ANALYSIS OF THE ACTION OF SOYBEAN LIPOXYGENASE ON LINOLEIC ACID. J.W. Lagocki, E.A. Emken, J.H. Law and F.J. Kezdy (Northern Reg. Res. Ctr., ARS, USDA, Peoria, Ill. 60604) *J. Biol. Chem.* **251**, 6001–6 (1976). The time course of the soybean lipoxygenase-catalyzed oxygenation of linoleic acid has been analyzed using a kinetic scheme based on two binding sites, compulsory product activation and competitive inhibition by substrate and by product. The dissociation constant (K_p) of the product from the free enzyme is much smaller than 10^{-5} M, the dissociation constant of the substrate from the enzyme · substrate · product complex (K_{ps}) has a value of $(7.7 \pm 0.3) \times 10^{-6}$ M, and the competitive inhibition constant of the product (K_{pp}) is equal to $(2.9 \pm 0.3) \times 10^{-5}$ M. Reduction of the hydroperoxide product to a hydroxy acid by sodium borohydride does not alter the product activation kinetics. From the study of the time course of the reaction, no evidence was found for the irreversible inactivation of the enzyme.

• Detergents

PREPARATION OF SPRAY DRIED CALCIUM CARBONATE-CONTAINING GRANULES. S.D. Cherney (Procter & Gamble). *U.S. 3,992,314.* The process consists of mixing a water soluble alkali metal carbonate, bicarbonate, and/or sesquicarbonate, water, and submicron calcium carbonate particles to form an aqueous slurry substantially free of the water soluble salts of silicates, phosphates, and anionic surfactants followed by spray drying the slurry. The resulting calcium carbonate-containing granules have a high effective surface area and a low degree of agglomeration.

LIQUID COMPOSITION FOR FABRIC TREATMENT. H.J. Zenon. *U.S. 3,992,332.* A water soluble composition for treating fabrics consists of at least 1% of a water soluble silicone glycol copolymer, at least 5% of a fiber-coupling and antistatic agent including a phoshate derivative of anionic series selected from the group consisting of alkyl phosphate esters, and at least 70% water. Additionally, the composition may contain at least 0.5% detergent selected from the group consisting of coconut fatty acid alkanolamide.

COLORIMETRIC METHOD FOR THE ANALYSIS OF RESIDUAL ANIONIC OR CATIONIC SURFACTANTS. L.K. Wang (Calspan Corp.). *U.S. 3,992,149.* An aliquot of the aqueous solution to be tested is shaken with a buffer solution, a dye reagent, and chloroform. If anionic surfactant is present, it is extracted into the chloroform, reacts with the dye, and is determined colorimetically. A second aliquot of the aqueous solution is taken, buffered, and mixed with a second dye and chloroform. Cationic surfactant, if present, is extracted into the chloroform layer and then determined colorimetrically.

LIQUID REGULATED FOAM DETERGENT COMPOSITIONS. M. Berg, J. Hoffmeister, G. Jakobi, and P. Krings (Henkel & Cie). *U.S. 3,985,670.* A phosphate-free washing agent composition consists of (a) 15–60% of a mixture of low and high ethoxylated ethylene oxide adducts to fatty alcohols; (b) 0.2–8% of foam inhibitors selected from the group consisting of nonsurface active foam inhibitors at levels of 0.2 –0.8%, alkali metal salts of saturated fatty acids at levels of 1.5–8.0%, and mixtures of the two; (c) 0.3–15% of a water soluble salt of an organic compound capable of sequestering calcium; (d) 10–40% of a water soluble or water emulsifiable organic solvent having no more than 7 carbon atoms; (e) 0–10% of at least one of the following: optical brighteners, soil suspension agents, wash alkalis, antimicrobial compounds, hydrotropic compounds, and opacifiers; and (f) the balance to 100% water. The pH of a 1% aqueous solution of the composition is 8.5–10.

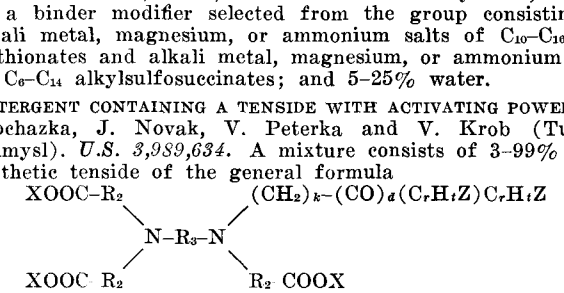
FABRIC TREATING COMPOSITIONS COMPRISING CLAY MIXTURES. M.S. Marsan (Procter & Gamble). *U.S. 3,989,631.* The composition comprises clay mixtures selected from hydrophilic Laponite clay and hydrophobic Laponite clay; hydrophilic Laponite clay and smectite clay; and hydrophobic Laponite clay and smectite clay. The smectite clay has an ion exchange capacity of at least 50 meq/100 g.

ANTIBACTERIAL COMPOSITION. G.N. Apostolatos, J.C. Bohrer and J.T. Inamorato (Colgate-Palmolive Co.). *U.S. 3,989,827.* The composition, effective against gram-positive and gram-negative bacteria, comprises 4,2′,4′-trichloro-2-hydroxy diphenyl ether and 3,5,4′-tribromo salicylanilide.

SULFOSUCCINATE DERIVATIVES AS DETERGENT BUILDERS. V. Lamberti (Lever Bros. Co.). *U.S. 3,989,700.* The derivatives are α-sulfoalkyl-β-sulfosuccinic acid and its alkali metal, ammonium, and substituted ammonium salts.

QUICK LATHERING TOILET BARS. L.M. Prince (Lever Bros. Co.). *U.S. 3,989,647.* A nonmushing, high lathering, synthetic toilet bar with a pH of 4.5–9.5 comprises 40–85% of a primary alkane sulfonate; 5–35% of a 12 carbon fatty acid; 5–30% of a binder modifier selected from the group consisting of alkali metal, magnesium, or ammonium salts of C_{10}–C_{16} acyl isethionates and alkali metal, magnesium, or ammonium salts of C_6–C_{14} alkylsulfosuccinates; and 5–25% water.

DETERGENT CONTAINING A TENSIDE WITH ACTIVATING POWER. K. Prochazka, J. Novak, V. Peterka and V. Krob (Tukovy prumysl). *U.S. 3,989,634.* A mixture consists of 3–99% of a synthetic tenside of the general formula



Z is H or –NH and X is alkali metal or hydrogen. The remainder of the mixture consists of conventional detergent additives.

BUILDER COMPOSITIONS. V. Lamberti (Lever Bros. Co.). *U.S. 3,990,983.* A particulate detergent composition consists of 20% cetyltrimethylammonium bromide, 50% trisodium carboxymethyloxy-succinate, 10% chlorinated trisodium phosphate, 10% sodium metasilicate, and 10% sodium sulfate.

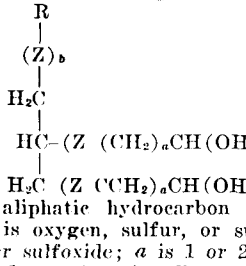
PROCESS FOR THE PREPARATION OF PHOSPHONATED N,N-DISUBSTITUTED FATTY AMIDES. R.R. Mod, J.A. Harris, J.C. Arthur, Jr., F.C. Magne, G. Sumrell, and A.F. Novak (U.S. Secy. of Agriculture). *U.S. 3,988,226.* The process comprises reacting N,N-disubstituted oleamide with a dialkyl phosphite using gamma radiation from cobalt-60 to initiate free radical reaction.

TOILET BARS. P. Seiden (Procter & Gamble). *U.S. 3,988,255.* Toilet bars which provide a soft, smooth skin texture after use comprise (a) 65–90% of a soap selected from the group consisting of alkali metal, ammonium, and alkanolamine salts of fatty acids of 8 to 24 carbon atoms; (b) 1–15% of a mixture of nonethoxylated sorbitan esters; and (c) 4–25% moisture. The mixture of sorbitan esters comprises 5–50% of monoesters, 20–90% of diesters, and 0–75% of tri- and tetraesters.

BUILT BLEACHING DETERGENT. G.J.P. Bezons and Y. Demangeon (Colgate-Palmolive Co.). *U.S. 3,991,000.* The composition comprises 4–40% of an organic detergent; 5–50% of an inorganic percompound; 15–30% of alkali metal builder salt; 10–19% of a water soluble salt of an acid selected from the group consisting of nitriloacetic acid, hydroxyethyl aminodiacetic acid, iminodiacetic acid, and N,N-bis(carboxymethyl)-amino-2-pentanedioic acid; and such percentage of a water soluble inorganic copper salt as to contain, on a detergent composition basis, 0.125–0.25% copper.

SOAP BARS. G. Srinivasan, R.M. Twemlow, and S. Varadarajan (Lever Bros. Co.). *U.S. 3,991,001.* The bars contain a superfatting agent which is a clathrate of urea and a free straight chain fatty acid having 8–22 carbon atoms. The clathrate amounts to 2–40% of the total soap.

HYDROXY SUBSTITUTED SULFOXIDES AND THIOETHERS. V. Lamberti and H. Lemaire (Lever Bros. Co.). *U.S. 3,988,377.* There is claimed a detergent having the structure:



R is an aliphatic hydrocarbon group having 5–15 carbon atoms; Z is oxygen, sulfur, or sulfoxide but at least one Z is sulfur or sulfoxide; *a* is 1 or 2; *b* is 0 or 1; *m* is 0 or 1; *n* is 0 or 1; $m + n$ in all occurrences is 1; and R′ is H, CH_2OH or CH_3.

DETERGENT COMPOSITIONS. H. Arai, K. Tsujii, and H. Kasai (Kao Soap Co.). *U.S. 3,988,265.* The compositions, which are effective for washing clothing, hair, kitchen articles, and the like, consist of 3 50% of water soluble 1-hydroxyalkane sulfate, a water soluble anionic or nonionic organic surface active agent, and water soluble neutral or alkaline inorganic builder salts or organic builders.

DETERGENTS' EFFECT ON FABRIC SOFTENERS. L. Hughes, J.M. Leiby, and M.L. Deviney (Ashland Chemical Co., Columbus, OH). *Soap, Cosmet. Chem. Spec.* 52(10), 44–52, 66 (October, 1976). Interactions of cationic softeners with detergent components in a wash cycle situation were studied. The two commercial fabric softeners used were dihydrogenated tallow dimethylammonium chloride ("Adogen" 442) and an imidazolinium type ("Varisoft" 475). Types of interactions studied were multiple exposure buildup, wash and rinse buildup, inhibition by detergent components and combinations of these, effect of hardness, and whether adsorption occurred via cations or ion pairs. In distilled water, anionic surfactants, alone or in combination with other detergent components, prevented softener deposition. Certain of the other components were also deleterious in this respect, and, generally, "Varisoft" 475 was more susceptible than "Adogen" 442. In hard water, the effect of the anionics was reduced: softener adsorbed onto cotton mode readily with increasing hardness. The opposite was true for nonionic surfactants. "Adogen" 442 and "Varisoft" 475 were indistinguishable in amounts adsorbed on cotton in the system ABS/Ca^{++} and in the system nonionic/Ca^{++}. For the SLS/Ca^{++} system, more "Adogen" 442 was adsorbed. Only cations were adsorbed at typical rinse cycle concentrations of softener, most likely by exchange. There was no scrambling of methyl groups between anion and cation in the case of "Varisoft" under wash cycle conditions.

PROCESS FOR IMPROVING GRANULAR DETERGENTS. S. Toyoda, K. Takenouchi, N. Ohno, and N. Hara (Lion Fat and Oil Co.). *U.S. 3,989,635.* The detergent consists of 5–40% of water soluble anionic and/or nonionic detergents and 40–95% of builders. The process comprises agitating the granular composition and simultaneously spraying onto it a substance to improve noncaking, flowability, and hardness properties. The sprayed-on substance consists of a first coating comprising alkali metal silicates, carbonates, and hydroxides and a second coating comprising aluminum sulfate. The aluminum sulfate reacts with the first material on the surfaces of the detergent particles to form a waer insoluble coating film. Coating is performed at 10–250C for 10 seconds to 10 minutes after which the composition is dried.

DIRECT DETERMINATION OF NONIONIC AND ANIONIC DETERGENTS IN EFFLUENTS. Z. Kozarac, V. Zutic and B. Cosovic (Marine Res. "Rudjer Boskovic" Inst., Zagreb, Croatia, Yugoslavia). *Tenside Deterg.* 13(5), 260–5 (1976). Electrochemical methods based on the measurement of the polarographic maximum of mercury (II), and of the capacity current by the Kalousek comutor technic, are proposed for direct determination of nonionic and anionic surfactants in effluents. The procedures were tested on various effluent samples of a large medical center and compared with parallel spectrophotometric measurements. The method of polarographic maximum of Hg(II) gives the total surfactant content in the sample, which corresponds to the total detergent content only in the case of fresh laundry effluents, where detergents are the predominant pollutants. Using the method of Kalousek commutator it is possible to determine nonionic and anionic detergents in a single measurement, even in a sewage sample. Analysis of an effluent sample includes appropriate dilution, addition of electrolyte and the electrochemical measurement of surfactants in the concentration range 0.05–5 and 0.1–0.7 ppm using the polarographic method and Kalousek commutator technic. Triton X114 and sodium lauryl sulfate were used as calibration substances.

A NEW METHOD OF SAPONIFYING FATS WITH THE POSSIBILITY OF ITS COMPLEX UTILIZATION. St. A. Ivanov and P.I. Vasvazova-Biceva (Plovdiver Univ. "P. Hildndarski," Science Chair for Chem. Technol. Bulgaria). *Seifen, Ole, Fette, Wachse.* 102(16), 459 61 (1976). Devised is a new method of heterogeneous saponification of fats with fine-dispersed hydrate of soda in the environment of a polar aprotic organic solvent—acetone and others, with the soaps developed being precipitated so that they can be used as soap powder after separation, with the glycerin and unsaponifiable accompanying agents remaining in the solvent. In this way, phase separation of fatty acids takes place at the same time as saponification, with this being in the form of sodium soap, of glycerin, and the unsaponifiable accompanying agent without additional application of liquid-liquid or liquid-solid extraction. This method permits complex utilization of fats and fat concentrates.

SCALP AND HAIR CLEANING. H. Tronnier (Stadt. Hautklinik, Dortmund). *Seifen, Ole, Fette, Wachse* 102(15), 433–7 (1976). The effects of chemical particles of a cleaning prescription are examined with a view to scalp and hair cleaning. Use of suitable washing raw materials and additional raw materials enables industry today not only to guarantee protection of hair during washing but also to specifically allow for certain structural anomalies of the scalp during treatment. The existing but medically irrelevant damage to hair and skin caused by any cleaning process can be unpleasant during simultaneous or subsequent treatment, if the hair is already damaged and in the case of endorgenously damaged hair or skin disease.

EFFECTS OF WASHING WASTE WATER ON THE ENVIRONMENT. R. Schulze-Rettmer (Westf. Techn. Hochschule Aachen). *Seifen, Ole, Fette, Wachse* 102(15), 427–30 (1976). According to the new sewage disposal law, the specific noxiousness of waste water must be examined. Here this is done with the waste water from the washing process. The points described are the waste water from the washing process, analysis of the waste water, noxiousness of the waste according to the sewage disposal law and the remaining noxiousness on the

sewage. Other points dealt with are the effects of sewage on water. Methods of reducing unfavorable ecological effects on the washing process are proposed.

METHODS OF ASSESSING UTILITY VALUES OF DETERGENTS. H. Harder, d. Arends and W. Pochandke (Henkel & Cie. GmbH, Dusseldorf). *Seifen, Ole, Fette, Wachse* 102(15), 421–6 (1976). Various methods are used today to check the washing effect of detergents. Absolutely reliable information about the effect on the washing can only be obtained by means of tests carried out under the same conditions as prevailing in practice. If more than three detergents are to be compared, special test schedules must be used. Brightness measurements are used to record the cleaning effect but, in addition to these measurements, visual assessments are also necessary. Other examinations are based on calcareous deposits in the washing machine for instance. The overall effect on the washing is made up of the sum of all influences to be measured.

MEASURING THE RATE OF DISSOLUTION OF PASTY SUBSTANCES. H.E. Tschakert (Marl). *Seifen, Ole, Fette, Wachse* 102(15), 415–20 (1976). The structures of pastes, especially pasty soap pastes, pasty tensides and washing pastes are reviewed. The dissolution processes of soap and tenside solutions are explained by reference to a comprehensive list of literature. An apparatus to measure the dissolution rate of pasty substances is described. In the practical section pasty washing raw materials and formulations of washing pastes and creams are described. Washing pastes, thickened with an increasing share of salt or CMC are formulated as test pastes, and their rate of dissolution is determined. Applied evaluation examples of washing paste solubility are enumerated.

RESEARCH ON THE INFLUENCE OF CATIONIC TENSIDE ON SILVER IODIDE SOLS. R. Despotovic, N. Filipovic and N. Pecek (Ruder Boskovic Inst., Zagreb, Jugoslavia). *Colloid Polym. Sci.* 254(10), 895–9 (1976). Colloid properties of silver iodide sols formed in statu nascendi are dependent on various factors. Ionic surfactants influence a series of colloid chemical properties of these sols. The results of radiometry (heterogeneous exchange processes), adsorption-desorption equilibria, tyndallometry, electron microscopy, microelectrophoresis, tensiometry and X-ray diffractometry are presented for negative silver iodide sols in the presence of a cationic tenside. The results are of importance in a radionuclide separation. A good fixation of radionuclides can be obtained by adding an adequate amount and type of surfactant to a radionuclide solution.

PRECIPITATION OF NONIONIC TENSIDES BY POLYMERIC ACIDS. SUPPLEMENTARY EFFECT OF INORGANIC SALTS AND ACIDS. S. Saito, T. Taniguchi and H. Matsuyama (Momotani Juntenkan, Ltd., Osaka, Japan). *Colloid Polym. Sci.* 254(10), 882–9 (1976). Addition of acid or inorganic salts, particularly of polyvalent cations, causes precipitation of nonionic surfactants of the polyoxyethylene type from water in the presence of polymeric acids, such as polyacrylic and polymethacrylic acids. The precipitation takes place more remarkably at higher temperature. The nonionics form water-soluble complexes with these polymeric acids, and the cations and H^+ give rise to contraction of the complexes, thus leading them to precipitation. The counterions (anions) also play some part in the precipitation reaction at high salt concentrations. The complex of polymeric acid and nonionics with longer polyoxyethylene chains is less affected by these additives on precipitation.

THE POLLUTION OF NATURAL WATERS BY SYNTHETIC DETERGENTS. IX. NONIONIC SURFACE AGENTS IN NATURAL WATERS. M.C. Dobarganes Garcia y J. Ruiz Cruz (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* 27, 259–65 (1976). A study on nonionic surface agents contribution to the problem of natural waters pollution by synthetic detergents, test methods, analytical and control methods, etc., has been made. The general lines of following papers on this subject are given.

SYNTHESIS AND ANTIMICROBIAL PROPERTIES OF *N*-SUBSTITUTED AMINO ACID TYPE AMPHOTERICS CONTAINING THIOETHER LINKAGE. Y. Abe and S. Osanai (Faculty of Engineering, Keio University, Yokohama), *Yukagaku* 25(7), 419–23 (1976). N-Substituted glycine-, alanine- and betaine-type amphoteric surfactants containing long chain alkylthio group were synthesized, and their growth inhibitory activities against Gram positive, Gram negative baccili and some fungi were studied. The effect of the alkylthio group on their antimicrobial and surface activities was compared to that of the alkoxy group of the corresponding N-substituted amino acid amphoterics containing alkoxy group. The obtained N-substituted amino acid amphoterics containing alkylthio group generally have large antimicrobial powers and excellent surface activities except alanine type derivatives. Dibasic amino acid-type amphoterics having an alkylthio group in the molecule were also tested. Their antimicrobial activities were less than those of the corresponding monobasic amino acid-type amphoterics. Furthermore, N-substituted glycine- and alanine- type amphoteric surfactants, which contained the ether and thioether linkages in the long chain were synthesized and their antimicrobial and surface activities were studied. It was found that the antimicrobial powers of N-substituted amino acid type amphoterics containing alkoxy group is enhanced by introducing an additional thioether group in the molecule. The relative position of ether and thioether group apparently affected their antimicrobial activities.

SOME SURFACE ACTIVE PROPERTIES AND ANTIMICROBIAL ACTIVITIES OF SALTS OF LONG CHAIN N-α-ACYL-L-ARGININE ESTERS. R. Yoshida, K. Baba, T. Saito, and I. Yoshimura (The Central Research Laboratories, Ajinomoto Co., Inc., Kawasaki-shi), *Yukagaku* 25(7), 404–8 (1976). Long chain N-α-acyl-L-arginines obtained by the reactions of C_{10}–C_{16} fatty acid chlorides with L-arginine, were esterified by ethyl alcohol containing dry hydrogen chloride to yield salts of long chain N-α-acyl-L-arginine esters. To examine their surface active properties and antimicrobial activities, Krafft point, pH value, critical micelle concentration, surface tension, foaming power, wetting and emulsifying properties and minimum inhibition concentration (MIC) were measured and these data were compared with those of benzyldimethyl {2- [2(p-1,1,3,3-tetramethylbutylphenoxy) ethoxy] ethyl} ammonium chloride (benzethonium chloride). Among the salts of long chain N-acyl-L-arginine esters, the lauroyl derivatives showed best surface active properties and antimicrobial activities, and had almost the same properties as those of benzethonium chloride. The hydrolysis properties of the salts of N-α-acyl-L-arginine esters were also examined.

PREPARATION OF POLYETHYLENEGLYCOL MONOESTERS OF SOME ALKYLDIHYDROXYBENZOIC ACIDS AND DETERMINATION OF SURFACE TENSION OF THEIR AQUEOUS SOLUTIONS AND OF ANTIMICROBIAL ACTIVITY. T. Uchibori, S. Watanabe and Y. Abe (School of Hygienic Sciences, Kitasato University, Kanagawa-ken), *Yukagaku* 25(7), 399–403 (1976). Tri- and tetraethyleneglycol monoesters of pentyl-, hexyl-, heptyl- and octyldihydroxybenzoic acids were prepared by the reaction of tri- and tetraethyleneglycol monochloride with alkyldihydroxybenzoic acids which had been obtained from resorcinol by acylation and then reduction to alkylresorcinol, followed by carboxylation. Surface tension of aqueous solutions of these esters was determined and it was found that the surface tension lowered to about 40 dyne/cm and with triethylene glycol monoesters, cmc were about 10^{-3} M and with tetraethyleneglycol monoesters, about 10^{-4} M. Antibacterial and antifungal activities were evaluated in terms of minimum inhibitory concentration by a dilution method. Antibacterial activity of the tetraethyleneglycol monoesters was found to increase markedly with increase in the number of carbon atoms of their alkyl group and the monoester of octyldihydroxy benzoic acid was as active as a commercial cationic surfactant. In the series of triethyleneglycol monoesters, that of heptyldihydroxybenzoic acid showed the highest activity. All the monoesters except tetraethylene- glycol monoester of pentyldihydroxybenzoic acid were highly active to M. gypseum and T. interdigital, unlike monoether of alkyl resorcynols.

SMALL MICELLE OF POTASSIUM CAPRYLATE. Y. Ishigami and H. Narasaki (National Chemical Laboratory for Industry, Tokyo), *Yukagaku* 25(6), 335 40, (1976). In the course of the study on the lower order molecular association of oligosoap and polysoap in aqueous solution, the aggregation and solution properties of potassium caprylate (KC_8) were investigated since its structure is simple and contains the same (polar) functional group, i.e. carboxylate, on those of oligosoap and polysoap. (1 The cmc values were measured by various methods. They were clearly observed and in good agreement with each other. (2 The pre-cmc aggregation of KC_8 may be probable in aqueous solution from the fact that reduced intensity vs. concentration plot shows a gradual ascent with increasing the concentration up to the cmc, and that the solubilization of the dye vs. concentration plot has two inflexion points. Further: (3 lower order molecular association of KC_8, (4 effective micellar charge and (5 polydispersity of the micelle size have been discussed. The characteristics of (2), (3), and (5) of KC_8 seem to be similar to those of oligosoap. ●