abstracts

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• Fats and Oils

DEVELOPMENT OF A PROCESS TO EXTRACT PROTEIN AND OIL FROM FRESH COCONUT. THE WORK OF THE TROPICAL PRODUCTS INSTITUTE. D.A.D. Dendy and W.H. Timmins (Tropical Products Institute, London). *Oleagineux* **29**, 37–43 (1974). The objective of the wet-milling experiments was to identify the conditions necessary for optimum extraction of the oil and protein from fresh coconut. The fundamental question concerned the nature of the extraction mechanism. The use of wedge mills was found most satisfactory for breaking open the coconut cells to release an emulsion of oil, protein and water, which is separated by pH adjustment and centrifugation to give high grade oil and protein. Overall yield is 85% for a pilot scale plant.

VISIBLE DEFECTS OF CASTOR SEED. G.A. Polcaninova et al. *Maslozir. Prom.* **1974**(4), 11–13. A visible defect of castor seed is the presence of yellow, dark gray and black almonds in the seed. The coloring of almonds is the result of the modification of chemical composition of their jelly part, due to the higher humidity of the seeds. Because of that, it is particularly important to clean and dry the castor seed. One of the methods, good for conserving the quality of castor seed, is to cool them after drying. (Rev. Franc. Corps Gras)

PRODUCTION OF THE FAT AND OIL INDUSTRY IN 1973. L.L. Razgon et al. *Maslozir. Prom.* **1974**(4), 27–34. The production of vegetable oils in 1973 was 2,396,000 t: sunflowerseed oil 1,440,200 t, cottonseed oil 648,700 t, soybean oil 168,500 t, linseed oil 57,700 t, castor oil 20,300, corn oil 10,700 t, mustard oil 13,700 t, and others 35,880 t. The soap production, calculated on 40% fatty acids, was 1,165,800 t. The margarine production reached 877,500 t. Synthetic detergents production was 229,200 t. (Rev. Franc. Corps Gras)

FORMATION OF TOCOPHERYL-O-QUINONE DURING THE MISCELLA-SOYBEAN OIL REFINING WITH ADSORBENT. A.N. Umanskaja et al. *Maslozir. Prom.* **1974**(4), 13–14. The content of tocopherols in soybean oil largely depends on the moisture content of the soybeans during extraction; the higher the water content, the less tocopherol in the extracted oil. At the same time, content of oxidation products of tocopherols (5-δ-tocopheroxy-δ-tocopherol and tocopheryl-o-quinone, "Toco-Red") is higher. With the increase of the quantity of the bleaching earth in the miscella, the concentration of "Toco-Red" is increased from 26 μg/g to 170 μg/g in miscella treated with 5% adsorbent. If the moisture content is only 8–11%, "Toco-Red" is not found in miscella either before or after treatment with the bleaching earth. (Rev. Franc. Corps Gras)

INFLUENCE OF ELECTROSTATIC FIELDS ON THE PROPERTIES OF A NICKEL-COPPER CATALYST. V.T. Zolocevskij et al. (KNIIP). *Maslozir. Prom.* **1974**(4), 15–17. KNIIP has elaborated a new method for catalyst separation from hydrogenated fat. The method is based on the precipitation of the catalyst on the electrodes in an electrostatic field. Comparative hydrogenation of the methyl esters of sunflowerseed oil with a catalyst before and after treatment in an electrostatic field has been done at 200–220C. A nickel-copper catalyst (ratio 5:1) was used. The results show that the electrostatic field has no influence on the quality of the catalyst. No change in the kinetics of hydrogenation of linoleic and oleic acids has been found. Results of many experiments conducted to examine the influence of the electrostatic field on the selectivity of the catalyst are given. (Rev. Franc. Corps Gras)

POSSIBILITY OF USE OF RHEOLOGICAL METHODS FOR STUDY OF PHYSICO-CHEMICAL STRUCTURE OF LIPIDS. Lj. Dakovic et al. (Tehnoloski fakultet, Novi Sad, Yugoslavia). *Bilt. Bil. ulja* **1973**(1–2), 7–18. Analysis of the internal structure of a colloidal lipid system, shows that rheological behavior is dependent of four elements which are given and elaborated mathematically and graphically. Many experiments have been done with butterfat and the results are discussed. (Rev. Franc. Corps Gras)

INFLUENCE OF THE PHOSPHATIDES ON THE REFINING PROCESS OF OILS. J. Lezajic et al. (Fabrika ulja, Zrenjanin, Yugoslavia). *Bilt. Bil. ulja* **1973**(1–2), 3–6. After discussing the physical and chemical properties of phosphatides, data on the influence of phosphatides on the refining process are given. It is necessary to eliminate phosphatides before refining. If they remain in the oil, many difficulties in the refining occur (loss of the oil during neutralization process, lowering of the bleaching power of the bleaching earth, etc.). (Rev. Franc. Corps Gras)

CHARACTERISTICS OF CHEMICAL COMPOSITION OF WINTER RAPESEED K-712 (LOW IN ERUCIC ACID). K. Babuchowski et al. *Zesz. nauk. ART Olszt. Rolnictwo* **1973**(3), 131–43. The weight of dry matter in 1000 seeds of rapeseed with low erucic acid content is about 24% less compared with other varieties of rapeseed. The content of erucic acid in rapeseed K-712 is reduced to 14.8%, while rapeseed with high erucic acid has 47.1%. Iodine number of oil from rapeseed K-712 is 110.9, while it is 100.4 in the oil from seed with high erucic acid content. The amino acid composition of proteins of meal from rapeseed K-712 is better; the content of lysine, glutanic acid, asparagine and arginine is higher. (Rev. Franc. Corps Gras)

STUDY OF INFLUENCE OF POLY(VINYL CHLORIDE) PACKAGING ON SOME QUALITATIVE ASPECTS OF EDIBLE FATS AND OILS AND ON THE MODEL MEDIA. M.Ya. Terskaya et al. *Voprosi Pitanija* **1974**(2), 24–8. A study has been done on edible fats and oils in PVC packaging. The quality of PVC materials has been examined. The results show that there is no danger of contamination and that the quality of fats and oils is well preserved in this kind of packaging. (Rev. Franc. Corps Gras)

COMPOSITION OF VOLATILE COMPOUNDS FROM DEODORIZATION OF VEGETABLE OILS. N. Plecas et al. (Tvornica ulja, Zagreb, Yugoslavia). *Bilt. Bil. ulja* **1973**(3–4), 13–17. Bibliographical

review is given of the data about composition of the volatile compounds from the deodorization of vegetable oils. Results obtained on deodorization of sunflowerseed oil, of a mixture of sunflowerseed and soybean oils, and of a hydrogenation soybean oil are given. (Rev. Franc. Corps Gras)

SOLUBILITY OF BRASSYLIC ACID. J. Cechnicki et al. *TSPK Pollena* **17**, 519–25 (1973). In consideration of its structure, brassylic acid theoretically should have good solubility in the solvents which can give or accept electrons. Contrary to that, the solubility is weak in other solvents, like heptane. The experiments show that in the solvents like acetone or ethyl acetate the solubility of brassylic acid is practically ideal. (Rev. Franc. Corps Gras)

REFINING OF SOYBEAN OIL. S.N. Volotovskaja et al. (VNIIZ). *Maslozir. Prom.* **1974**(2), 14–16. In soybean oil obtained from imported soybeans, the quantity of phosphatides varies between 3.2–3.5%, acidity value between 2.0–2.9, and the color between 70–76 mg of iodine. The experiments have been done with this oil to find optimal refining conditions. The optimal conditions for neutralization process were found: temperature 65–70C, alkali concentration 100 g/l with the excess of 20–30%. The yield of neutralized oil is 92.31–94.35%. Bleaching is done with 0.5–1% Actisil T_2 bleaching earth at 90–95C for 30 minutes. According to laboratory and semi-pilot experiments, the following technological scheme for soybean oil refining has been established: hydratation → treatment with citric acid solution → neutralization → washing → drying → bleaching → deodorization. (Rev. Franc. Corps Gras)

HYDROGENATION OF COTTONSEED OIL IN A SOLUTION WITH SEVERAL COMPONENT CATALYSTS. I.P. Nazarova et al. *Maslozir. Prom.* **1974**(2), 16–18. Hydrogenation of cottonseed oil in a mixture ethanol-hexane with the aluminum-nickel-copper catalyst was studied. It was found that the addition of chrome on the catalyst aluminum-nickel-copper accelerates the hydrogenation process. In the fat obtained by this hydrogenation, the content of trans fatty acids is lower, as is the melting point. The positional isomerization is also diminished. (Rev. Franc. Corps Gras)

NEW SAMPLING DEVICES. V.K. Lozesnik et al. *Maslozir. Prom.* **1974**(2), 29–32. UKRNIIMP has elaborated several methods for mechanical sample taking. One system is pneumatic and is designed for friable raw materials (seeds, meal, hulls, etc.). A similar system can be used for fats and oils. The authors described one pneumatic sample taking device for sunflower seed and also some others for taking samples of oilseeds, fluid oil from tank wagons, and oils and fats from cylindrical vertical tanks. (Rev. Franc. Corps Gras)

DETERMINATION OF AFLATOXINS IN COTTON SEEDS AND MEAL. E.P. Kjuz et al. *Maslozir. Prom.* **1974**(2), 13–14. Study of microflora of peanut seeds and meal and the determination of aflatoxins in them has been published in many papers. It is not true for the cotton seeds and meal. The authors verified a series of methods (Burnaseva, Velasco, Robertson, Willey, Pons), before they concluded that the determination of aflatoxins in cotton seeds and meal must be done by the following scheme: delipidation with hexane or petroleum ether, extraction of aflatoxins with chloroform, purification of extracts on an aluminum or silica gel KSK column, separation of aflatoxins by thin-layer chromatography, identification and determination by fluorescence. (Rev. Franc. Corps Gras)

STUDY OF THE PROCESS OF FLOC FORMATION IN PRE-PRESSED OIL. A.V. Necaeva et al. *Maslozir. Prom.* **1974**(2), 11–13. The influence of the quantity of water on the coagulation of phospholipidic complex is verified by the authors. They also studied the influence of the temperature of heating on the kinetics of floc formation in sunflowerseed oil. For crude pre-pressed oil, the optimal temperature for floc formation is 25C. (Rev. Franc. Corps Gras)

INFLUENCE OF HYDROTHERMAL TREATMENT ON THE INTENSIFICATION OF EXTRACTION PROCESS OF OIL. V.V. Kljuckin et al. (VNIIZ). *Maslozir. Prom.* **1974**(2), 8–11. Soybean cultivated in the Far East analyzes 18.5–21.7% oil, 39.8–44.0% crude protein and 2–3% of phospholipids. The soybean oil, obtained by direct extraction, had 1.8% phospholipids. The phospholipid content of the soybean meal is about 1.6%, protein content 50% and oil content 1%. Experiments done by the authors using a special hydrothermal treatment of soybean before extraction are described. The results show that the extraction of soybean oil is 4 times quicker if this treatment is used before extraction. (Rev. Franc. Corps Gras)

INDUSTRIAL EXPERIMENTS WITH THE RICE BRAN. O.F. Sulimenko et al. (Cent. Lab. Oil Industry of North Caucasia). *Maslozir. Prom.* **1974**(1), 37–8. The rice bran from Krasnodar area has been analyzed; the moisture content varies from 11.0–13.5%, and acid value of the oil from 17.22–113.0. The oil content in the rice bran was 9.5–10.5%. The oil was extracted in the extractor "Okrim." The obtained oil had the following characteristics: acid value 17.86–114.62, moisture 0.16–0.82% and phosphatides 0.43–0.56%. The oil in the meal was 0.54–0.78%, ash 8.5% (with 11.25% moisture) and 11.15–14.21% protein. (Rev. Franc. Corps Gras)

CLEANING OF EFFLUENTS OF OIL INDUSTRY WITH THE ELECTRICAL FLOTATION. V.S. Nadysev et al. *Maslozir. Prom.* **1974**(1), 39. The author describes an electrocoagulator elaborated by VNIIZ, which works on the same principle as electroflotator. The coagulator has aluminum electrodes, and during operation Al_2O_3 is formed which has good coagulation properties. When 50% of the electrodes are gone, it is necessary to replace them. VNIIZ has built an electrocoagulator to treat 1800 m^3 per day that is destinated for an oil factory in Bendery. (Rev. Franc. Corps Gras)

INFLUENCE OF THE MOISTURE ON THE DIELECTRIC CONSTANT OF LIPID EMULSIONS. Ju. G. Suharev et al. *Maslozir. Prom.* **1974**(1), 18–20. For moisture determination in lipid emulsions, it is convenient to use the dielectrometric method. This method is based on the linear relationship between dielectric constant of the emulsion and its moisture content. The different factors which influence this relation are given. Results show that this method is convenient for determination of the moisture in lipid emulsions when the moisture content is between 0.4–20%. (Rev. Franc. Corps Gras)

VARIATION OF PHYSICOCHEMICAL VALUES OF VEGETABLE OILS DURING DEODORIZATION. M.E. Koncalovskaja et al. *Maslozir. Prom.* **1974**(1), 14–18. Alkali refined sunflowerseed and cottonseed oils have been examined during and after deodorization. In these oils, peroxides are decomposed and carbonyls and conjugated trienes are formed during deodorization. Sunflowerseed oil treated with an adsorbent and then deodorized has a lower carbonyls content. The same results are obtained for cottonseed oil treated with an adsorbent. (Rev. Franc. Corps Gras)

STUDY OF THE COMPOSITION OF WAXES FROM LINSEED AND THEIR INFLUENCE ON THE THERMAL PROPERTIES OF OIL. B.Ja. Sterlin et al. *Maslozir. Prom.* **1974**(1), 12–14. The wax content of crude linseed oil varies between 0.01–0.05%. During the pre-pressing treatment of linseed, about 50% of total wax content comes from the seeds to the oil. The waxes have no influence on the thermal properties of linseed oil. It is interesting that in the wax composition of linseed, different fatty acids are present, with even and odd numbers of carbon atoms. (Rev. Franc. Corps Gras)

THE DILATATION COEFFICIENT OF SUNFLOWERSEED OIL AS A FUNCTION OF THERMAL PARAMETERS. A.N. Vyselesskij et al. *Maslozir. Prom.* **1974**(1), 10–12. Use of sunflowerseed oil for frying under vacuum or pressure in food industry made it necessary to determine some of thermophysical characteristics of this oil. The characteristics include, beside others, dilatation. The dilatation of sunflowerseed oil at pressures from 0 to 30 kg/cm^2 and for the temperatures from 50–200C is given. (Rev. Franc. Corps Gras)

STUDY OF ELECTROPHYSICAL CHARACTERISTICS OF SUNFLOWER SEED. V.V. Voroncov et al. *Maslozir. Prom.* **1974**(1), 6–8. By heating a material in an electromagnetic field of high frequency, the internal temperature of material is higher than the temperature on the surface. This temperature gradient accelerates the drying process. In sunflower seed, dielectric rigidity is a function of seed humidity. (Rev. Franc. Corps Gras)

CONTRIBUTIONS OF AGRONOMIC RESEARCH TO THE FAT INDUSTRIES. G. Fauconneau (I.N.R.A., Theix (63), 63110 Beaumont). *Rev. Franc. Corps Gras* **21**, 105–17 (1974). Research work related to fats and oils done in I.N.R.A. is reviewed. About fifty researchers are working on different problems involving vegetable and animal raw materials as well as technology. Different factors (genetic, environment, feeds) which have influence on the fatty acid composition of fats and oils are examined. Much work has been and is being done in the domain of vegetable proteins. The quality and content of protein in different varieties of sunflower and rapeseed are of special interest. The interdisciplinary characteristics of this research are pointed out.

EVALUATION AND AFLATOXIN ELIMINATION METHODS IN OILSEED PRODUCTS (OILS AND MEALS). A. Prevot (Inst. des Corps Gras-ITERG, Paris). *Rev. Franc. Corps Gras* 21, 91–103 (1974). Aflatoxin content in peanuts may be lowered by seed screening during receiving, dehulling or after dehulling. The different technics employed are described. The influence of the refining on aflatoxin elimination in oil is pointed out, then the meal detoxifying processes (solvent extraction, ammoniation, de Smet, Lesieur-Speichim methods) are discussed. Results obtained are examined from a chemical and nutritional point of view. Still it is not possible to say which method is best, from a nutritional point of view, for detoxifying meal contaminated by aflatoxin. It seems that ammoniation is the best method for industrial use.

STRUCTURE, BIOLOGICAL ACTIVITY AND DETERMINATION OF MYCOTOXINS CONTAMINATING OLEAGINOUS PRODUCTS. C. Frayssinet (Inst. Recherches Scientifique sur le Cancer, 94800 Villejuif). *Rev. Franc. Corps Gras* 21, 91–103 (1974). The problem of aflatoxin was recently discovered and the author gives the progress in this field in the past decade. After a review of the structure of the major mycotoxins, methods for their determination are described: biological (with ducklings, fertile eggs, *Bacillus megatherium*), physicochemical (thin-layer chromatography) and rapid (mini column). Bases are mentioned for prevention of contamination.

CONTAMINATION OF OLEAGINOUS PRODUCTS BY MYCOTOXINS AND MYCOTOXICOSIS FOLLOWING THE INGESTION OF THESE PRODUCTS. P. Lafont (Lab. Toxicologie Alimentaire INSERM, 78-Le Vesinet). *Rev. Franc. Corps Gras* 21, 77–84 (1974). A regulation intended to prevent domestic animals from intoxication has been established. The mode of contamination is described for edible product of animal origin (milk and cheese). The possible synergism between aflatoxin and other mycotoxins is being studied.

SOME FACTORS WHICH INFLUENCE THE QUALITY OF DEODORIZED FAT. A.G. Sergeev et al. (VNIIZ). *Maslozir. Prom.* 1974(3), 22–5. The quality of deodorized fat was examined organoleptically. Factors which influence the quality of deodorized fat are: acidity value, absence of soap and phosphatides, bleaching earth and metals which act as catalysts. Of special importance on the quality of deodorized fat is the degree of oxidation of the fat before deodorization. The authors studied the changes in peroxide and carbonyl values at different refining stages. Peroxide value gives a good idea of the intensity of the oxidation process. The carbonyl value gives the content of C_{10}–C_{12} aldehydes, which are the base for the specific odor of hydrogenated fat. (Rev. Franc. Corps Gras)

STRUCTURAL MODIFICATIONS OF FATS. B.—MODIFICATIONS RELATED TO GLYCERIDIC STRUCTURE OF FATS. M. Naudet (Lab. Nat. Matieres Grasses-ITERG, Univ. Provence, Marseille). *Rev. Franc. Corps Gras* 21, 35–43 (1974). The modifications of the glyceridic structure of fats are the consequence of inter and intra-molecular exchanges between fatty chains. The mechanism of these spontaneous or induced exchanges is described. Natural fats have definite glyceridic structure; modern analytical methods based on chromatographic separations, as well as enzymatic reactions, allow the elucidation of these structures. The analytical methods which can be used for determining the modification of structure in pure or blended fats are reviewed. Practically, the modification of the glyceride structure of fats is very important, especially regarding interesterification. Fats with different characteristics result from inter and intra-molecular exchanges between fatty acids.

OIL EXTRACTION PROCESS. M. Pike and A.W. Routledge (Albright and Wilson Ltd.). *U.S. 3,833,628.* Glyceride oils are extracted from vegetable or fish sources by treatment with an aqueous solution containing an effective amount of a sulphonate salt selected from the group consisting of alkali metal, alkaline earth metal, and ammonium salts of phenyl and alkylphenyl sulphonic acids. The liquid phase is then separated and the oil recovered from it. In preferred cases, e.g., with palm fruit, the source is such that the sulphonate salt treatment brings about the removal of a major proportion of available oil without expressing.

PRODUCTION OF LIGHT COLORED, COLOR STABLE FATTY ACIDS. S.S. Naskar and G. Renckhoff (Dynamit Nobel Ag.). *U.S. 3,833,629.* Light colored, color stable fatty acids of 8–18 carbon atoms are produced by heating the crude fatty acids in the presence of vanadium oxide, a lower alkyl vanadate, a lower alkyl ester of zirconic acid, an aromatic carboxylic acid or lower alkyl ester thereof, or a mixture of the aromatic carboxylic acid or ester with the alkyl ester of titanic or zirconic acid at 180–260C, and then distilling the resulting mixture under a vacuum.

PROCESS FOR THE LIGHTENING AND COLOR STABILIZATION OF FATTY ACID FORERUNNINGS. S.S. Naskar and G. Renckhoff (Dynamit Nobel Ag.). *U.S. 3,836,554.* The process comprises heating the fatty acids with technical grade silicon at 180–250 C and distilling off the forerunnings under vacuum.

• Fatty Acid Derivatives

OBTENTION OF MONOGLYCERIDE ESTERS AND DIACETYLTARTARIC ACID. A.A. Smidt et al. *Maslozir. Prom.* 1974(1), 20–2. A method by which monoglyceride esters were obtained from different fatty acids is described. The process has two stages: acetylation of tartaric acid and esterification of monoglycerides with obtained acetylated derivatives. Acetylation is done in a nitrogen atmosphere for 15–60 minutes at 120C. The formed acetic acid is distillated under vacuum. Optimal conditions for esterification are: 1 hour, 120C, and a ratio of diacetyltartaric acid and monoglyceride 1:1.2. (Rev. Franc. Corps Gras)

INFLUENCE OF MOLECULAR DISTILLATION ON THE FORMATION OF ISOMERS 1 AND 2 OF MONOGLYCERIDES OF SATURATED FATTY ACIDS. A.A. Smidt et al. *Maslozir. Prom.* 1974(2), 18–19. For this study, experiments have been done in a pilot plant molecular still with three stages. The first stage is for gas elimination and is done under a pressure of 1.5–2.0 mm Hg and a temperature of 85–90C. The second stage is for elimination of the glycerine and free fatty acids (pressure 3×10^{-2} mm Hg, temperature 116C). In the third one, distillation of monoglycerides under 5×10^{-3} mm Hg is done. Conditions in the first and second stages have no effect on the separation of mono- and diglycerides and on the content of isomers 1 and 2. It was found that the temperature of 133C in the third stage allows recovery of monoglycerides mainly in isomer-1 form. (Rev. Franc. Corps Gras)

ALUMINUM POLYGLYCEROL FATTY ACID ESTERS. M.M. Rieger (Warner-Lambert Co.). *U.S. 3,833,627.* The esters have prolonged acid neutralization characteristics and anti-foam activity.

OIL BASED COATING COMPOSITION. H.J. Rose. *U.S. 3,834,920.* Sausages formed in synthetic casings are more easily peeled when the casings are provided with an internal coating comprising a food grade mineral oil in admixture with an acetylated fatty monoglyceride and 5–30% of an alkoxylated type surfactant which is poorly soluble in mineral oil. The coating is preferably applied to the interior of the casing as a lubricant during the shirring of the casing on a conventional shirring machine.

CYANOETHOXYLATED FATTY ACID METAL SOAP THICKENED GREASES. H.E. Kenney, E.T. Donahue and G. Maerker (U.S. Secy. of Agriculture). *U.S. 3,835,051.* Monohydroxy fatty acids are cyanoethylated, and the resulting cyanoethoxy derivative is treated with the desired alkali, alkaline earth metal or other metallic base to form a soap which is dispersed in a petroleum oil base or a synthetic base oil of the diester type to form a grease.

EMULSION FOR HOT ROLLING ALUMINUM PRODUCTS. E.E. McDole and F.L. Howard (Kaiser Aluminum & Chemical Corp.). *U.S. 3,835,052.* Polybutene and saturated fatty alcohols are added to a net oil composition comprising hydrocarbon base oils, lubricity agents, emulsifiers, and the like. When mixed with water, the neat oil with additives provides an emulsion which minimizes pickup in the hot rolling of aluminum products and provides a rolled product having improved surface characteristics.

COLD METAL FORMING LUBRICANT. F.W.C. Jones (Oxy Metal Finishing Corp.). *U.S. 3,836,467.* The lubricant comprises (a) water (optional), (b) alkali metal orthophosphate, (c) alkali metal fatty acid soap, and (d) alkali metal alkaryl sulfonate.

GREASE THICKENERS. H.E. Kenney, E.T. Donahue and G. Maerker (U.S. Secy. of Agriculture). *U.S. 3,836,468.* Keto fatty acids or their derivatives are cyanoethylated, and the resulting three carbon cyanoethyl branched chain fatty acids are mixed with an appropriate amount of a diester or a petroleum base oil. The mixture is then reacted in situ with a dilute aqueous solution of lithium hydroxide to obtain a stable grease.

• Biochemistry and Nutrition

INFLUENCE OF A HIGHER QUANTITY OF FATS AND OILS IN THE RATION ON THE METABOLISM OF SOME VITAMINS. V.V. Efremov et al. *Voprosi Pitanija* **1974**(2), 43–9. A mixture of sunflowerseed oil and prime steam lard (50:50) representing 43% of the caloric value in a diet, reduced the rate of metabolism of thiamine, riboflavin and niacin in the liver. The concentration of ascorbic acid in urine, blood and liver was higher, as was that of retinol in blood and liver. Introduction into the experimental ration of twice the normal dosage of vitamins helps to normalize the metabolism of vitamins B_1, B_2, B_6, PP, C and A. (Rev. Franc. Corps Gras)

P-PHENYLENEDIAMINES AS HYPOLIPIDEMICS. R.E. Manning (Sandoz-Wander, Inc.). *U.S. 3,833,734.* Certain *p*-phenylenediamines, e.g., N^1,N^2-di-(2-octyl)-*p*-phenylenediamine, are useful as hypolipidemics.

DETERMINATION OF VOLATILE FATTY ACIDS IN PLASMA AFTER ETHANOLIC EXTRACTION. C. Remesy and C. Demigne (Stat. de Physiopathologie de la Nutr., Inst. Natl. de la Recherche Agronomique, Theix, 63110 Beaumont, France). *Biochem. J.* **141**, 85–91 (1974). A new rapid micro-method for measuring plasma volatile fatty acids is described. The volatile fatty acids are extracted from plasma with ethanol in the presence of a known quantity of internal standard (sodium isobutyrate). After evaporation of the ethanolic solution of the sodium salts, the residue is dissolved in a dilute solution of orthophosphoric acid to permit analysis by g.l.c. A technique of g.l.c. analysis is described which permits the separation of all the volatile fatty acids from the other plasma constituents at temperatures below 100°C in 5 min. Steam-distillation techniques are unsatisfactory when the acetic acid concentrations in the plasma are below 0.2 mM. Heating of a number of plasma constituents in acid conditions gives rise to acetic acid. The binding of volatile fatty acids to plasma proteins was studied; this binding is negligible for acetic acid, but increases with the length of the fatty acid carbon chain. The limits of use of the method and the physiological implications are discussed.

HEPATIC DRUG HYDROXYLATION AND LIPID PEROXIDATION IN RIBOFLAVIN-DEFICIENT RATS. J.M. Patel, N.R. Galdhar and S.S. Pawar (Div. of Biochem., Dept. of Chem., Marathwada Univ., Aurangabad (Maharashtra), India). *Biochem. J.* **140**, 363–8 (1974). The effect of riboflavin deficiency and phenobarbital pretreatment on drug hydroxylation and lipid peroxidation was investigated. A significant decrease in aniline and acetanilide hydroxylation as well as NADPH-linked and ascorbate-induced lipid peroxidation was observed during 4- and 7-week riboflavin deficiency in both adult male and adult female rats. The drug-hydroxylation and lipid-peroxidation activities were further lowered with the increase in riboflavin deficiency. The phenobarbital pretreatment induced aniline and acetanilide hydroxylase activity even in riboflavin-deficient animals. Drug hydroxylation inhibits lipid peroxidation in both deficient and normal rats. The administration of riboflavin was followed by a significant increase in drug hydroxylation and lipid peroxidation.

THE PRESSURE DEPENDENCE OF THE LIPID BILAYER PHASE TRANSITION. K.R. Srinivasan, R.L. Kay and J.F. Nagle (Depts. of Chem. and Phys., Carnegie-Mellon Univ., Pittsburgh, Pa. 15213). *Biochemistry* **13**, 3494–6 (1974). The transition temperature for dipalmitoyllecithin bilayers has been determined at pressures up to 100 bars by following the volume change accompanying the transition. The increase in the transition temperature was found to be nonlinear with increasing pressure whereas the density change due to the transition was invariant with pressure up to the highest pressure studied. The near equality of the limiting slope $(dp/dT)_{p=1}$ with $\Delta H/T_m\Delta V$ at 1 atm is consistent with a first-order transition. The entropy change for the transition, as calculated from the Clapeyron equation, decreases by about 40% over the pressure range studied. The implications of these results for order-disorder theories are discussed.

EFFECT OF DIETARY SELENIUM AND AUTOXIDIZED LIPIDS ON THE GLUTATHIONE PEROXIDASE SYSTEM OF GASTROINTESTINAL TRACT AND OTHER TISSUES IN THE RAT. K. Reddy and A.L. Tappel (Dept. of Food Sci. and Technol., Univ. of Calif., Davis, Calif. 95616). *J. Nutr.* **104**, 1069–78 (1974). The effect of dietary selenium on the detoxification of dietary peroxides via the glutathione peroxidase system was studied. Rats were fed Torula yeast-based selenium-deficient diets with either 15% fresh tocopherol-stripped corn oil or 15% autoxidized corn oil with a peroxide value of 692 mEq/kg. Rats fed these two diets were further divided into groups that were fed either 0 or 2 ppm selenium as selenomethionine. Body weight gain of the two groups of rats fed the autoxidized oil was significantly lower than that of the two groups fed fresh corn oil. The specific activity of glutathione peroxidase in various regions of the gastrointestinal tract, liver, blood, and adipose from selenium-supplemented rats was significantly higher than in these tissues from the non-supplemented rats. In the rats not supplemented with selenium, glutathione peroxidase activity was significantly increased in the group fed autoxidized corn oil; increased activity was not observed in tissues of selenium-supplemented rats fed peroxides. With few exceptions, glutathione reductase activity was the same in tissues from each of the four dietary groups. Significantly more peroxide accumulated in the adipose of the peroxide-fed rats not supplemented with selenium than in the adipose of the other three groups.

INTERACTION OF APOLIPOPROTEIN-ALANINE AND APOLIPOPROTEIN-GLUTAMINE-I WITH PHOSPHATIDYLCHOLINE. EFFECT ON SOLUTE QUENCHING OF INTRINSIC FLUORESCENCE. H.J. Pownall and L.C. Smith (Marrs McLean Dept. of Biochem., Baylor College of Med., Texas Med. Ctr., Houston, Tx. 77025). *Biochemistry* **13**, 2590–3 (1974). The interaction of egg phosphatidylcholine with apoLP-alanine$_1$, apoLP-glutamine-I, and human serum albumin has been investigated by quenching of the intrinsic protein fluorescence in both the presence and absence of the phospholipid. The quenching by a negatively charged quencher, iodide ion, used in conjunction with a positively charged quencher, pyridinium ion, reflected the relative charge in the region of tryptophans in the protein and indicated the magnitude of binding of phospholipid. Expressions were derived to quantitate both protein accessibility and the phospholipid binding efficiency of these proteins. ApoLP-alanine$_1$ bound phospholipid more efficiently than apoLP-glutamine-I. Both apolipoproteins were more efficient than human serum albumin.

HEAD GROUP MODULATION OF MEMBRANE FLUIDITY IN SONICATED PHOSPHOLIPID DISPERSIONS. D.M. Michaelson, A.F. Horwitz and M.P. Klein (Depts. of Biophys. and Physical Biochem., Johnson Res. Foundation, Univ. of Pa., Philadelphia, Pa. 19104). *Biochemistry* **13**, 2605–12 (1974). The mobility of the polar head group, as well as of the hydrocarbon region, of phosphatidylethanolamine (PE) molecules arranged in sonicated dispersions is markedly dependent on the charge of the ethanolamine head group: there is more molecular motion when PE is negatively charged than at pD levels where it is zwitterionic. At physiological values of pD, the molecular motions of PE are more restricted than are those of phosphatidylcholine (PC). These results were obtained by preparing, at various pD values, sonicated dispersions of PE, of PC, and of equimolar mixtures of PC and PE, and by studying the proton and phosphorus magnetic resonance spectra of these dispersions. The observed bilayer symmetry and head group modulation of the fluidity of sonicated PE and cosonicated PC:PE dispersions are discussed in the context of the structure and fluidity of biological membranes.

LIPOPHOSPHONOGLYCAN OF THE PLASMA MEMBRANE OF ACANTHAMOEBA CASTELLANII. D.G. Dearborn and E.D. Korn (Section on Cellular Biochem. and Ultrastructure, Natl. Heart and Lung Inst., Natl. Insts. of Health, Bethesda, Md. 20014). *J. Biol. Chem.* **249**, 3342–6 (1974). Approximately 14% of the mass of lipophosphonoglycan of the amoeba plasma membrane consists of three classes of long chain fatty acids: (a) normal, saturated and unsaturated and branched, saturated fatty acids C-16 to C-28, 4.5%; (b) normal and branched, saturated 2-hydroxy fatty acids C-22 to C-28, 8.4%; and (c) a group tentatively identified as normal and branched, saturated 2-hydroxy-3-methyl fatty acids, 0.9%. The branched fatty acids in the first two groups are tentatively identified as the anteiso series. Radioactive palmitic acid is incorporated by growing cells into the first two groups of fatty acids.

ROLE OF VITAMIN D METABOLITES IN PHOSPHATE TRANSPORT OF RAT INTESTINE. T.C. Chen, L. Castillo, M. Korycka-Dahl and H.F. DeLuca (Dept. of Biochem., College of Agricultural and Life Sci., Univ. of Wisconsin-Madison, Wisc. 53706). *J. Nutr.* **104**, 1056–60 (1974). Transport of phosphate by everted sacs of rat intestine was studied. Vitamin D stimulated this system and glucose as an oxidizable substrate was required in agreement with previous reports. Phosphate transport was highest in the upper duodenum in the presence of calcium in the medium. In this segment, calcium greatly increased phos-

phate transport. In the jejunum, however, calcium in the medium did not appreciably affect phosphate transport. In this segment vitamin D, 25-hydroxycholecalciferol and 1,25-dihydroxycholecalciferol administration, but not 24,25-dihydroxycholecalciferol, stimulated phosphate transport. Although the time course of response of jejunal phosphate transport was similar for 25-hydroxycholecalciferol and 1,25-dihydroxycholecalciferol, nephrectomy prevented the response to 25-hydroxycholecalciferol, but not to 1,25-dihydroxycholecalciferol. Thus it appears likely that 1,25-dihydroxycholecalciferol and not 25-hydroxycholecalciferol is the metabolically active form in this system.

EFFECT OF DIETARY RAPESEED OIL ON THE FATTY ACID COMPOSITION OF TESTES OF MATURING RATS. J.G. Coniglio, W.M. Grogan, Jr. and D.G. Harris (Dept. of Biochem., Schl. of Med., Vanderbilt Univ., Nashville, Tn. 37232). *Proc. Soc. Exp. Biol. Med.* **146**, 738–41 (1974). Testes of rats fed a purified diet containing rapeseed oil from the time of weaning had more 16:1 and 18:1 and a smaller amount of 20:3 than testes fed a similar diet containing corn oil instead of rapeseed oil. Pups nursed by mothers maintained on the rapeseed oil diet from the day of delivery and continued on the diet after weaning had larger amounts of 18:1, 18:3, 20:1 and 22:6 and lower amounts of 22:5 than pups treated similarly but with corn oil as the dietary fat. No effect was noted in either experiment on the body weight, testicular weight, or the histological state of the testes by the rapeseed oil fed at 20% of the diet.

THE COMPLETE AMINO ACID SEQUENCE OF ALANINE APOLIPOPROTEIN (APOC-III), AN APOLIPOPROTEIN FROM HUMAN PLASMA VERY LOW DENSITY LIPOPROTEINS. H.B. Brewer, Jr., R. Shulman, P. Herbert, R. Ronan and K. Wehrly (Molecular Disease Branch, Natl. Heart and Lung Inst. Natl. Insts. of Health, Bethesda, Md. 20014). *J. Biol. Chem.* **249**, 4975–84 (1974). The alanine apolipoprotein (apoLp-Ala) was isolated from patients with familial hyperlipoproteinemia (type V). ApoLp-Ala is a single chain protein of 79 amino acids with a single carbohydrate side chain containing 1 mole each of galactosamine and galactose, and 0 to 2 moles of sialic acid per mole of protein. The complete amino acid sequence of apoLp-Ala was determined by manual and automated Edman degradations of the intact protein, and tryptic and succinylated tryptic peptides. The NH_2-terminal residue is serine, the COOH-terminal residue alanine. The carbohydrate moiety is attached to threonine at position 74 in the sequence. The amino acid sequence of apoLp-Ala contains no long sequences of hydrophobic residues which contrasts with the linear amphipathic regions present in the two integral membrane proteins cytochrome b_5 and glycophorin.

ISOLATION AND CHARACTERIZATION OF A NOVEL LIPID, 1(3),2-DIACYLGLYCERYL-(3)-0-4'-(N,N,N,-TRIMETHYL)HOMOSERINE, FROM OCHROMONAS DANICA. A.E. Brown and J. Elovson (Dept. of Biol., Univ. of Calif.—San Diego, La Jolla, Calif. 92037). *Biochemistry* 13, 3476–82 (1974). The phytoflagellate, *Ochromonas danica*, is unique in containing high concentrations of the detergent-like chlorosulfolipids, about 0.2 μmol/mg of total cell protein; in contrast, the organism contains less than 0.01 μmol of phospholipids/mg of protein. A second novel polar lipid has now been isolated from *O. danica* and characterized as 1(3),2-diacylglycerol-3(1)-0-4'-(N,N,N-trimethyl)homoserine, by chemical and mass spectrometric analysis. Its concentration in *O. danica* is 0.14 μmol/mg of protein, and it is suggested that this lipid, rather than the detergent-like chlorosulfolipids, largely substitutes for the usual phospholipids in membrane bilayer structures in *O. danica*.

BIOSYNTHESIS OF CHLOROSULFOLIPIDS IN OCHROMONAS DANICA. ASSEMBLY OF THE DOCOSANE-1,14-DIOL STRUCTURE IN VIVO. J. Elovson. *Ibid.*, 3483–87. It has been proposed that formation of the diol backbone in the chlorosulfolipids of *Ochromonas danica* includes hydration of an ω-9 unsaturated intermediate. Such a mechanism is excluded by experiments using ^{18}O in vivo and we report here results on the incorporation of labeled precursors which establish instead the following biosynthetic pathway in *O. danica*: octadecanoic acid → docosanoic acid → 14-hydroxydocosanoic acid → docosane-1,14-diol. Since chlorination occurs after completion of the diol structure, this sequence accounts for the assembly of the diol backbones in all C_{22}-sulfolipid subspecies of different degrees of chlorination.

REGULATION OF RAT HEART LIPOPROTEIN LIPASE ACTIVITY DURING COLD EXPOSURE. P. Keig and J. Borensztajn (Dept. of Pathol., Pritzker Schl. of Med., Univ. of Chicago, Chicago, Ill. 60637). *Proc. Soc. Exp. Biol. Med.* **146**, 890–3 (1974). Starved thyroidectomized, adrenalectomized, adrenal-demedullated and sham operated rats were exposed to 4C for 3 hr and their heart lipoprotein lipase activities compared to those of animals maintained at room temperature. The lipoprotein lipase activity in the hearts of the thyroidectomized rats was comparable to that of the sham operated animals when expressed as units/heart. The enzyme activities in the hearts of the adrenalectomized and adrenal-demedullated rats were about 50% lower than those of the controls. In all animals, exposure to cold temperature induced significant increases in the myocardial lipoprotein lipase activity. In normal rats this effect could not be reversed by the administration of insulin. It is concluded that the increases in lipoprotein lipase activity in the hearts of rats exposed to cold temperatures are not dependent on adrenal and thyroid hormones.

THE REACYLATION OF DEACYLATED DERIVATIVES OF DIPHOSPHATIDYLGLYCEROL BY MICROSOMES AND MITOCHONDRIA FROM RAT LIVER. J. Eichberg (Biol. Res. Lab., McLean Hosp., Belmont, Mass. 02178). *J. Biol. Chem.* **249**, 3423–29 (1974). Rat liver microsomes contain an enzyme which catalyzes the acylation by acyl Coenzyme A thioesters of di(1(1″)acyl-*sn*-glycero-3-phosphoryl)1′,3′-*sn*-glycerol(di(lysophosphatidyl)glycerol) to a compound identified as either 1′(1-acyl-*sn*-glycero-3-phosphoryl)-3′(1″,2″ diacyl-*sn*-glycero-3-phosphoryl)-*sn*-glycerol or the corresponding 1′(1,2 diacyl isomer) (phosphatidyllysophosphatidylglycerol). A small amount of diphosphatidylglycerol is also formed. Evidence was obtained for the presence of radioactivity in both 1(1″) acyl and 2(2″) acyl positions of the reaction products. The enzyme has a pH optimum of pH 8.5 and displays considerable activity at an even more alkaline pH. In this regard, the acyl-transferase resembles the enzyme which catalyzes the acylation of the 1-acyl isomer of lysophosphatidylglycerol, but differs from that which carries out the acylation of the 1-acyl isomer of lysophosphatidylcholine. Under the conditions used, linoleate was incorporated less readily than either oleate or stearate. Rat liver mitochondria displayed slight acyltransferase activity at pH 7.4 and virtually none at pH 9.0.

LIPOPROTEIN UPTAKE AND METABOLISM BY RAT AORTIC SMOOTH MUSCLE CELLS IN TISSUE CULTURE. E.L. Bierman, O. Stein and Y. Stein (Lipid Res. Lab., Dept. of Med. B, Hadassah Univ. Hosp., Dept. of Exp. Med. and Cancer Res. Hebrew Univ.-Hadassah Med. Schl, Jerusalem, Israel). *Circulation Res.* **35**, 136–50 (1974). Aortic smooth muscle cells from the rat were successfully grown in tissue culture and shown to have characteristic morphology.[125] I-labeled homologous very low density lipoproteins and high density lipoproteins were taken up by these smooth muscle cells during incubation for 48 hours at the stationary phase. Despite multiple washings, a large proportion of the lipoprotein radioactivity associated with the cells was apparently surface bound and trypsin releasable. With both lipoprotein fractions, lipid and protein uptake by the cells measured after trypsinization was related to time and to the amount of lipoprotein protein added to the medium.

EFFECTS OF THYROID HORMONE DEFICIENCY ON CYCLIC ADENOSINE 3′:5′-MONOPHOSPHATE AND CONTROL OF LIPOLYSIS IN FAT CELLS. K.J. Armstrong, J.E. Stouffer, R.G. Van Inwegen, W.J. Thompson and G.A. Robison (Marrs McLean Dept. of Biochem., Baylor College of Med., Houston, Tx. 77025). *J. Biol. Chem.* **249**, 4226–31 (1974). Isolated fat cells from hypothyroid rats, in contrast with those from normal animals, lack ability to give a lipolytic response to epinephrine or glucagon. However, activation of triglyceride lipolysis was induced with (N^6, $O^{2'}$-dibutyryl cyclic adenosine 3′:5′-monophosphate), or a combination of epinephrine and phosphodiesterase inhibitors. Adenylyl cyclase was activated by catecholamines or glucagon in membrane ghosts prepared from fat cells obtained from hypothyroid rats. The characteristics of the enzyme, and its activation by hormones and fluoride were similar to those observed in fat cell membrane ghosts from normal animals. Thus, adenylyl cyclase appears to be functional in the hypothyroid state, although lipolysis is blocked. Whole fat cells were incubated in the presence and absence of epinephrine or theophylline, and accumulation of cyclic AMP over 10 min was measured. Basal, unstimulated levels were found to be similar in cells from normal and hypothyroid animals. In the presence of theophylline alone, similar levels of cyclic AMP were again observed. An increase in cyclic AMP accumulation in response to epinephrine stimulation, however, was not obtained in cells from hypothyroid rats except in the presence of the phosphodiesterase inhibitor.

INTIMAL THICKENING IN NORMOCHOLESTEROL RHESUS MONKEYS FED LOW SUPPLEMENTS OF DIETARY CHOLESTEROL. M.L. Armstrong, M.B. Megan and E.D. Warner (Arteriosclerosis Res. Center and the Cardiovascular Div., Dept. of Internal Med., Univ. of Iowa College of Med., Iowa City, Iowa 52242). *Circulation Res.* **34**, 447–54 (1974). Rhesus monkeys were fed a high-fat diet containing either 0, 43, or 129 μg/kcal of cholesterol for 18 months. In the monkeys on the cholesterol-supplemented diets, changes in plasma cholesterol remained within the range found in monkeys fed the cholesterol-free diet. Monkeys on the cholesterol-supplemented diets were compared with monkeys given no dietary cholesterol with range-matched plasma cholesterol; intimal thickness of the aorta and branch arteries, distribution of lipoprotein cholesterol, and tissue content of cholesterol in aorta and liver were considered. The monkeys on the cholesterol-supplemented diets showed intimal thickening with more sudanophilia and increased aortic cholesterol, a decrease in plasma high-density lipoprotein cholesterol, and an increase in low-density lipoprotein cholesterol, and the monkeys fed the higher amount of dietary cholesterol showed an increase in hepatic cholesterol. No null point for the effect of dietary cholesterol on arterial intima was found even at an intake level far below that conventionally used for the induction of experimental atherosclerosis in the nonhuman primate. The intimal changes found in response to very low cholesterol intake imply that subtle qualitative alterations in lipoproteins are of critical importance to our understanding of lesion induction.

• Edible Proteins

NEW PHYSICO-CHEMICAL METHODS FOR PROTEINS. L. Pietrzak. *Przem. spoz.* **27**, 508–13 (1973). Many papers which were published last year, contained the new results from the research on proteins, especially physico-chemical properties. Many new analytical methods were elaborated on this basis. Some of them are: dispersion of optical activity, circular dichroism, and abnormal magnetooptical dispersion. These new methods use specially constructed spectropolarimeters. (Rev. Franc. Corps Gras)

SIMPLE AND QUICK METHOD FOR PROTEIN DETERMINATION IN CRUSHED SUNFLOWER SEED. B. Dulinac et al. *Bilt. Bil. ulja* **1973**(3–4), 9–11. The colorimetric method is used for protein determination; the color is measured at 550 nm. The classical Kjeldahl method is used for establishing the correlation with this method. The linear regressive equation is established between the results of both methods: $y = 0.01 + 0.0144\ x$. (Rev. Franc. Corps Gras)

PROTEIN FIBER FORMING. W. Heusdens and C.W. Fredericksen (Ralston Purina Co.). *Reissue 28,091.* Tender texture protein structures are continuously formed from an aqueous slurry of proteinaceous material having a solids content of up to 35%. The slurry is heated under pressure and then cooled, thus forming the fibers.

PROCESS FOR ISOLATING PROTEINS. J.W. Finley, E. Hautala and C.E. Walker (U.S. Secy. of Agriculture). *U.S. 3,828,017.* Cereal or other protein-containing material is ground and mixed with a liquid fluororcarbon whose density is adjusted to 1.35–1.45. The resulting slurry is centrifuged to produce a protein fraction floating on the surface of the liquid, a bottom phase composed mainly of starch, and an intermediate fluorocarbon phase containing fat. The protein phase can be easily separated from the remainder, dried, and used as a dietary supplement. The starch and fat components can also be separated.

METHOD OF MAKING PROTEIN-CONTAINING FOODSTUFFS RESEMBLING MINCED MEAT. V.B. Tolstoguzov, D.B. Izjumov, V.Y. Grinberg, A.N. Marusova and V.T. Chekhovskaya. *U.S. 3,829,587.* The foodstuffs are prepared from a mixture containing raw proteinaceous food substances, flavoring aromatizing and coloring agents, spices, salts, water, and edible acids in amounts sufficient to lower the pH of the mixture to below the isoelectric point of the proteinaceous material. In addition, charged polysaccharides are stirred into the mixture to form a complex. Compounds of metals having a valence of at least two and substances to raise the pH of the mixture to above the isoelectric point of the proteinaceous material are then added. The mixture is heated to destroy the protein-polysaccharide complex.

PREPARATION OF PEANUT FLOUR. A. Matsunaga. *U.S. 3,829,589.* Free flowing peanut flour, free of objectionable peanut odor and from which impurities including tannin are removed, is produced by a process including the following steps. Shelled peanuts are gently parched at 50–90C for 3–6 minutes, soaked in a saline solution for 0.5–5 minutes at 20–50C, heated in water at 100–120C for 15–45 minutes, washed in water, and then heated again at 100C. The product is compressed and pulverized to less than 300 mesh and spray dried to form an off-white, free-flowing flour.

NONISOELECTRIC PROTEIN. R.L. Hawley (Ralston Purina Co.). *U.S. 3,830,942.* A soluble protein product, particularly for use in highly acid foods, is produced from oleaginous seed materials by solubilization at pH at or about the isoelectric point. The protein is digested by enzymes after which the enzymes are heat-inactivated. The digested and undigested protein portions are dried separately. The insoluble fraction is useful for enriching food products and especially bakery goods since it is essentially inert and does not bind water.

WATER SOLUBLE WHIPPABLE PROTEIN MATERIAL. C. Akin (Standard Oil Co.). *U.S. 3,833,552.* The protein material is derived from single cell protein by treatment with aqueous acid under controlled temperature and time conditions.

SAUSAGE ANALOG. H.T. Leidy, C.M. Kerrigan and D.C. Byble (General Foods Corp.). *U.S. 3,836,678.* A sausage-like food product is prepared by autoclaving a gel precursor which is a mixture of a nonfibrous gelable soy protein isolate and a material selected from albumen, casein, whey, and mixtures of these.

• Drying Oils and Paints

CONTRIBUTION TO THE STUDY OF POLYENIC COMPOUNDS AUTOXIDATION AND OF THE DRYING PHENOMENON. I. R. Poisson. *Double Liaison* **20** No. 215/216, 273–87 (1973). A bibliographical study stating the present knowledge of the phenomenon of autoxidation of drying oils. The author defines the materials used and examines the main characteristics of the phenomenon. The results of a functional analysis of the non-volatile oxidation products are given. 90 refs. II. *Ibid.*, No. 217, 319–29. The volatile products of linseed autoxidation were identified as water, CO_2, CO, formaldehyde and C_5–C_7 condensable aldehydes. Non-volatile compounds are more difficult to identify because they belong to different compounds with similar characteristics. III. *Ibid.*, No. 218, 371–8. Reactions that can lead to the structures determined during analysis of autoxidixed polyenic compounds are listed. Peroxides formed react on the products present in the reactional environment; reactions of saturated or ethylenic aldehydes are examined, particularly the autoxidation of aldehydes with unsaturated compounds that leads to hydroxylated esters. (World Surface Coatings Abs. No. 383)

RESISTANCE OF EPOXY PAINTS TO ALKALI AND ACIDS. B.I. Bhatt, R.R. Shah and K. Subrahmanyam (Ahmedabad Textile Industry's Res. Assn., Ahmedabad-15). *Paintindia* **24**(3), 25–6 (1974). It was concluded that a 30% caustic soda solution can be stored in epoxy finished mild steel vessels up to 90C. Dilute sulfuric acid up to 5% can also be stored in epoxy finished vessels. Concentrated sulfuric and hydrochloric acids attack epoxy paint films. For concentrated acids, rubber-based paints are recommended.

POLY SEMI-ESTERS AS RAW MATERIALS FOR WATER-DILUTE VARNISHES. R. Dhein, B.-U. Kaiser and J. Schoeps (Bayer AG, Krefeld-Uerdingen). *Farbe u. Lack* **80**(7), 629–32 1974. Varnishes have been prepared by maleinising for varnish raw materials containing hydroxyl groups leads after neutralization with amine to water-dilutable varnish systems. Examples show that it is possible to obtain water-dilutable stoving enamels which are equivalent in their properties to the corresponding conventional products.

EPOXY RESIN TECHNOLOGY. W. Brushwell. *Paintindia* **34**(5), 17–21 (1974). Review of coatings update concerned with all types of epoxies.

GENERAL NOTES ON TUNG OIL. G. Loew (Bologna, Italy). *Seifen-Öle-Fette-Wachse* **100**(14), 355–7 (1974). The production and properties of tung oil are described. Many possibilities of application in chemical engineering are enumerated.

SUNFLOWER OIL VARNISH. K.M. Goldberg et al. *Lakokras. Mat.* 1973, *No* **4**, 83–4. Varnishes have been prepared by maleinising sunflower oil, esterifying with pentaerythritol and thickening to the desired viscosity. The production details and char-

acteristics of the products are presented. (World Surface Coatings Abs. No. 382)

FLUOROCHEMICAL SURFACTANTS FOR LATEX PAINTS. R.G. Petrella and M. Langsam (Air Products and Chemicals Inc.). *U.S. 3,822,228.* Improved stain and dirt release properties are obtain in latex paint compositions by incorporating therein surface active fluorochemicals.

OILLESS ALKYDS. T.M. Powanda (Celanese Corp.). *U.S. 3,829,530.* The alkyds contain an interpolymer of a polyol having 3–4 hydroxyl groups, an aliphatic diol with 5–7 carbon atoms, and a phthalic anhydride. They are capable of providing superior coatings.

AUTOXIDIZABLE ADDUCTS OF FATTY ACID ESTERS. J. Gillan, F.J. Lubbock and L. Polgar (Dulux Australia Ltd.). *U.S. 3,830,763.* Autoxidizable maleic adducts of fatty acid esters of dipentaerythritol and tripentaerythritol are disclosed. The adducts are modified by reaction of the anhydride rings with monohydric alcohols to form the structure of succinyl half-esters. The compositions are of particular use as film-forming constituents of liquid paint compositions, which can have acceptable application properties at nonvolatile contents of the order of 90%. Particularly useful are acrylic alcohols such as hydroxyethyl methacrylate.

AQUEOUS SEALER COMPOSITION. J.J. Jeffery and A.N. Walus (Du Pont). *U.S. 3,835,076.* The composition contains a polymeric binder in an aqueous medium in which the polymeric binder comprises the following components: (A) an epoxy ester resin of a maleinized drying oil fatty acid such as maleinized linseed oil fatty acids and an epoxy hydroxy polyether resin; and (B) an acrylic-epoxy ester graft copolymer that has a backbone of methyl methacrylate, styrene, ethyl acrylate, acrylonitrile or mixtures thereof, contains 1–7% of methacrylic acid or acrylic acid which has been reacted with an alkylene imine and the polymeric side chain segments of the graft copolymer are epoxy esters of an epoxy resin and an aliphatic dicarboxylic acid. The composition forms a high quality coating particularly useful as a sealer for automobile and truck bodies over which other finishes can be applied.

• Detergents

THEORETICAL INVESTIGATION OF SOME FLOTATION REAGENT CHARACTERISTICS, II: DODECYL AMINE CATION/SALT MINERALS INTERACTION. M. Medareva (Dept. of Physics, Inst. of Mining and Geology, Sofia). *Tenside Detergents* 11(4), 209–12 (1974). The interaction, amine/alkalohalides, is examined on the basis of the electronic structure of the dodecyl amine. The potential energy of the mineral and the interaction energy of the mineral, the amine and water are determined. It is shown that the results of flotation depend on those quantities.

ADSORPTION STUDIES ON QUARTZ, III: EFFECT OF SURFACE TREATMENT AND ADSORBATE CONFIGURATION. S.F. Estefan and M.A. Malati (Natl. Res. Center, Dokki, Cairo, UAR; Medway and Maidstone College of Technol., Chatham, Kent, England). *Tenside Detergents* 11(4), 205–8 (1974). The adsorption of sodium oleate by quartz was enhanced and became less exothermic in presence of Ca^{2+} ions. Ca^{2+} ions led to a decrease in the amount of oleate desorbed. Prior treatment of quartz with hydrofluoric acid led to a higher oleate adsorption density and diminished the amount desorbed. Drying quartz at a higher temperature produced an increase in the amount desorbed. Under comparable conditions, the abstraction of sodium elaidate was appreciably higher than that of sodium oleate. The enhancement of adsorption due to Ca^{2+} ion activation was greater in the case of sodium elaidate than sodium oleate.

SEMI-ESTERS OF SULFOSUCCINIC ACID AND THEIR APPLICATIONS IN THE COSMETICS AND TEXTILE INDUSTRIES. H. Casotii (Research Labs. Trinidad Warco Quimica, S.C.A.). *Tenside Detergents* 11(4), 202–4 (1974). Although much of the technical literature is devoted to the use of sulfosuccinic semi-esters in cosmetics, in the Argentine the sulfosuccinic acid semi-ester of stearic acid monoethanolamide (SBMAS) has become established mainly in the textile sector for wool washing, having had to compete with anionic surfactants and in many cases also with nonionics. Only in fixed tariff laundries where price is a decisive factor are nonionics, alkylbenzene sulfonates and even soap and soda being used for washing. Laundering of woolen goods is, of course, subject to seasonal changes. Nevertheless 600–750 tons of SBMAS are being sold annually in the Argentine. With a fat content of the SBMAS of 50% (active content 35%) and the use of 1.5% based on raw wool, this means that about 50,000 tons of raw wool are being washed with SBMAS. The residual fat content of wool is around 0.8% on average.

A GENERALLY APPLICABLE METHOD FOR DETERMINING THE BIODEGRADABILITY OF WATER SOLUBLE ORGANIC SUBSTANCES UNDER NEARPRACTICAL CONDITIONS. W. Huber and K.H. Popp (BASF AG, Ludwigshafen). *Tenside Detergents* 11(4), 195–7 (1974). A non-specific method for determining biodegradability is presented which is based on the determination of total organically bound carbon through wet oxidation, substance and effluent being metered by means of separate, electronically controlled pumps.

NUMERICAL CLASSIFICATION OF SURFACTANTS. W. Langmann and H. Hofmann. *Tenside Detergents* 11(4), 185–94 (1974). The present ISO recommendation was drafted in order to incorporate all surface active substances in a clear system. Work on this project commenced 15 years ago and is now published in draft form. Further work led to ISO/R 817, which was issued in December 1964 and revised June 1965. At the same time, development of other systems of documentation for chemical substances in general proceeded. So far however, none of these systems has managed to become universally established. The conversion of the classification system for surfactants into an international standard has been shelved by the appropriate ISO committee for the time being, on the understanding that steps be taken to ascertain whether there is demand in technical circles for a standardized system of classification for surface active substances. The system is discussed and comments invited.

EFFECTS OF SURFACE ACTIVE MATERIALS ON THE SOLUBILITY, CHEMICAL STABILITY, AND AVAILABILITY OF CUTANEOUS APPLIED AGENTS. B.C. Lippold (Inst. for Pharmacy, U. of München). *J. Soc. Cosmet. Chem.* 25, 423–25 (1974). Surface active materials in solution, especially above their CMC, influence cutaneously applied agents differently. The presence of micelles generally improves solubility. The rates of reactions of hydrolytic and oxidative processes are altered by micelle formers. In order to predict stabilization, exact knowledge of the decomposition reactions is required. With regard to availability of the agent, the presence of surface active materials has far-reaching consequences. Reduction of availability i.e., lowered activity, depends greatly on the physiochemical properties of the agents.

EMULSIFIERS FOR INDUSTRIAL WAX EMULSIONS. H. Hadert. *Coating*, 6 No. 6, 192–3: No. 7, 219: No 9, 288–90 (1973). Aliphatic alcohol polyglycol ethers, hydroxyethyl aliphatic alcohols and hydroxyethyl aliphatic acid amines are examined. Additives for improving gloss, flow, wetting power, anticorrosion and other properties are described. (World Surface Coatings Abs. No. 383)

DEVELOPMENT OF THE SOAP INDUSTRY. L.L. Razgon et al. *Maslozir. Prom.* 1974(1), 1–6. Soap and synthetic detergents production in U.S.S.R. from 1955 until 1972 is given. In 1955, soap production was 1,075.8 thousand tons and synthetic detergents 1.2 thousand tons. In 1972, the production was 1,222.9 thousand tons of soap and 534.3 of synthetic detergents. The annual per capita consumption of these products is also given. (Rev. Franc. Corps Gras)

ELECTRODIALYTIC PURIFICATION OF GLYCERINE FROM SOAP INDUSTRY. A.A. Smidt et al. *Maslozir. Prom.* 1974(3), 31–4. The distillation method of purifying of glycerine has many problems, especially polymerization and partial thermal decomposition of glycerine. This causes an important loss (10–15%). This is not the case if electrodialytic purification is used followed by ion exchange resin treatment. Work done in one experimental installation is described and optimal conditions for this process are given. (Rev. Franc. Corps Gras)

SYSTEMS PIT AND CER AND MODERN METHODS FOR CHOOSING AN EMULSIFIER. L. Marszall. *TSPK Pollena* 17, 526–30 (1973). System HLB, despite being widely used, was found to give unsatisfactory results for a correlation between emulsion stability and HLB value. Two new methods are discussed; PIT (Phase Inversion Temperature) and CER (Cohesive Energy Ratio). According to Shinoda et al., the temperature of phase inversion is the temperature at which hydrophilic-lipophilic properties of an emulsifier are exactly in equilibrium. The ratio of cohesive energy, according to Beerbower et al., is a combination of the HLB system of Griffin and of the R system of Winsor. (Rev. Franc. Corps Gras) ■