

Wastewater papers sought

A call for papers has been issued for an ASTM symposium on "Quantitative and Statistical Analyses of Biological Data for the Assessment of Water and Wastewater Quality" to be held during the week of June 20, 1977, in Minneapolis, MN.

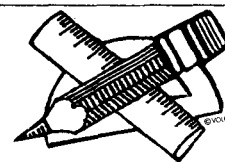
The purpose is to present state-of-the-art quantitative and statistical approaches to analyzing field and laboratory biological data as well as to help identify problems and solutions.

Prospective authors may send titles, abstracts, and ASTM paper offer forms by Dec. 15 to Dr. Kenneth L. Dickson, Center for Environmental Studies, Virginia Polytechnic Institute and State University, 1020 Derring Hall, Blacksburg, VA 24061. Paper offer forms are available from Dr. Dickson or Jane B. Wheeler, ASTM, 1916 Race St. Philadelphia, PA 19013 (Tele: 215-299-5413).

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Abstracts



EDITOR: S. KORITALA—ABSTRACTORS: N.E. Bednarczyk, J.C. Harris, M.G. Kokatnur, F.A. Kummerow, T. Mares, B. Matijasevic, J.C. Means, D.B.S. Min, E.G. Perkins, and R.A. Reiners

• Fats and Oils

PALM OIL: TECHNOLOGY AND USES. J. Baltes (D-4401 Sendenhorst, Sudtor 13, Germany). *Rev. Fr. Corps Gras* 22, 255-60 (1975). The author shows the economic importance of palm oil for West Europe and especially, West Germany. Properties and composition of the principal oils used in oil mills and special conditions of transport and storage are described. Industrial processings of palm oil are also reviewed. Refining is indispensable for obtaining products of consumption, while hydrogenation, interesterification, and fractionation are used to make particular products.

KINETIC STUDY OF CRYSTALLIZATION OF PLASTIC FATS. I. SOLIDIFICATION CURVES BY BROAD BAND NMR. E. Sambuc and M. Naudet (Lab. National Matières Grasses—ITERG, Univ. d'Aix-Marseille, 13331 Marseille Cedex 3). *Rev. Fr. Corps Gras* 22, 261-7 (1975). NMR with broad band is the only technique allowing one to follow the solid content during the crystallization of plastic fats. In order to plot kinetics of crystallization during a stationary slow cooling, the conditions of continuous determination of solid-content by NMR with continuous wave have been studied. The apparatus is described and repeatability of method is discussed.

EXPERIMENTAL AUTOMATIC APPARATUS FOR CONCENTRATION OF THE UNSAPONIFIABLE MATTER IN OILS BY LIQUID-LIQUID EXTRACTION. H. Kallel (Lab. CNRS, 94320 Thiais). *Rev. Fr. Corps Gras* 22, 269-70 (1975). A simple automatic apparatus able to concentrate 8 or 9 times the unsaponifiable matter of oils in a reduced fraction of the starting oil is described. This procedure applied to olive oil is studied and the results are given. The use of this apparatus has an advantage which is that the time of extraction is reduced to about 1 hour.

DEHULLING OF DELINTED COTTON SEEDS. A. Pringuet (Société Speichim, Paris). *Rev. Fr. Corps Gras* 22 271-4 (1975). Because the African oil mills cannot practically sell the lint, it is preferable to remove the delinting operation. An important economy of equipment and energy is thus allowed. Hullers have to be suited to non-delinted seeds. They consist of the own huller, the separator, and hulls breaker. If the lint content is high (10 to 12% max), it is preferable to hull the seeds and to take into consideration gains of supplementary oil and cost of the equipment.

PALM OIL: TECHNOLOGY AND USES. II. J. Baltes (D-4401 Sendenhorst, Sudtor 13, West Germany). *Rev. Fr. Corps Gras* 22, 305-11 (1975). In this second part of the paper hydrogenation, transesterification, and fractionation of palm

oil, as well as its use and the use of its products in foods, are described. Hydrogenation which is sometimes used also for bleaching, fractionation, and transesterification are of great interest for the preparation of palm oil products. The corresponding technology is reviewed. The greatest amount of palm oil is used for shortenings and margarine manufacturing. Palm oil fractions are used in frying oils or cocoa butter substitutes. Several examples of such applications are presented.

OXIDIZED ACIDS AND NEW CHEMICAL SPECIES. J. Graille et al. (Lab. National Matières Grasses, ITERG, Marseille). *Rev. Fr. Corps Gras* 22, 313-6 (1975). Crude, refined, or heated fats can be analyzed for thermal and oxidative alteration products either through TLC as oxidized acids, or through column chromatography on hydrated alumina as new chemical species. If these two methods are applied to the same oil, the results are similar as long as alumina chromatographed methyl esters are free of unsaponifiable matters and a blank is carried out simultaneously. The TLC method will be preferentially used when the alteration products content is under 5% and the column method when this content is above 3%.

KINETIC STUDY OF CRYSTALLIZATION OF FATS. II. COOLING CURVES, SOLIDIFICATION CURVES, AND COMBINED CURVES. E. Sambuc and M. Naudet (Lab. National Matières Grasses—ITERG, Univ. d'Aix-Marseille, 13331 Marseille, Cedex 3). *Rev. Fr. Corps Gras* 22, 317-26 (1975). The cooling curves, solidification curves, and combined curve of a plastic fat, used as a model, are studied in detail. The influence of different parameters on the shape of these curves and on the location and importance of accidents shown by them, is studied. The time to reach the temperature on condition that it exceeds one hour, the initial temperature on condition that it exceeds the melting point by 15°C, have no effect. On the contrary, the final temperature which affects the rate of cooling and the importance of solidification is very important and is studied in detail.

POWDERED FATS: MANUFACTURING, PROPERTIES, USES. J. P. Lang and A. Uzzan (Institut Corps Gras—ITERG, Paris). *Rev. Fr. Corps Gras* 22, 327-35 (1975). This review deals with the manufacturing of powders from fats or mixtures of fats with other compounds. The technology is difficult and expensive, but the final products have better stability and are of easy use in the preparation of feeds and milk-replacers. Numerous fats with a melting point 35-50°C are convenient. Additives enhance the stability and the solubility. The manufacturing of powdered fats encloses a step of crystallization which takes place after spray-drying or on a

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refrigerated drum. The fineness of the powder (10-50 μ) is important for the physiological properties of foods and the solubility of the final product. Three examples of manufacturing are given.

STUDY OF THE STRUCTURE OF TRIGLYCERIDES OF FRACTIONATED PALM OIL. I. DEVELOPMENT OF AN ANALYSIS METHOD OF TRIGLYCERIDES OF SOLID AND LIQUID FRACTIONS OF PALM OIL. C. Deroanne et al. (Faculte Sciences Agronomiques, B-5800 Gembloux, Belgium). *Rev. Fr. Corps Gras* 22, 599-604 (1975). A new method of calculating the triglyceride structure is described. Calculated values according to the method of the "1-3 random 2 random distribution" are ponderated by coefficients obtained after determination of triglycerides separated on thin layer silicagel impregnated with AgNO₃.

STUDY OF THE UNSAPONIFIABLE AND THE GLYCERIDE COMPOSITION OF CORYLLUS OILS. M. Van Dijck et al. (Lab. Bromatologie et Toxicologie, Univ. Louvain, Van Evenstraat 4, Louvain, Belgium). *Rev. Fr. Corps Gras* 22, 619-22 (1975). The quantitative composition of diglycerides and triglycerides is studied in two European species of Coryllus: Coryllus avellana and Coryllus maxima. Besides, the qualitative and quantitative composition of some fractions of the unsaponifiable: sterols, methyl 4 sterols, triterpenic alcohols, is given for the two mentioned species.

STUDY OF THE STRUCTURE OF TRIGLYCERIDES OF FRACTIONATED PALM OIL. II. EVALUATION OF CRYSTALLIZATION OF TRIGLYCERIDES DURING THE COOLING OF PALM OIL FOR ITS FRACTIONATING BY TERTIAUX PROCESS. C. Deroanne et al. (Faculté des Sciences Agronomiques de l'Etat, B-5800 Gembloux, Belgium). *Rev. Fr. Corps Gras* 23, 27-32 (1976). The triglycerides of palm oil associate into mixed crystals in proportions which vary in function with the cooling temperature. Crystallization of these triglycerides is strongly affected by the symmetry and homogeneity of molecules.

ANALYTICAL IDENTIFICATION OF MIXTURES OF ANIMAL FATS. U. Bracco and H. Winter (Lab. Rech. Société d'Assistance Technique pour Produits Nestlé S.A., Lausanne, Switzerland). *Rev. Fr. Corps Gras* 23, 87-93 (1976). The specific distribution of palmitic acid in β -position of the triglycerides from lard, offers a new analytical tool in the study of lard beef tallow mixtures. Lipolysis of fat, followed by thin layer separation of the monoglycerides and gas-liquid chromatography of their fatty acids, allows the characterization of lard and beef tallows of several origins and the study of the composition of their mixtures.

EXTRACTION OF PALM OIL WITH A SOLVENT. P. J. Everaerts and B. Lubis (BPPM, P. O. Box 104, Medan, Indonesia). *Oleagineux* 31, 129-30 (1976). With current processing techniques, an oil palm factory operates satisfactorily even if 6 to 7% of oil remains in the cake. It seems warranted to try an extraction method with a solvent to extract the palm oil from the fruits. The extraction with a solvent is applied, but with an oil loss of about 7%, which is comparable to that of press extraction. The extraction by solvent should envisage yield of oil of approximately 98-99% so studies have been done to improve this process. It seems that the extraction without previous drying doesn't give good results. Drying considerably improves the yield of oil. Study of solvent extraction efficiency in relation to the degree of drying of pulp is being continued.

SHAKER-CONDITIONER FOR OILSEEDS. J. F. Witte (STORK-Amsterdam. B. V., Postbus 108, Amstelveen, Holland). *Oleagineux* 31, 177-9 (1976). The shaker-conditioner applies a process described in a Dutch patent. In this process, seed in semi-fluidized condition is brought into contact with steam at atmospheric pressure. The seed is thus heated to 100C in a very short time, which entails an increase in moisture content. After keeping at 100C for a very short period, the seed is dried by means of hot air. During the drying stage, the seed temperature drops to approx. 65C. The process takes place in an apparatus described in another Dutch patent and shown schematically in this paper.

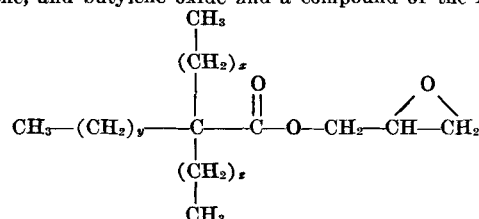
USE OF MODIFIED WHEY SOLIDS AS MARGARINE ADDITIVE. G.E. Seibelli and J.V. Feminella (Stauffer Chemical Co.). *U.S. 3,982,039*. The margarine comprises, as an ingredient of its aqueous phase, 0.5-6% of the dried modified whey product formed by drying the second fraction obtained by passing partially delactosed cheese whey through the bed of a molecular

sieve resin. The whey product has a lactose content of 40-50%, an ash content of 20-30%, and a protein content of 15-20%.

COMPREHENSIVE EVALUATION OF FATTY ACIDS IN FOODS. VIII. FINFISH. J. Exler and J.L. Weirauch (Consumer and Food Economics Inst., A.R.S., U.S.D.A., Hyattsville, Md.). *J. Am. Diet. Assoc.* 69, 243-8 (1976). A table of values for total lipid and fatty acid composition of 70 species of domestic and foreign finfish is presented. Data are given as grams per 100 grams edible portion and were taken from both unpublished sources and those published since 1960. Some factors affecting fatty acid composition of the fish and also the nutritional value of the fish are discussed.

GREASE COMPOSITION. T. Dodo and M. Ikeda (Idemitsu Kosan Co.). *U.S. 3,980,572*. A lubricating grease composition comprises a major amount of a lubricating base oil and a lithium salt of a blended fatty acid prepared by mixing 5-15% of natural stearic acid or 12-hydroxystearic acid with 0.5-50%, based on the weight of natural fatty acid, of a mixture of synthetic fatty acids having 8-24 carbon atoms. 0.5-5% aluminum stearate may also be included in the composition.

NOVEL AUTOXIDIZABLE DERIVATIVES OF MALEINIZED MONOCARBOXYLIC FATTY ACIDS. B. Leary and F.J. Lubbock (Dulux Australia Ltd.). *U.S. 3,981,895*. The derivative is the product obtained by heating together: (a) an autoxidizable maleinized monocarboxylic fatty acid and (b) a diol selected from 2,2-bis(4-hydroxy cyclohexyl) propane and the reaction product of 2,2-bis(p-hydroxy phenyl) propane with an alkylene oxide so as to form a monoester of the diol and open the maleic anhydride ring, and reacting the resulting ring-opened product by heating with (c) an alkylene oxide selected from ethylene, propylene, and butylene oxide and a compound of the formula:



x , y , and z are integers and $x + y + z = 4-6$ inclusive. A monoester of oxide (c) is obtained. The derivative is characterized as having both carboxyl and hydroxyl groups, an acid value of 40-100 KOH/g, and the presence of a monoester linkage of (b) and a monoester linkage of (c).

METHODS OF ANALYSIS APPROVED BY THE CODEX ALIMENTARIUS COMMISSION. I. ACID VALUE. W. Horwitz (Bureau of Foods, Food and Drug Administration, Washington, DC 20204) *J. Assoc. Off. Anal. Chem.* 59, 658-61 (1976). Numerous variations exist for determining the acidity of fats and oils by titration. A Youden ruggedness test was performed, using extreme conditions existing in the methods, endorsed by various international organizations: aqueous and alcoholic standard alkali, 5 or 56 g sample, 50 or 150 ml alcohol or alcohol-ether solvent, titration at room temperature or 60°C with 2 ml or 8 drops of phenolphthalein indicator, to the first color change or to a pink persisting for 60 sec. The titration method was found to be extremely rugged at the 1% oleic acid level with none of the variables influencing the result. At the 0.15% level, only the sample size affected the result.

QUALITY AND CHEMICAL CONSTITUENT OF SUNFLOWER SEEDS FROM DIFFERENT PORTIONS OF THE HEAD. Soad A.M. Youssef (Faculty of Agri., Kafr El-Sheikh, Tanta University, Egypt) and Abdel-Hamid Y. Abdel-Rahman (Faculty of Agri., Alexandria University, Egypt) *Grasas Aceites (Seville)* 27, 97-100 (1976). Heads of two cultivars and two strains of sunflower (*Helianthus annuus* L.) were divided into three concentric ring shaped zones. The means of agronomic characters (100 seed wt., kernel %, hull percent, seed dimensions and seed yield/head) and chemical composition of seeds (moisture, oil, protein, crude fiber, ash and nitrogen free extract) showed a presence of significant differences among the three portions on the heads. In all cases seeds from inner zone were significantly lower in agronomic characters than those from the outer or middle rings. Oil comprises about 26-52% and protein about 15-25% of the sample, whereas hulls contain about 84% crude fiber and ash. There were varietal differences concerning the relationship between agronomic characters,

chemical constituent and seed position. Fatty acid composition and oil quality of seed oil makes it desirable for use as an edible oil.

DESCRIPTION OF A MECHANICAL ANALOGIC MODEL FOR SOLVENT EXTRACTION, IN A (PERCOLATION) DEVICE, OF OILS CONTAINED IN OIL-SEED FLAKES. C.G. Herrera, J.C. Martin and J.M.M. Moreno (Instituto de la Grasa y sus Derivados, Sevilla) *Grasas Aceites (Seville)* 27, 73-96 (1976). In order to improve designs, developments and automation of plants for solvent extraction of seed-oils, it is very suitable to get ready an analogic model, its (answers) symbolizing behaviours of liquid phase flows generated during the extraction. The model described is formed by assembling several rheological elements (Newtonian dashpots, friction elements, Hookean springs, bumpers, etc.). The model running, consisting in an alternative series of traction and compression stages, symbolizes the alternative series of penetrations and drainages of liquid phases inside the capillary pores and among surfaces of oil-seeds flakes in the extractor baskets. The equation for the total time of analogic model running is proposed as a mathematical model for that flow series.

THE UNSAPONIFIABLE MATTER OF FATS. THE STEROLIC FRACTION OF PORTUGUESE VIRGIN OLIVE OILS. H.M.P. de L'Duarte Costa and R.M.B.S. Martins *Grasas Aceites (Seville)* 27, 101-6 (1976). The qualitative and quantitative composition of the sterolic fraction of Portuguese virgin olive oils is studied according the method recommended by the International Olive Oil Council, which it is discussed. It has been obtained in 140 samples from the campaigns 1973/1974 and 1974/1975, 24.3% and 4.3% respectively for the beta-sitosterol. These results are lower to the 94%. It has been proved that a sample from the maritime zone has a stigmaterol content higher than that of the campesterol which makes decrease the beta-sitosterol value significantly.

CHEMICAL COMPOSITION OF COMPOUNDS PRODUCED BY THE PEA APHID *ACYRTHOSIPHON PISUM* (HARRIS): PENTANE AND CHLOROFORM-METHANOLIC EXTRACTS OF BODY LIPIDS. K. Stránský, A. Trka, J. Kohoutová, and M. Streibl (Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, 166 10 Prague 6) *Collect. Czech. Chem. Commun.* 41(6), 1799-804 (1976). The pentane (B) and chloroform-methanolic (C) extract of crushed bodies of the pea aphid *Acyrtosiphon pisum* (Harris) was analysed. Homologous series of alkanes (inclusive of *trans*- β -farnesene), higher esters, saturated and unsaturated triglycerides, free aliphatic acids and alcohols, 1,3- and 1,2-diglycerides and ethanediol monoesters were detected by means of chromatographical and spectrometrical methods. The results were compared with those obtained by analysis of the pentane extract (A) of surface lipids from intact bodies.

THE SYNTHESIS OF KETO ACIDS AND HYDROXY ACIDS AND THEIR ESTERS WITH CYCLOPENTANE RING. S. DOLEZAL (Laboratory of Monosaccharides, Prague Institute of Chemical Technology, 166 28 Prague 6) *Collect. Czech. Chem. Commun.* 41(6), 1698-703 (1976). Using radicalic addition of cyclopentanone on unsaturated carboxylic acids or esters with the terminal double bond, I, ω -(2-oxocyclopentyl)alkanoic acids or esters II have been prepared. The keto esters obtained (and the keto acid IIIa) were reduced with sodium borohydride to corresponding alkyl ω -(2-hydroxycyclopentyl)alkanoates III (or hydroxy acid IIIa). The infrared spectra of the compounds prepared have been measured.

• Biochemistry and Nutrition

CHOLESTEROGENESIS: DEREPRESSION IN EXTRAHEPATIC TISSUES WITH 4-AMINOPYRAZOLO-[3,4-D]PYRIMIDINE. J.M. Andersen and J.M. Dietschy (Southwestern Med. School, Univ. of Texas Health Sci. Ctr. at Dallas, Dallas, Tex. 75235) *Science* 193, 903-5 (1976). Administration of 4-aminopyrazolo[3,4-d]pyrimidine decreased serum cholesterol levels in the rat to less than 5 milligrams per deciliter. Coincident with this change, there was a 2.1- to 16.0-fold increase in the rate of sterol synthesis in seven extrahepatic tissues. This suggests that cholesterol carried in serum lipoproteins plays a major role in regulating sterol synthesis in many extrahepatic tissues.

RELATIVE ACTIVATION OF MILK LIPOPROTEIN LIPIASE BY SERUM OF COWS FED VARYING AMOUNTS OF FAT. D.M. Super, D.L. Palmquist and F.L. Schanbacher (Dept. of Dairy Sci., Ohio Agric. Res. and Development Center, Wooster, Ohio 44691) *J. Dairy Sci.* 59, 1409-13 (1976). A routine laboratory assay to evaluate relative concentrations of lipoprotein lipase activa-

tor (apo C-II) in cow serum was developed. The assay was linear for at least 120 min after an initial, unexplained, lag time of 13 to 15 min. Half-maximal activation was in the range of 1 to 2% serum in the assay. Inhibition of activation was indicated at high amounts (10%) of serum. Activation from plasma was half that from serum, presumably caused by an increase in substrate K_m in the presence of heparin. Use of glyceryl tri[9,10- 3H] oleate yielded excessively high blanks; [2- 3H] glyceryl triolein is suggested for routine assay. Relative amounts of activator were not different between dry and lactating cows fed "conventional" diets. Activator concentration increased linearly with increasing dietary fat and was related to concentration of total lipid in plasma. The assay may provide a useful adjunct in studies on lipoprotein metabolism.

ROLE OF PHOSPHOLIPIDS IN THE CALCIUM-DEPENDENT ATPASE OF THE SARCOPLASMIC RETICULUM. ENZYMATIC AND ESR STUDIES WITH PHOSPHOLIPID-REPLACED MEMBRANES. C. Hidalgo, N. Ikemoto and J. Gergely (Dept. of Muscle Res., Boston Biomed. Res. Inst.; Dept. of Neurology, Massachusetts General Hosp.; and Depts. of Neurology and Biol. Chem., Harvard Med. Schl., Boston, Mass. 02115) *J. Biol. Chem.* 251, 4224-32 (1976). Studies on the formation and decomposition of phosphoenzyme have been carried out with the three types of ATPase preparations. At 0°, the rate of inorganic phosphate liberation is 8 times lower in DPL-enzyme than in del-enzyme with little difference in the steady state level of phosphoenzyme. In DOL-enzyme, the level of phosphoenzyme and the rate of inorganic phosphate liberation are 1.8 and 3.5 times higher than the corresponding values obtained with del-enzyme. Addition of ADP to the phosphorylated intermediate of DPL-enzyme induces a fast reversal of the phosphorylation reaction. These results indicate that the physical state of the phospholipid molecules associated with the enzyme affects the decomposition of phosphoenzyme, with little effect on the phosphorylation reaction and its reversal.

IDENTIFICATION OF *sn*-GLYCERO-1-PHOSPHATE AND PHOSPHOETHANOLAMINE RESIDUES LINKED TO THE MEMBRANE-DERIVED OLIGOSACCHARIDES OF *ESCHERICHIA COLI*. E.P. Kennedy, M.K. Rumley, H. Schulman and L.M.G. van Golde (Dept. of Biol. Chem., Harvard Med. Schl., Boston, Mass. 02115) *J. Biol. Chem.* 251, 4208-13 (1976). The glycerophosphate linked to the oligosaccharide in phosphodiester bond is the *sn*-glycero-1-P enantiomer. This finding strongly supports the previous conclusion that the oligosaccharides are the acceptors of the polar headgroups of membrane phospholipids, since the unesterified glycerophosphate of phosphatidylglycerol is an *sn*-glycero-1-P residue, otherwise rare in nature. The glycerophosphate residues in the membrane-derived oligosaccharide are not substituted in the *sn*-2 or *sn*-3 positions, since they are readily oxidized by periodate under mild conditions. Alkaline hydrolysis liberates glycerophosphate, and only negligible amounts of free glycerol, consistent with the view that the glycerophosphate residues are linked to glucose units through position 6, unfavorable for the formation of glucose cyclic phosphate intermediates that would eliminate free glycerol.

EFFECTS OF ADRENERGIC AGONISTS ON PHOSPHATIDYLINOSITOL LABELLING IN HEART AND AORTA. E.G. Lapetina, P.A. Briley and E. DeRobertis (Inst. de Biol. Celular, Facultad de Med., Univ. de Buenos Aires, Paraguay 2155, 1121 Buenos Aires, Argentina) *Biochim. Biophys. Acta* 431, 624-30 (1976). The metabolism of phosphatidylinositol has been investigated in heart fragments and aorta slices incubated with adrenergic agonists. Noradrenaline and isoprenaline had no stimulatory effect on $^{32}P_i$ incorporation into phosphatidylinositol in cat and guinea-pig hearts. Incorporation of $^{32}P_i$ into phosphatidylinositol was enhanced by noradrenaline and methoxamine in cat aorta. This information is consistent with the idea that the enhanced phosphatidylinositol turnover produced during adrenergic stimulation is mediated through α -adrenergic receptors and not through β -adrenoceptors.

FACTORS THAT INFLUENCE MILK CHOLESTEROL AND LIPID PHOSPHORUS: CONTENT AND DISTRIBUTION. K.C. Bachman and C.J. Wilcox (Dairy Sci. Dept., Inst. of Food and Agric. Sci., Univ. of Florida, Gainesville, Fla. 32611) *J. Dairy Sci.* 59, 1381-7 (1976). Average cholesterol content of 356 raw milk samples was 152.2 $\mu g/ml$ and upon centrifugation (3,000 $\times g$ for 8 min), 16.9% was distributed in the skim milk phase. Lipid phosphorus averaged 19.0 $\mu g/ml$ and was partitioned 50:50 between cream and skim milk phases. Weight ratios of cholesterol to lipid phosphorus for milk and skim milk were

8.30:1 and 2.94:1. When variation due to milk yield, fat percent, and somatic cell numbers (deoxyribonucleic acid percent reflectance) was accounted for by least squares, cholesterol content and distribution did not differ among breeds (Holstein, Jersey, and Guernsey). Breed differences in lipid phosphorus content of whole milk could not be detected. However, Holsteins had a significantly lower content of lipid phosphorus and a higher weight ratio for skim milk. Milk yield, fat content, and somatic cells affected responses of cholesterol and lipid phosphorus. This supports a multiple origin concept for membrane material in skim milk.

ADIPOSE TISSUE CELL SIZE AND LIPOLYSIS IN THE RAT: RESPONSE TO EXERCISE INTENSITY AND FOOD RESTRICTION. E.W. Askew and A.L. Hecker (Letterman Army Inst. of Res., Presidio of San Francisco, Calif. 94129) *J. Nutr.* **106**, 1351-60 (1976). This experiment was designed to determine if the adaptive increase in adipose tissue epinephrine-stimulated lipolysis (ESL) observed in exercise trained rats is related to decreased adipocyte size or a direct response to exercise. Two levels of treadmill exercise and three levels of food restriction were imposed on male rats over a 12 week experimental period to create a distribution of adipose tissue cell sizes. Epinephrine-stimulated lipolysis was subsequently measured in the isolated adipocytes from rats trained at two different exercise levels and in untrained rats fed either ad libitum or 16%, 27%, or 35% dietary restriction. Energy restriction was effective in reducing body weight and to some extent epididymal fat pad weight; however, adipocyte size and number were not significantly affected. Exercise in both groups of trained rats was effective in reducing adipocyte size; however, cell size did not differ between training groups. The group receiving the greatest amount of daily exercise had significantly greater ESL indicating that the adaptive increase in lipolytic potential seen in adipose tissue of exercise trained rats is a true metabolic adaptation not secondary to reduced cell size.

COMPARISON OF THE BINDING OF VARIOUS BILE ACIDS AND BILE SALTS IN VITRO BY SEVERAL TYPES OF FIBER. J.A. Story and D. Kritchevsky (The Wistar Inst. of Anat. and Biol., 36th St. at Spruce, Philadelphia, Penn. 19104) *J. Nutr.* **106**, 1292-94 (1976). The binding in vitro of the sodium salts of cholic acid, chenodeoxycholic acid, deoxycholic acid, taurocholic acid, taurochenodeoxycholic acid, taurodeoxycholic acid, glycocholic acid, glycochenodeoxycholic acid, and glycodeoxycholic acid by alfalfa, bran, cellulose, lignin, and cholestyramine was measured. Cholestyramine bound an average of 81.3% of all the bile acids and salts tested whereas cellulose bound only negligible amounts (1.4%). Of the other substances tested, lignin bound 29.2%, alfalfa, 15.9% and bran, 9.0%. No distinct pattern of binding was discerned. It is therefore apparent that the validity of statements concerning the effect of fiber on bile salt metabolism rests upon the specificity of the composition of the fiber involved and the bile acids or salts tested.

BENEFICIAL PHYSIOLOGIC ACTION OF BEANS. E.W. Hellendoorn (Central Inst. for Nutrition and Food Res., TNO, Zeist, The Netherlands). *J. Am. Diet. Assoc.* **69**, 248-53 (1976). The author reviews the literature indicating the beneficial effects of a diet high in fiber and the detrimental effects of highly refined carbohydrate. In a study with 20 male volunteers divided into two groups, one group received a meal of boiled legumes (mainly brown beans, *Phaseolus vulgaris*), corresponding to 100 g dry material for four weeks while the other group continued on their normal diet. In the next period, lasting 13 weeks, the diets were reversed. In the control period before the bean diet was fed, the average difference in serum cholesterol between the two groups was slight. In each of the experimental periods, the cholesterol level of the beans group was significantly lower than that of the other group. In the second experimental period, the difference was also significantly different from that of the control period.

POLYUNSATURATED MEAT AND DAIRY PRODUCTS IN FAT-MODIFIED FOOD PATTERNS FOR HYPERLIPIDEMIA. H.D. Brown, V.G. deWolfe, H.K. Naito, W.J. Harper, and D.L. Palmquist (Dept. of Food Science and Nutrition, Ohio State University, Columbus). *J. Am. Diet. Assoc.* **69**, 235-42 (1976). Polyunsaturated beef and milk were produced by feeding cattle polyunsaturated oil protected from degradation in the rumen by denatured protein. In human diets, these products were substituted for their saturated counterparts in a fat-modified food pattern which included polyunsaturated oil and margarine. Eleven subjects, of whom three were normocholesteremic, participated: six of the eleven had been following a fat-modified diet for

some time. Five persons were supplied polyunsaturated animal products during the first four week experimental period, then saturated products during the second four week period. The other six received saturated products first, then polyunsaturated. Serum cholesterol levels were 6% lower with intake of polyunsaturated products than with saturated ones. There was little change in serum cholesterol with polyunsaturated products in the six persons who had previously followed a fat-modified diet; in five persons not previously on such a diet, serum cholesterol was reduced 18%. It is concluded that polyunsaturated animal products with some restriction in the amount of polyunsaturated animal fat are useful in fat-modified food patterns for reducing hyperlipidemia.

PHOSPHOLIPID AND LIPOPOLYSACCHARIDE IN PROTEUS MIRABILIS AND ITS STABLE PROTOPLAST L-FORM: DIFFERENCE IN CONTENT AND FATTY ACID COMPOSITION. J. Gmeiner and H.H. Martin (Institut für Mikrobiologie, Fachbereich Biologie der Technischen Hochschule Darmstadt) *Eur. J. Biochem.* **67**, 487-94 (1976). Cells of the stable protoplast L-form of *Proteus mirabilis* contain 1.5 to 2 times more extractable lipid, mostly phospholipid, per dry weight than cells of the bacterial form. Under identical conditions of cultivation the qualitative and quantitative composition of the phospholipid is very similar in both cell forms. The range of mole percentages of individual phospholipid species is 76-80 for phosphatidylethanolamine, 10-13 for phosphatidylglycerol, 3.9-5.5 for diphosphatidylglycerol and 1.0-2.1 for lysophospholipid. However, all phospholipid species in the L-form differ from those of the bacterial form by a lower content of long-chain fatty acids and a higher content of short-chain fatty acids. Growth of the L-form in the presence of growth-stimulating horse serum results in a change of phospholipid composition accompanied by the uptake of phospholipid and fatty acids from the serum into L-form phospholipid. L-form protoplasts synthesize the same two types of lipopolysaccharide, I and II, that were previously identified in the bacterial form of *Proteus mirabilis*. However, only small amounts of the more hydrophilic lipopolysaccharide II are present in the L-form. Lipopolysaccharides from both cell forms have virtually identical polysaccharide compositions but differ strikingly in the relative content of fatty acids in their lipid-A moieties. Molar ratios of tetradecanoic acid, hexadecanoic acid and 3-hydroxytetradecanoic acid are 5:1:6 in the bacterial form and 5:0.1:6 in the L-form grown in serum-free medium. The observed differences between the bacterial form and the protoplast L-form are interpreted as results of the adaptation of the L-form to life in the state lacking an envelope by formation of a physically more stable but still sufficiently fluid protoplast membrane. A rapid method based on fatty acid analysis for the simultaneous quantitative determination of phospholipid and lipopolysaccharide content of whole cells is reported.

POSSIBLE PHOSPHOLIPID PRECURSOR FOR PHOSPHATIDYL SERINE IN RAT HEART. Z. Kiss (Institute of Biochemistry, Biological Research Center of the Hungarian Academy of Sciences, Szeged) *Eur. J. Biochem.* **67**, 557-61 (1976). The incorporation of ³²P-labelled inorganic phosphate into phospholipids of rat heart slices was investigated in pulse-chase experiments. The comparison of the specific activities of individual phospholipids suggested that phosphatidic acid can be ³²P precursor for phosphatidylserine. Studies with L-serine revealed the full calcium dependence of phosphatidylserine formation in heart homogenates. Chasing experiments with [1,2-¹⁴C]ethanolamine and [methyl-¹⁴C]choline proved the precursor role of phosphatidylethanolamine and phosphatidylcholine and indicated a base exchange mechanism. Among phospholipids phosphatidic acid was the most potent in stimulating phosphatidylserine formation in homogenates. The conclusion was reached that phosphatidic acid can also be regarded as precursor for phosphatidylserine.

STUDIES ON LYSOPHOSPHOLIPASES VII. SYNTHESIS OF ACYLTHIOESTER ANALOGS OF LYSOLECITHIN AND THEIR USE IN A CONTINUOUS SPECTROPHOTOMETRIC ASSAY FOR LYSOPHOSPHOLIPASES, A METHOD WITH POTENTIAL APPLICABILITY TO OTHER LIPOLYTIC ENZYMES. A.J. Aarsman, L.L.M. van Deenen and H. van den Bosch (Laboratory of Biochemistry, Padualaan 8, De Uithof, Utrecht, The Netherlands) *Bioorg. Chem.* **5**, 241-53 (1976). The synthesis of acylthioester analogs of lysolecithins, i.e., 2-hexadecanoylthio-1-ethyl-phosphorylcholine and 3-hexadecanoylthio-1-propyl-phosphorylcholine is described. Both compounds were found to be hydrolyzed by a homogeneous lysophospholipase from beef liver, a spectrophotometric assay for the activity of which was developed by continuous measurement of the released thiol groups in the presence of

dithionitrobenzoic acid. Phospholipase A₂ from pig pancreas effected hydrolysis of the acylthioester bond in 2-hexadecanoylthio-1-ethyl-phosphorylcholine, the enzymatic action of which could also be monitored spectrophotometrically. Lipase from pig pancreas was found to hydrolyse acylthioester bonds in 2-hexadecanoylthio-1-ethanol. The tributyrin ester of 3-mercaptopropanediol was synthesized and used to compare the release of total acid and thiol groups during hydrolysis with lipase. A ratio of about 2:1 was found for these releases. These findings clearly indicate the potential applicability of acylthioester analogs of substrates for phospholipases, lysophospholipases, and lipases in continuous spectrophotometric assays for lipolytic enzymes.

EFFECT OF HEATING AND CHILLING BUFFALO MILK ON THE PROPERTIES OF FAT GLOBULE MEMBRANE PROTEINS. A.K. Bandyopadhyay and N.C. Ganguli (National Dairy Research Institute, Karnal, India) *J. Food Sci. and Technol.* 12, 312 (1975). Heating and chilling buffalo milk induced compositional changes in the fat globule membrane proteins. The most affected constituents were bound carbohydrates whose levels diminished during all treatments. Changes in the amino acid composition of fat globule membrane protein were more pronounced due to effect of sterilization than by boiling and pasteurization. Chilling of milk had little effect on the amino acid composition. Gel filtration pattern revealed that pasteurization, boiling and chilling altered the molecular size of the minor components, whereas sterilization resulted in the formation of a major protein peak of higher molecular size. The fat globule membrane proteins of unprocessed milk were resolved by polyacrylamide gel electrophoresis into thirteen protein and six glycoprotein components. Boiling and sterilization altered the electrophoretic characteristics, whereas, chilling had no impact. It is proposed that heating and chilling of buffalo milk bring about compositional and structural changes in the fat globule membrane.

• Edible Proteins

APPLICATIONS OF SOY PROTEINS IN PASTRY, CONFECTIONERY, AND DIETETIC PRODUCTS. R. Caers (Société Goorden, Schoten/Anvers). *Rev. Fr. Corps Gras* 23, 81-6 (1976). The application of soybeans and their properties are reviewed for different pastries. In most applications, the advantages of flours are due to absorptive properties of proteins which insure a good distribution of liquid in the paste and stabilize the exchange of moisture between the cooked product and the ambient air. The absorption of fat on protein causes a whipping cream and a more homogenous repartition of fat in the aqueous phase. The role of lecithin, fats, and δ -tocopherols (strong antioxidants) is established.

CHARACTERISTICS AND PHYSICOCHEMICAL PROPERTIES OF SOYBEAN FLOURS, SOY PROTEIN CONCENTRATES AND ISOLATES. R. Duterte (Société Industrielle des oléagineux, 62002 Arras). *Rev. Fr. Corps Gras* 23, 15-25 (1976). Physicochemical and functional properties of soybean by-products allow very interesting technological properties resulting in their increasing use. The functional properties are specially owed to proteins. Some depend on the solubility determined by "nitrogen solubility index". The functional properties: water or fats absorbance, emulsifying or foaming capacity, viscosity, and gel or film formation are affected by different factors: nature of proteins and their denaturation extent, presence of other components in soybean and food products, conditions of processing, which can be planned at best to improve the final products characteristics.

EFFECT OF TECHNOLOGY ON THE COMPOSITION AND NUTRITIONAL VALUE OF FOOD PROTEIN PRODUCTS. C. Cheftel et al. (Lab. Biochimie et Technologie Alimentaires, Univ. Sciences et Techniques, 34060 Montpellier). *Rev. Fr. Corps Gras* 23, 7-13 (1976). Effect of following technological treatments on the composition and nutritional value is reviewed by the authors. Alkaline severe treatments applied to a sunflower protein isolate involve a destruction of some amino acids (arginine, threonine, serine, etc.) and appearance of unusual amino acids such as lysinoalanine which cause a decrease in *in vitro* digestibility and even isomerization of residual lysine. The residual methionine is changed into sulphoxide by oxidant treatments; the nutritional value is only very little decreased. The polyphenols-proteins interaction and its effect on the color have been studied on the model system: chlorogenic acid-casein.

PLACE AND FUTURE OF TEXTURED VEGETABLE PROTEINS IN RELATION TO THEIR NUTRITIONAL VALUES. G. Debry et al. (Dept. Nutrition et Maladies Métaboliques Univ. Nancy, 40, rue Lionnois, 54000 Nancy). *Rev. Fr. Corps Gras* 22, 611-7 (1975). Acceptability and nutritional value of soybean and horsebean textured proteins have been studied for children and adults by methods of spontaneous alimentation and nitrogen balance. The nutritional interest in these new foods is discussed in relation to different parameters.

SPINNING OF SUNFLOWER PROTEINS. PHYSICAL PROPERTIES IN RELATION TO THE ORGANOLEPTIC QUALITY OF SPUN PRODUCTS. M. Fabre (Rhône-Poulenc Industries, Saint-Fons, Rhône). *Rev. Fr. Corps Gras* 22, 593-8 (1975). Experiments of spinning related by the author have been carried out with isolated sunflower proteins. Their aim is to produce analogies as similar as possible to meat products in regard to structure and organoleptic characteristics. Spinning consists of following steps: dissolution of proteins in alkaline solution, filtration of obtained gel or colloid, proper spinning by extrusion through a drawing-plate, coagulation and stretching of obtained fibers in acid solution, neutralization, and washing. The particular appearances peculiar to isolated sunflower proteins are described. The importance of post-spinning operations is emphasized.

PREPARATION OF PROTEINS FROM OILSEEDS BY MICROBIOLOGICAL METHODS. T. Staron (Station des Antibiotiques et des Bioconversions I.N.R.A., Rue du Maréchal Leclerc, 28110 Luce-Chartres, France). *Rev. Fr. Corps Gras* 22, 579-89 (1975). Oilseeds have a high content of proteins and most of them are well balanced in amino acids (limiting factor, methionine). However, some oilseeds contain toxic substances (isothiocyanates, phenols, peptides, etc.) which reduce their uses. The microbiological methods allow the elimination of these substances and, at the same time, the concentration of the proteins. Their biological value is improved. The author reviews some oriental foods prepared by these methods (miso, shoyu, tempeh, etc.) which make up a large part of the proteinic foods for many Asiatic populations. He describes the process of production of rapeseed proteins by microbiological methods, using *Geotrichum candidum*. At last, he describes a new process called chemio-biological process which includes the advantages of both methods: the chemical and the microbiological. The process starts with a microbiological step in order to degrade the antinutritional components, then a chemical step with the solubilization of protein by an alkaline solution followed by their precipitation in an acidic solution.

METHOD OF MANUFACTURING EDIBLE SOY PROTEIN-CONTAINING SIMULATED MEAT PRODUCT. S. Obata, Y. Yamato and H. Taniguchi (Fuji Oil Co.). *U.S. 3,982,004*. A fibrous soybean product, which is mixed with meat, is obtained by passing a slurry of proteinaceous material through a heat exchanger under high pressure with subsequent cooling and pumping into a collecting zone. There is produced elongated filaments of multimolecular polymers with 90-50% of a nontextured protein paste capable of gelation when heated. The mixture is shaped and heat treated to produce the stimulated meat product.

APPARATUS FOR PREPARATION OF A SOYBEAN BEVERAGE BASE. A.I. Nelson, B.P.N. Singh, and S. Singh (Univ. of Illinois Foundation). *U.S. 3,981,234*. The entire apparatus is comprised of the following parts: soybean conditioning system, dehulling apparatus, screening and aspiration apparatus in which cotyledons are separated from hulls, blanching (tenderizing) apparatus for treating the cotyledons, wet soybean grinding apparatus, Fitzmill, and final blending, milling, heating, and homogenizing apparatus.

PROCESS FOR PRODUCING AN EDIBLE COTTONSEED PROTEIN CONCENTRATE. H.K. Gardner, Jr., R.J. Hron, Sr., H.L.E. Vix, and J.M. Ridlehuber (U.S. Secy of Agriculture). *U.S. 3,972,861*. The process comprises (a) drying cottonseed meats at 180 F to 2.5% moisture or less; (b) cooling the meats to room temperature; (c) comminuting the cooled meats in a pin mill to prevent pigment gland and oil cell rupture; (d) slurring the milled meats in a nonpolar hydrocarbon solvent; (e) passing the slurry into a liquid cyclone to produce an underflow stream containing the pigment gland-gossypol, large meal particles, and hull particles; (f) feeding the overflow stream to a rotary vacuum filter where the miscella is separated from the solids; (g) washing the cake with nonpolar solvent to remove all of the oil; and (h) removing the residual solvent

from the cake to produce an edible flour product having less than 60 ppm of residual solvent, 65% protein, 0.045% or less of free gossypol, and less than 1% oil. Overall recovery of initial solids is 46%.

• Detergents

BAR SOAP CONTAINING SILICA COLLOIDS. L. McDonald (Pollution Abatement Foundation). *Soap, Cosmet. Chem. Spec.* 52(6), 42-50, 66 (1976). A soap toilet bar not requiring coconut oil is made by reacting tallow fatty acids and oleic acid with alkali silicates under conditions of high shear to produce soda soaps and silica colloids *in situ*. In terms of chemical, physical, and performance properties the colloidal silica soap compared favorably with toilet bars made from 80 parts tallow and 20 parts coconut oil. Soil removal tests with the product in granular form on cotton demonstrated a significant boost in cleaning efficiency, even in hard water, over the soil removal ability of the basis soap. Economic considerations involved in the cost of both the raw materials and the process are briefly discussed. This type of product may find use in communities which prohibit the use of non-soap organic detergents for home laundry service.

STUDIES ON ADSORPTION OF SURFACTANTS ON ACTIVATED CARBONS I. ADSORPTION OF NONIONIC SURFACTANTS. I. Abe, K. Hayashi, and M. Kitagawa (Osaka Municipal Technical Research Institute, Osaka) *Yukagaku* 25, No. 3, 145-50 (1976). The relationship between the molecular structure of nonionic surfactants and their adsorptivities on activated carbons was investigated. The adsorption isotherms for all water-soluble nonionic surfactants used in this study were Langmuir type and the adsorptivities were higher than ordinary organic compounds. With the increase in the length of polyoxyethylene chain of polyoxyethylene nonylphenyl ether (NP), activated carbons were saturated by NP in lower concentrations, and both the adsorption rate and the amount of adsorbed NP at saturation decreased. For the surfactants with a fixed length of polyoxyethylene chain, the adsorption was favored by the increase in the length of the alkyl chain. An unsaturated bond in the alkyl chain depressed the adsorption. The carbon activated with zinc chloride had large surface area and pores, and was effective for the adsorption of nonionic surfactants. When an aqueous solution of NP was passed through the column of activated carbon under certain conditions, the adsorption efficiency was 90.6%. These results suggest that the use of activated carbon may be very effective for the treatment of wastewater containing nonionic surfactants.

STUDIES ON ADSORPTION OF SURFACTANTS ON ACTIVATED CARBONS. II. THE EFFECT OF COEXISTING SALTS FOR ADSORPTIONS OF NONIONIC SURFACTANTS. I. Abe, K. Hayashi, and M. Kitagawa (Osaka Municipal Technical Research Institute, Osaka), *Yukagaku* 25, No. 3, 151-5 (1976). The effect of coexisting salts for adsorption of nonionic surfactants on activated carbon in aqueous solution was investigated. Inorganic salts which reduced the cloud point of polyoxyethylene nonylphenyl ether (NP-10) increased the adsorption of NP-10 on activated carbon, while inorganic salts which raised the cloud point disturbed the adsorption. In the case of organic salts, the adsorption of NP-10 on activated carbon was disturbed because of the competing adsorption between NP-10 and organic salts. The amount of adsorption of NP-10 decreased with increasing the hydrophobicity of organic salts. Sodium sulfate, sodium perchlorate and sodium citrate aggregated NP-10 molecules. The aggregation was influenced by temperature. The amount of adsorption of NP-14 on activated carbon was unaffected by the changes of pH in the range of 2 to 12.

AUTOMATED DETERMINATION OF BUILDERS IN DETERGENTS. I. DETERMINATION OF SILICATES AND PHOSPHATES. T. Tsuda, S. Takano, K. Furuya, and K. Kunihiro (Household Products Research Laboratories, Kao Soap Co., Ltd., Tokyo) *Yukagaku* 25, No. 3, 156-60 (1976). Sodium silicate and sodium tripolyphosphate in detergents were determined automatically by using Technicon Auto Analyzer. Detergents were fused with alkali carbonates to form soluble silicate and orthophosphate from sodium silicate and tripolyphosphate. Then, the alkali fused sample solution was neutralized and determined colorimetrically. Silicate is measured at 420 nm based on silicomolybdate method, and phosphate is measured at 660 nm based on molybdenum blue method. Both compounds were determined using the same sample solution without inter-

ference and also determined simultaneously. The range of determination for silicate was from 10 to 100 mg/l, and for phosphate from 50 to 300 mg/l. Forty samples could be determined within one hour.

SURFACE TREATING COMPOSITIONS. T.J. Rose (Procter & Gamble). *U.S. 3,976,581*. A fabric softening composition consists of a substituted ammonioamidate having the formula $R_1CON-N^+R_2R_3R_4$ and a pH buffering compound comprising a weak acid. The ammonioamidate has a pK_a of 5 to 7, and the buffering compound is present in an amount sufficient to maintain the pH of a solution containing the two compounds at a pH less than, equal to, or not greater than two units above the pK_a of the ammonioamidate.

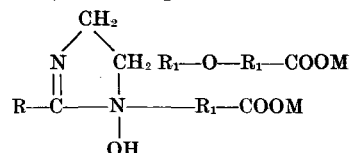
SULFOSUCCINATE DERIVATIVES AS DETERGENT BUILDERS. V. Lamberti (Lever Bros. Co.). *U.S. 3,976,642*. The builders are α -hydroxypolyethyleneoxy- β -sulfosuccinic acids and their alkali metal, ammonium, and substituted ethanolammonium salts.

SOAP BAR MANUFACTURE. W.H. Paris, R.C. Wolfe, T.P. Fay and R.D. Lindquist (Avon Products, Inc.). *U.S. 3,976,736*. Soap bars containing detailed graphics on their surface are made resistant to marring during packaging by cooling the shaped billets with a gas in a confined zone under conditions sufficient to harden the surface.

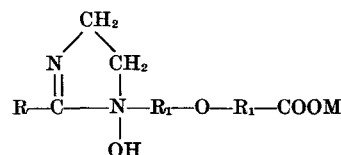
SURFACE ACTIVE COMPOSITION. J. Doumoulin (Rhone-Poulenc S.A.). *U.S. 3,975,294*. The composition comprises 45-90% of an n-alkyl monoether of a polyethylene glycol, 5-35% of a sodium dialkyl-sulfosuccinate, 2-17% of an acid selected from oleic, linoleic, linolenic, and ricinoleic acid, and 1.5-12% of an amine selected from triethanolamine and N-hydroxyethylmorpholine.

DETERGENT COMPOSITIONS. J.F. Davies, P.A. Gilbert and L. Thompson (Lever Bros. Co.). *U.S. 3,975,312*. The compositions comprise 10-50% of a synthetic anionic, nonionic, amphoteric, or zwitterionic detergent active compound and a builder which forms insoluble calcium and magnesium salts. The builder is selected from the group of water soluble and dispersible alkali metal salts of alkane (C_{18-22})-1,2-disulfonic acids.

SOLID AMPHOTERIC SKIN CLEANSER. J.B. Shelmire, Jr. *U.S. 3,975,313*. A process for manufacturing a solid amphoteric skin cleanser comprises heating a mixture of an amphoteric surfactant compound selected from the group consisting of



and



with a hexahydric alcohol such as dulcitol, mannitol, and sorbitol at 155-165 C to form a homogeneous mixture followed by cooling to form the solid composition. The amphoteric surfactant is partially neutralized with base.

DETERGENT ADDITIVES. K. Hachmann, G. Jakobi, R. Weber, A. Boeck and D. Jung (Henkel & Cie). *U.S. 3,975,280*. The active part of the composition comprises 10-70% of an activator for percompounds, 1-75% of an enzyme, 1-60% of an optical brightener, 1-60% of a biocide, and 1-30% of a perfume. The active material is surrounded by a coating comprising 20-90% of a saturated fatty acid or alcohol, 10-40% of a water soluble compound such as polyoxy-lower alkylene glycols, nonionic surfactants, and anionic surfactants, and 1-40% of a water insoluble but swellable compound capable of absorbing 500% or more of water such as alkali metal salts of copolymers of acrylic acid. There is also claimed a detergent composition containing the additive and a process for making it. It is storage-stable.

ACTIVATION OF PEROXYGEN BLEACHES. H. Douchis and F.-T.H. Lee (FMC Corp.). *U.S. 3,975,153*. In the method of simul-

taneously laundering and bleaching fabrics at temperatures between ambient and 80 C, the activator for the peroxygen compound is an isophorone derivative of the group consisting of isophorone enol acetates and isophorone oximinooacetate. The activator is present in an amount of at least one-half mole per mole of active oxygen compound. As a group, the activators are characterized by low odor, toxicity, and skin irritation properties.

BLEACHING COMPOSITIONS. H.F. Weyn (Colgate-Palmolive Co.). *U.S. 3,974,082*. The compositions consist of an oxygen-releasing inorganic percompound, an acyl-alkyl ester, and an esterase or lipase enzyme capable of hydrolyzing the ester. The compositions are effective for bleaching at temperatures above 25 C.

FABRIC SOFTENER. Y. Wiersema and R.D. Rieke (Procter & Gamble). *U.S. 3,974,076*. The softener composition comprises (a) water-insoluble softener component particles consisting of (1) 2-10 parts of a water-insoluble quaternary ammonium compound and (ii) 0.1-2 parts of a water-insoluble straight chain alcohol; (b) 0.1-2.0% of a nonionic surfactant; 0.1-3% of a water soluble ethoxylated quaternary ammonium compound; and (d) the balance a water soluble liquid carrier.

2-MERCAPTOQUINOXALINE-1-OXIDES, SALTS THEREOF, AND 2-(1-OXOQUINOXALINYL) DISULFIDES IN DETERGENT COMPOSITIONS. M.L. Douglass (Colgate-Palmolive Co.). *U.S. 3,971,725*. A detergent composition includes a surface active compound and a fungicidal or bacteriocidal amount of 2-mercaptoquinoxaline-1-oxide and/or its salts and disulfides.

ALKALI METAL POLYSILICATES AND DETERGENT COMPOSITIONS CONTAINING THEM. O.L. Bertorelli, R.K. Mays, L.E. Williams and H.F. Zimmerman, Jr. (J.M. Huber Corp.). *U.S. 3,971,727*. A washing composition comprises a synthetic organic detergent and a builder which is an alkali metal polysilicate. The polysilicate comprises the spray dried and pulverized product obtained by hydrothermally reacting an aqueous mixture of finely divided silica, an alkali metal hydroxide, and an alkali metal sulfate. The polysilicate complex contains polysilicate ions in a highly polymerized, irreversible state with a $\text{SiO}_2/\text{Na}_2\text{O}$ ratio in the range of 1.8:1 to 2.7:1.

SEQUESTERING AGENT. G.C. Robinson (Ethyl Corp.). *U.S. 3,971,728*. The agent, which is capable of sequestering calcium and magnesium ions, is a water soluble salt of a cis-2,5-disubstituted tetrahydrofuran in which the substituents are carboxy groups or carboxymethyl groups.

ACID MIX PROCESS. J.A. Sagel and C.E. Weber (Procter & Gamble). *U.S. 3,971,815*. In the process of sulfating an organic detergent precursor by contacting the precursor with a sulfating agent, there is claimed the improvement of carrying out the reaction in the presence of an effective amount of benzoic acid to lower the acid mix viscosity.

SOAP COMPOSITIONS FOR NONGELLING SOAP SOLUTION. E. Howarth (H. Kohnstamm & Co.). *U.S. 3,972,823*. The composition consists of water and less than 10% of a powder having a titer of 40-44 C. The powder consists of 50-95% of a dry neutral alkali metal soap of a fatty acid or mixture having a titer of 36-42 C and 5-50% of a free fatty acid having a titer of at least 42 C and 12-22 carbon atoms. The free fatty acid acts as a stabilizer to prevent gelation when the powder is dissolved in water.

THE AIRLIFT, ITS FORMATION AND SIGNIFICANCE FOR DETERGENT POWDER TREATMENT. H. Zilski. *Seifen, Ole, Fette, Wachse* 102(10), 265-8 (1976). The air lift not only ensures unproblematic conveyance of the washing powder leaving the spraying tower and thus permits extensive processing in free fall. Its main object is, above all, cooling down to room temperature during conveyance, the washing powder leaving the spraying tower at a temperature of 70 to 100 C.

ELECTROKINETIC INTERPRETATION OF THE ADSORPTION OF IONIC TENSIDES WITH RESPECT TO SOLID BODIES. B. Dobias (Chem. Inst. Physical Chem., Univ. Regensburg). *Tenside Deterg.* 13(3), 131-8 (1976). With salts that are incompletely soluble in pure water, the grid ions will determine the potential. The formation of the positive and negative binding points have been schematically represented. The adsorption isotherms of anionic surfactants at incompletely insoluble salts have a double S shape with a central platform which corresponds to a "monomolecular" cover of the soiled surface with adsorbate. The

maximum values of the adsorption isotherms correspond, as far as the surface required by the adsorbed molecules of the surfactant is concerned, to the formation of a second polar adsorption layer. The calculated values of the surface required by the adsorbed surfactants from the platforms of the adsorption isotherms agree well with the values from the isoelectric points. On the basis of an electrokinetic interpretation of the adsorption isotherms a mechanism of adsorption has been suggested which adopts a reciprocal effect between the surfactant molecules in the electric double layer and the grid ions of the incompletely soluble salt.

DECOMPOSITION KINETICS OF LINEAR ALKYL BENZOLSULFONATE. H. Leidner, R. Gloor and K. Wuhmann (Chem. Werke Hüls AG). *Tenside Deterg.* 13(3), 122-30 (1976). Numerous sulfophenylcarboxylic acids are produced as intermediates in the microbial degradation of Marlon A (anionic detergent of the LAS type). They were identified and their concentrations semiquantitatively estimated. Further breakdown of these intermediates is very slow. It is concluded that they are partly responsible for the poor degradability found when judged on the basis of disappearance of DOC rather than on the methylene blue reaction criterion used in the OECD test. The decomposition products were also found in the effluents of biological sewage treatment plants and in rivers.

NON-POLLUTANT SURFACTANTS STIMULATING THE GROWTH OF PLANTS. O.K. Dobozy and B. Bartha. *Tenside Deterg.* 13(3), 139-43 (1976). Earlier work showed that on treating the soil with certain cationic and potentially cationic surfactants, an increase in yield can be attained in plant cultivation. Current findings are the surfactants tested proved to be specific to species. On carrying out the treatment with Evagro (cationic surfactant) optimal for the given plant, the yield changes as a function of the dosage according to a maximum curve, while the correlation coefficient of the dosage-yield correlation is 0.7. The increase in yield attained by treatment with an Evagro found optimal for the given plant, at a dosage near the optimum was found to be significant on the 0.1-1.0% level, on the basis of both single experiments and all the experiments carried out during 4 years. On the basis of phenological observations, in addition to providing for a significantly higher yield, Evagro also increase the number of bearing stock, the quantity of the crop, bring forward the time of ripening and decrease the amount of withering. Results were obtained without environmental pollution.

SURFACTANT-COLLIGEND PARTICLE SIZE EFFECTS ON ION FLOTATION: INFLUENCES OF MIXING TIME, TEMPERATURE, AND SURFACTANT CHAIN LENGTH. R.B. Grieves, D. Bhattacharyya and J.K. Ghosal (Univ. Kentucky, Lexington, Ky.). *Colloid Polym. Sci.* 254, 507-15 (1976). The ion flotation of Cr(VI) from 0.926×10^{-3} M aqueous suspensions at pH 4.1 is related to particle size distribution data, obtained by filtration of the surfactant-Cr(VI) suspensions prior to flotation. The effects of surfactant-Cr(VI) mixing (precipitation and aggregation) time and of temperature are established over 10-45 C, with particle size and flotation generally increasing with temperature. Five, rather high purity, quaternary ammonium surfactants are used, with chain lengths from C_{10} to C_{18} . The optimum chain length at 13° and 23° C is C_{14} and at 33° and 43° C is C_{16} . An increase in the molar surfactant/Cr(VI) ratio in the initial suspension improves flotation until values of the ratio of 1.1, 1.2 and 2.2 are exceeded for C_{16} , C_{18} and C_{14} surfactants, respectively. The four roles of a surfactant in ion flotation—as a precipitant, as a dispersant (with surface adsorption opposing aggregation), as a collector, and as a frother—are discussed in terms of flotation, particle size distributions, and surface charge measurements.

PHOSPHORIC ACID ESTERS FOR THE WASHING AND CLEANING INDUSTRY. K. Henning. *Seifen, Ole, Fette, Wachse* 102(9), 238-40 (1976). Owing to the specific properties which phosphoric acid esters possess on account of their chemical constitution they can be used for particular purposes in the manufacture of washing and cleaning agents. Acid cleaning agents prepared with the use of short-chain alkyl phosphoric acid esters do not cause corrosion on stainless steel and have a much lower tendency to produce corrosion on other metal surfaces than orthophosphoric acid and other mineral acids. These products are therefore very suitable for the preparation of cleaning agents for rail vehicles. As cleaning agents based on alkylphosphoric acid esters do not cause damage to flagstones, tiles and mortar of joints, when correctly applied, the acid cleaning of swimming pools is another interesting

field of application for these products. It is also possible to formulate acid cleaning agents which owing to their intense dirt-removing effect and their additional capacity of dissolving deposits of calcium and rust are suitable for cleaning sanitary installations in households. Long-chain alkyl phosphoric acid esters have wetting and emulsifying capacities and in addition hydrotropic properties and the effect of regulating the formation of foam. Also they impart good antistatic properties and a softening effect to the material washed in them. They are consequently suitable for the manufacture of liquid products, for example, detergents for wool and light-duty detergents, and of low-foaming heavy-duty detergents. In regions with soft water undesired foaming can be avoided by the addition of long-chain alkyl phosphoric acid esters. As alkyl phosphoric acid esters are compatible with conventional ionic and nonionic surfactants their incorporation into washing and cleaning agents does not present any difficulty. In the preparation of liquid products their hydrotropic effect can advantageously be made use of.

HOUSEHOLD WASHING OF TEXTILES AND REDEPOSITION PROBLEMS. L. Ho Tan Tai (Lever, 55 av. Georges-V, 75008 Paris). *Rev. Fr. Corps Gras* 22, 527-35 (1975). The maintaining in suspension of soils of a substrate in order to prevent their redeposition on the substrate, called antiredeposition, is one of the basic operations of the detergency. It occurs particularly during the washing of textiles. The author reviews the kind of soils redeposited and the redeposition theory. He studied the influence of several factors on the phenomenon: electrolytes, mechanical action, temperature, and the kind of textile fibres. The mechanism of the antiredeposition is analyzed with the special effects of the surface active agents, the polyphosphates and the antiredeposition agents.

ON THE MEASURE OF MECHANICAL PROPERTIES OF SOAPS. II. MEASURE OF THE PENETRATION RESISTANCE BY FALL OF A WEIGHTED BODY. E. Sambuc and M. Naudet (Lab. National Matières Grasses—ITERG, Univ. d'Aix-Marseille, 13331 Marseille Cedex 3). *Rev. Fr. Corps Gras* 23, 33-40 (1976). A simple and cheap instrument is suitable for measuring the penetration resistance of soaps by fall of a weighted body, in absolute units, in a reproducible way. The results are not affected by the orientation of fibers induced by the plodding.

AUTOMATIC MINI-DETERMINATION OF CLOUD POINT OF NON-IONIC SURFACE-ACTIVE AGENTS. M. Thomas-Collignon (Lab. Rech. Colgate Palmolive, 92400 Courbevoie, France). *Rev. Fr. Corps Gras* 22, 605-8 (1975). In this paper, an automatic device for accurate and reproducible determination of cloud point of non-ionic surface-active agents is described. It is able to determine the cloudiness corresponding with cloud point while keeping this turbidity. The operator, advised by a sonorous signal can notice the corresponding temperature. 1.5 ml of solution are required for one measurement. Reproducibility is 0.1C.

FABRIC SOFTENER COMPOSITION. J.H. Kolaian, R.E. Jones, W.C. Crawford, and W.M. Cummings (Texaco, Inc.). *U.S. 3,979,307*. The composition comprises an aqueous dispersion containing 0.1-10% of a di(secondary alkyl) ammonium ester derivative.

DETERGENT COMPOSITION CONTAINING NOVEL BLEACHING AGENT. Y. Nakagawa, S. Sugiura, K. Matsunaga and Y. Ito (Kao Soap Co.). *U.S. 3,979,311*. The neutral composition consists of 3-40% of $4\text{Na}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}_2 \cdot \text{NaCl}$; 3-50% surfactant; 10-90% of neutral inorganic builder; 0-20% of alkaline inorganic builder; and 0-10% of organic builder. The composition is free of activator for the $4\text{Na}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}_2 \cdot \text{NaCl}$.

BLEACHING COMPOSITION. Y. Nakagawa, S. Sugiura, K. Matsunaga, and Y. Ito (Kao Soap Co.). *U.S. 3,979,313*. The composition consists of 20-100% of a mixture of $4\text{Na}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}_2 \cdot \text{NaCl}$ and an activator capable of reacting with hydrogen peroxide in aqueous solution to form an organic peracid; 0-10% of anionic and/or nonionic surfactant; 0-80% of a neutral inorganic builder salt; 0-30% of alkaline inorganic builder salt; and 0-10% of organic builder.

DETERGENT COMPOSITIONS. T.F. Child (Lever Bros. Co.). *U.S. 3,979,314*. The compositions comprise 5-40% detergent active compound, 10-75% sodium or potassium carbonate builder, and 5-60% finely divided precipitated calcium carbonate prepared by passing carbon dioxide into a suspension of calcium hydroxide. The calcium carbonate has a surface area of 30-100 square meters per gram and is treated before drying with a water insoluble inorganic dispersing aid selected from the group consisting of natural montmorillonite-type clays and

synthetic montmorillonite-type materials. The treated calcium carbonate has a decreased tendency to aggregation and deposition on washed fabrics.

HARD SURFACE CLEANING COMPOSITIONS. G.W. Claybaugh (Procter & Gamble). *U.S. 3,979,339*. A method of cleaning hard surfaces consists of scrubbing them with an aqueous solution containing 50-1,000 ppm surfactant, 100-20,000 ppm builder, and 2-1,000 ppm water soluble nonionizing polymeric material selected from the group consisting of polyvinyl alcohols and polyvinyl pyrrolidones.

HARD SURFACE CLEANING COMPOSITION. H.D. Munro (Procter & Gamble). *U.S. 3,981,826*. The composition comprises 19-79% of a liquid polyhydric alcohol, not more than 5% free water, 15-74% of an anionic surface active agent, 5-60% of a solid particulate water soluble abrasive inorganic salt selected from the group consisting of chlorides, sesquicarbonates, sulfates, phosphates, carbonates, and borates, and 1-5% of a highly voluminous oxide suspending agent selected from the group consisting of silicas, magnesias, aluminas, clays, and mixtures of these.

OLEFIN SULFONATE DETERGENT COMPOSITION. S.C. Klisch and C.A. Martin (Colgate-Palmolive Co.). *U.S. 3,979,340*. A liquid detergent composition having reduced gelling tendency consists of 25-35% of a mixture of the sodium salt of a sulfonated alpha olefin and an ammonium salt of an ethoxylated alcohol sulfate and 1-10% of an alkanolic acid diethanolamide in 30-90% of an aqueous medium containing 1-10% ethanol. The composition contains at least 15% ammonium cations.

DETERGENTS CONTAINING OLEFIN SULFONATE. J. Rubinfeld (Colgate-Palmolive Co.). *U.S. 3,980,588*. A detergent mixture suitable for use in aqueous liquid detergent compositions consists of an anionically active olefin sulfonate; a higher alkyl poly (ethenoxy) ether sulfate, both of which are present as the sodium, potassium, ammonium, or ethanolanionium salt; and a higher fatty acid diethanolamide. The ratio of sulfate to sulfonate is between 90:10 and 30:70, and the diethanolamide is present at a level of 0.5-10%, which is sufficient to improve foam stability.

• Drying Oils and Paints

PREPARATION OF EMULSIFIER FOR EMULSION POLYMERIZATION. M. Ishigami and Y. Inoue (Harima Chemicals Inc.). *U.S. 3,980,630*. The method comprises a disproportionation reaction of rosin, polyunsaturated fatty acids, or mixtures of the two in the presence of 0.01-5% iron iodine catalyst followed by neutralization of the product with alkali.

EMULSIFIERS FOR PREPARING AQUEOUS DISPERSIONS OF ALKYD RESINS. B. Zuckert and W. Schmut (Vianova-Kunstharz A.G.). *U.S. 3,979,346*. An alkyd resin dispersed in water contains 0.5-3% of ammonia and as a dispersing aid, a combination of a nonionic emulsifier and an anionic emulsifier. The hydrophobic part of the anionic emulsifier contains unsaturated fatty acids or alcohols and the hydrophilic part contains carboxyl groups at least 50% of which are dissociated by the ammonia utilized. The hydrophobic part of the nonionic emulsifier contains unsaturated fatty acids or alcohols and the hydrophilic part consists of polyethylene glycol chains and/or monomethoxy-polyethylene glycol chains.

SURFACE COATING COMPOSITIONS. T. Graham, M.J. Yates and D. Reid (Reed International Ltd.). *U.S. 3,979,343*. The composition comprises a pigment coated with up to 5% of a polymeric organic polyol hydrophilic agent; a binder comprising 5-95% of either an oil-modified alkyd resin or a polymerized fatty acid ester and 95-5% of an alkyd resin; and a volatile, water-immiscible organic solvent. An applicator used to apply the coating may be readily cleaned in a dilute aqueous detergent solution. •

when you move



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