ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, Yoshio Hirano, S. Kawamura, D.A. Leo, F.A. Kummerow, E.G. Perkins, Biserka Matijasevic

• Fats and Oils

RAPID DETERMINATION OF CAROTENE AND XANTHOPHYLL IN DRIED PLANT MATERIALS. R.E. Knowles, A.L. Livingston and G.O. Kohler (Western Regional Res. Lab., Agr. Res. Service, U.S. Dept. of Agr., Berkeley, Cal. 94710). *J. Agr. Food Chem.* 20, 1127–29 (1972). A method is presented for the rapid determination of carotene and xanthophyll in dried plant materials by stirring or reflux extraction followed by chromatography on a magnesia column. Procedures are specified which adequately exclude chlorophyll from the column eluates. Results obtained are in good agreement with analytical values obtained by overnight extraction at room temperature.

RAPID OLEIC/LINOLEIC MICROANALYTICAL PROCEDURE FOR PEANUTS. C.T. Young and G.R. Waller (Biochem. Dept., Agr. Exp. Station, Oklahoma State Univ., Stillwater, Ok. 74074). *J. Agr. Food Chem.* 20, 1116–8 (1972). A rapid microanalytical technique is described, whereby the oil from a portion of a peanut kernel was analyzed for the oleic/linoleic acid (methyl ester) ratio, with the remainder being planted for reproduction. Analysis of the methyl esters by gas-liquid chromatography required 2 to 4 min per sample, depending upon the equipment. The analytical techniques were evaluated for precision using 100 peanut varieties and the factors which influenced O/L ratios are reported. This procedure should assist in more rapid development of new peanut varieties that are demanded by the manufacturers of peanut products and other oilseed crops.

DETERMINATION OF PHENOLIC WOOD SMOKE COMPONENTS AS TRIMETHYLSILYL ETHERS. Mary R. Kornreich and P. Issenberg (Dept. of Nutr. and Food Sci., Mass. Inst. of Technol., Cambridge, Mass. 02139). *J. Agr. Food Chem.* 20, 1109–13 (1972). A rapid and simple method, developed for qualitative and quantitative analysis of phenol mixtures, was applied to investigation of wood smoke condensates and model food components exposed to smoke vapor. Phenolic fractions were isolated by conventional methods based on acidity, followed by formation of trimethylsilyl (TMS) ethers by treatment with N,O-bis(trimethylsilyl)trifluoroacetamide (BSTFA) at room temperature. An internal standard, 3,5-dimethylphenol, was added to eliminate volumetric errors in gas chromatographic (gc) injection. Mass spectra of TMS derivatives provide as much structural information as spectra of free phenols and the derivatives are more readily separated by gc. Phenol, guaiacol, 4-methylguaiacol and syringol were the major components found in the wood smoke vapor phase. Their concentrations were determined in smoke vapor and in oil and water models exposed to the vapor for 4 hr.

INTERACTIONS OF SOME WOOD SMOKE COMPONENTS WITH ϵ-AMINO GROUPS IN PROTEINS. Lan-Bo Chen and P. Issenberg. *Ibid.* 1113–5. Interactions of some previously identified wood smoke components with meat and pure proteins were investigated. Uncured lean beef sirloin strips, exposed to wood smoke for 10 hr, lost 44% of the available lysine initially present. Heating in air (65C, 10 hr) caused a 15% loss of available lysine. Beef homogenate, treated with acidic, phenolic or neutral fractions of smoke condensate, lost 14, 38 and 45% available lysine, respectively. A model system consisting of a soluble protein, bovine serum albumin (BSA), was treated with pure smoke components and the degree of interaction was determined spectrophotometrically by measuring the extent to which the protein reacted with dinitrobenzyl sulfonate. The reduction in available ϵ-amino groups observed when BSA was treated with sinapaldehyde and coniferaldehyde was comparable to that observed for some previously known active aldehydes (formaldehyde, glyoxal, pyruvaldehyde, and furfural). No significant interaction was detected when BSA was treated with phenol, cyclotene, eugenol, or syringol. A variety of colors, ranging from yellow to red, was produced by treating casein with aldehydes and phenolic aldehydes.

HYDROGENATION OF SOLVENT EXTRACTED GROUNDNUT OIL. S.R. Sabale, V.V.R. Subrahmanyam and J.G. Kane. *J. Oil Technol. Assoc. India* 3 No. 2, 41–6 (1971). Several commercial raw and refined solvent-extracted groundnut oil samples obtained from extraction plants during 1963–5 were found to vary widely in their characteristics such as volatile matter content, flash point, f.f.a. content and color, although saponification and I.V. were within normal ranges. The oils which had high f.f.a. contents were invariably darker in colour. Many of the oils showed poor response to hydrogenation. Their rates of hydrogenation could be increased by using higher percentage of catalyst or by pretreating the oils with ample quantities of spent Ni catalyst. Many of extraction solvent (commercial *n*-hexane) from various sources were tested for their effect on hydrogenation of groundnut oil. Some of the samples contained materials which poisoned the Ni catalyst. However, on distillation of the solvent, these materials remained in the distillation residue. Results indicate that the S content of solvent is not as critical a factor as the nature and amount of nonvolatile impurities. (World Surface Coatings Abs. No. 363)

SEPARATION OF LECITHIN AND CEPHALIN FRACTIONS FROM RAPESEED LECITHIN. J. Sawicki et al. *Rocz. Tec. Chem. Zywn* 22(1), 39–44 (1972). Phosphatides of rapeseed contain only 10% erucic acid. To make a good commercial product, it is necessary to remove oil from lecithin and then separate the phosphatides into two fractions: lecithin and cephalin, which are the emulsifiers O/W and W/O. The oil from lecithin is removed by Pardun method, using solvents hexane/acetone with addition of 2% water. (Rev. Franc. Corps Gras)

TOCOPHEROLS, FREE AND BOUND, IN THE DIFFERENT OIL SEEDS. D. Olejnik. *Rocz. Tec. Chem. Zywn* 22(1), 15–23 (1972). In soybean, rapeseed and linseed tocopherols are not only present in free form but also in the bound form. The largest quantity of tocopherols was found in rapeseed, 17.93 mg% calculated on dry substance. (Rev. Franc. Corps Gras)

KINETICS OF THE GLYCEROLYSES REACTION OF RAPESEED OIL. W. Zwierzykowski et al. *Rocz. Tec. Chem. Zywn* 22(2), 215–24 (1972). This paper describes optimal conditions for the formation of monoglycerides: temperature 210C and the molar

CALL FOR PAPERS

AOCS 47TH ANNUAL FALL MEETING

The Technical Program Committee has issued a call for papers to be presented at the AOCS Fall Meeting, September 16–19, 1973, in the Pick Congress Hotel, Chicago, Ill. Papers on lipids, fats and oils, and all related areas are welcome.

Submit three copies of a 100-300 word abstract with title, authors and speaker to L.H. Wiedermann, Swift & Co., Research & Development Center, 1919 Swift Dr., Oak Brook, Ill. 60523. The deadline for abstracts is May 15, 1973.

plex has been isolated from serum of cynomolgus monkeys. The complex components, retinol-binding protein (RBP) and thyroxine-binding prealbumin, have been studied separately and together by physical-chemical, chemical and immunological techniques and the results have been compared to those of the human counterparts. By several physical-chemical and chemical criteria, RBP and prealbumin of the two species appeared indistinguishable. On immunological analyses and on electrophoresis RBP from both species exhibited complete identity, whereas differences were evident for prealbumin. The only differences encountered for RBP of the two species seem to be two amino acid substitutions, both of which can be brought about by single base mutations. Prealbumin exhibited at least five amino acid substitutions per subunit but neither RBP nor prealbumin showed any differences in their NH_2-terminal sequences. Prealbumin of the two species exhibited partial identity on immunodiffusion analyses. This finding was corroborated by fluorescence titrations with use of prealbumin-specific monovalent antibody fragments. The RBP-binding region of prealbumin of the two species was apparently identical in spite of the fact that cynomolgus prealbumin obviously lacked four antigenic sites present on human prealbumin.

A NEW BACTERIAL SPHINGOPHOSPHOLIPID CONTAINING 3-AMINOPROPANE-1,2-DIOL. P. Kemp, R.M.C. Dawson and R.A. Klein (Dept. of Biochem., Agr. Res. Council, Inst. of Animal Physiology, Babraham, Cambridge CB2 4AT, U.K.). *Biochem. J.* 130, 221–7 (1972). A new sphingophospholipid has been isolated from the bacterial fraction of sheep rumen contents. This new lipid has been characterized as a ceramide phosphate moiety esterified to 3-aminopropane-1,2-diol through the primary alcohol group. Mass spectrometry has shown the intact lipid to contain a vicinal hydroxyl amino grouping, and oxidation with periodate converts it quantitatively into a new phospholipid which is probably ceramide phosphorylglycoaldehyde. The sphingophospholipid contains a mixture of saturated long-chain bases mainly with branched-chain alkyl groups, which are typical of a microbial origin. A Gram-negative bacterium isolated from rumen contents contains about 30% of the new lipid in its phospholipids when grown in pure culture.

REACTION OF GLYCERALDEHYDE-3-PHOSPHATE DEHYDROGENASE WITH DIBROMOACETONE. J. Moore, Jr. and A. Fenselau (Dept. of Physiological Chem., The Johns Hopkins Univ. Schl. of Med., Baltimore, Md. 21205). *Biochemistry* 11, 3753–62 (1972). Evidence for the proximal positioning of the catalytically essential cysteine residue and a histidine residue (or any residue bearing a nucleophilic side chain) was sought by means of chemical modification of rabbit muscle glyceraldehyde-3-phosphate dehydrogenase using the bifunctional reagent, 1,3-dibromoacetone. At pH 7.0 amounts of the reagent stoichiometric with the concentration of active sites produced rapid, complete, and irreversible inactivation of the enzyme by alkylating only one cysteine residue per polypeptide chain. These results imply that the histidine residue modified by photooxidation is not within 5 Å of the sulfur atom of the essential cysteine residue and probably does not serve as a nucleophile in the *hydrolase* activity of the enzyme.

EFFECTS OF OXYGENATED CHOLESTEROL DERIVATIVES ON ADRENAL CORTEX MITOCHONDRIA. L.D. Wilson (Depts. of Med. and Biol. Chem., Univ. of Cal. School of Med., Davis, Cal. 95616). *Biochemistry* 11, 3696–3701 (1972). The effects of a variety of cholesterol derivatives on the optical properties of adrenal cortex mitochondrial P-450 have been examined. Included in the sterols studied are several suggested oxygenated intermediates in the oxidative side-chain cleavage of cholesterol (forming pregnenolone). Typical type I difference spectra were produced when 25-hydroxycholesterol, 24(R)-hydroxycholesterol, or 20α, 22(R)-dihydroxycholesterol was added to aerobic adrenal cortex mitochondria. Type II spectra were produced by 22-ketocholesterol, 22(S)-hydroxycholesterol, and 22(R)-hydroxycholesterol.

ISOLATION, CHARACTERIZATION, AND PARTIAL PURIFICATION OF A FATTY ACYL COENZYME A REDUCTASE FROM BOVINE CARDIAC MUSCLE. R.C. Johnson and J.R. Gilbertson (Dept. of Pharm. and Physiology, Schl. of Dental Med. and Dept. of Biochem.,

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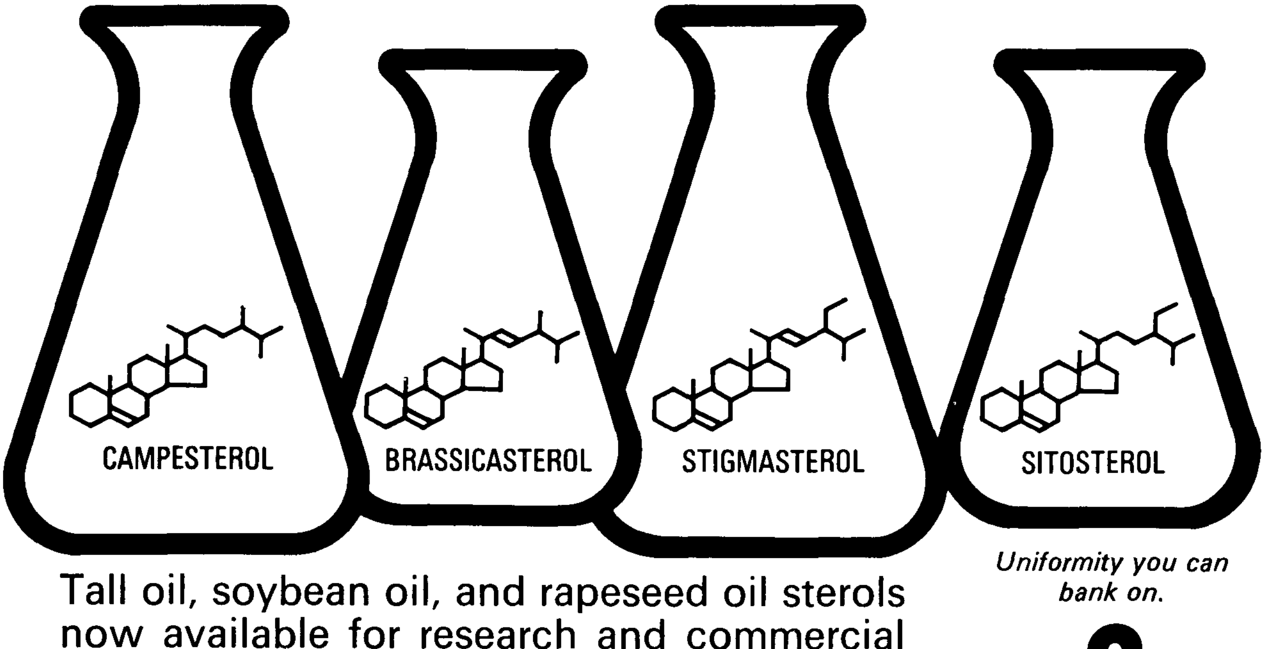

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Faculty of Arts and Sci., Univ. of Pittsburgh, Pittsburgh, Pa. 15213). *J. Biol. Chem.* **247**, 6991-8 (1972). A heat stable soluble enzyme has been isolated from bovine cardiac muscle which catalyzes the reduction of palmityl coenzyme A and stearyl coenzyme A to the corresponding fatty aldehyde. The enzyme has been purified about 480-fold over the original $10^6 \times g$ supernatant fraction by heating, ammonium sulfate fractionation and gel filtration chromatography. It has a molecular weight in the range 85,000 to 95,000 and requires NADH as a cofactor. A pH optimum in the range 7.0 to 7.5 has been demonstrated. Palmityl-CoA and stearyl-CoA are substrates for the enzyme. The aldehyde product has been verified by chromatography and conversion to derivatives.

Palmitic acid as a source of endogenous acetate and β-hydroxybutyrate in fed and fasted ruminants. D.L. Palmquist (Depts. of Dairy Sci., Ohio Agr. Res. and Dev. Center, Wooster, Ohio 44691). *J. Nutr.* **102**, 1401-6 (1972). In order to ascertain the endogenous origin of acetate and β-hydroxybutyric acid, specific radioactivities of plasma acetate, β-hydroxybutyrate and palmitate were determined after infusion of 1-^{14}C-palmitate into fed cows and fed or fasted sheep. Less than 2% of plasma acetate carbon and 5% of β-hydroxybutyrate carbon were derived from palmitate in fed animals, whereas these values were increased to 16 and 29%, respectively, in fasted ruminants. The data support a role for β-oxidation of long-chain fatty acids as a source of endogenous acetate of β-hydroxybutyrate in ruminants.

Fatty acid synthetases in Euglena gracilis. I. Goldberg and K. Bloch (J. B. Conant Labs., Harvard Univ., Cambridge, Mass. 02138). *J. Biol. Chem.* **247**, 7349-57 (1972). Additional properties of two previously described fatty acid synthetases (I and II) from *Euglena gracilis* are reported. The algal organism is now shown to contain another fatty acid synthetase (III). This system is ACP-dependent and elongates acyl-CoA derivatives from C_{10} to C_{18} to longer chain ACP thioesters. Synthetase III occurs in soluble form both in dark- and light-grown cells and in the latter is localized in the chloroplast. Evidence is presented that the two ACP-dependent synthetases (II and III) from *Euglena* operate in conjunction to furnish the fatty acids required for chloroplast membranes.

Erythrocyte membrane polyphosphoinositide metabolism and the regulation of calcium binding. J.T. Buckley and J.N. Hawthorne (Dept. of Chem., Univ. of Calgary, Calgary, Alberta, T2N 1N4, Canada). *J. Biol. Chem.* **247**, 7218-23 (1972). The terminal phosphate of ATP is incorporated into erythrocyte membrane polyphosphoinositides at the rate of 1.5 nmoles per min per mg of protein in the presence of 10 mM Mg^{2+} and 0.5 mM ATP. The amount of membrane polyphosphoinositide monophosphate can be doubled in 30 min. Phosphorylation proceeds until the entire supply of membrane phosphatidylinositol is exhausted. Inhibition of incorporation by Ca^{2+} depends on the concentration of Mg^{2+} in the medium. Incorporation is also lower in the presence of detergent, although it may be restored to normal by the addition of exogenous phosphatidylinositol. An Arrhenius plot of reaction rate had two linear portions with a transition at 17C. As the amount of polyphosphoinositide in the membrane is increased, the amount of calcium bound is elevated. The lowest detectable binding site on the membrane ($K_{assoc} = 4 \times 10^4$ liters per mole) appears to be affected. Calcium bound at this site increases in a 1:1 molar ratio with increased polyphosphoinositide monophosphate. Phosphorylation of membrane protein is too low to account for the increase in calcium binding. Membranes with elevated polyphosphoinositide levels also have much higher Ca^{2+}-ATPase activity than membranes with normal levels, although ($Na^+ + K^+$)-ATPase activity is not increased. The data provide the first direct evidence that the higher inositides may be involved in the regulation of intracellular calcium levels.

Molecular organization of lipids in Escherichia coli membranes. II. Effect of phospholipids on succinic-ubiquinone reductase activity. M. Esfahani, P.D. Crowfoot and S.J. Wakil (Marrs McLean Dept. of Biochem., Baylor College of Med., Houston, Tx. 77025). *J. Biol. Chem.* **247**, 7251-6 (1972). When membranes isolated from an unsaturated fatty acid auxotroph of *Escherichia coli* grown on oleate were treated with aqueous acetone, approximately 50% of the phospholipids were removed and 70% of the succinic-dichloroindophenol (DCI) reductase activity was lost. Preliminary incubation with total lipids isolated from cells grown on oleate or elaidate restored the reductase activity to the acetone-treated membrane. The data indicate that the presence of a transition in Arrhenius plot of succinic dehydrogenase (measured by DCI reduction) in the membranes of this mutant is dependent on the phospholipids, and that the temperature at which this transition occurs is determined by the nature of the apolar group of the lipid.

Effect of zinc on lipid peroxidation in liver microsomes and mitochondria. M. Chvapil, Janet N. Ryan and C.F. Zukoski (Dept. of Surgery, College of Med., Univ. of Arizona, Tucson, Az. 85724). *Proc. Soc. Exp. Biol. Med.* **141**, 150-3 (1972). We conclude that one of various possible mechanisms by which zinc stabilizes a variety of biomembranes (excluding mitochondrial) both in vivo and in vitro is related to the inhibition of peroxidation of membrane lipids.

Effect of cell size on in vitro fatty acid and glyceride-glycerol biosynthesis in rat adipose tissue. D.R. Romsos and G.A. Leveille (Dept. of Food Sci. and Human Nutr., Mich. State Univ., East Lansing, Mich. 48823). *Proc. Soc. Exp. Biol. Med.* **141**, 649-51 (1972). Glucose-U-^{14}C conversion into triglycerides (in the presence of insulin) decreased as rat fat cells enlarged (and/or aged). The results of this study show that the diminished lipogenic capacity results from the marked decrease in glyceride-fatty acid biosynthesis while glucose conversion into glyceride-glycerol was unaltered by fat cell size.

Apparent turnover of subcellular phospholipids in the liver of control and vitamin A-deficient rats. R.F. Krause and K.C. Beamer (Dept. of Biochem., Schl. of Med., West Virginia Univ., Morgantown, W.Va. 26506). *J. Nutr.* **102**, 1465-70 (1972). The half-lives of phospholipids derived from microsomes, mitochondria and soluble fractions of livers from control and vitamin A-deficient rats after the administration of ^{14}C-labeled choline, ethanolamine, glycerol and palmitic acid have been determined. The half-lives of subcellular phospholipids from control animals labeled with either choline, glycerol or palmitic acid were statistically similar (22 to 36 hours), whereas those phospholipids labeled with ethanolamine had significantly shorter half-lives (14 to 16 hours). No significant differences were noted between the half-lives of phospholipids from control and deficient subcellular fractions.

SELECTIVE TRANSFERS OF TRANS-ETHYLENIC ACIDS BY ACYL COENZYME A. PHOSPHOLIPID ACYLTRANSFERASES. Harumi Okuyama, W.E.M. Lands, F.D. Gunstone and J.A. Barve (Dept. of Biol. Chem., Univ. of Mich., Ann Arbor, Mich. 48104). *Biochemistry* 11, 4392–8 (1972). trans-Octadecenoyl coenzyme esters are generally good substrates for acyl-CoA: phospholipid acyltransferase action to form phosphatidylethanolamine or choline derivatives. The CoA esters of the 9-, 10-, and 11-positional isomers, which are relatively common in processed dietary fats, have different activities in forming phospholipids. Comparison of the patterns of selectivity for the cis and trans series supports the concept that acyl transfer to the 1 position is quite sensitive to configurational differences in acids, whereas transfer to position 2 is not. The latter transfer, however, seems favorable for acids with π bonds at positions 5, 9, and 12.

ISOLATION AND IDENTIFICATION OF 24,25-DIHYDROXYCHOLECALCIFEROL, A METABOLITE OF VITAMIN D_3 MADE IN THE KIDNEY. M.F. Holick, H.K. Schnoes, H.F. DeLuca, R.W. Gray, I.T. Boyle and T. Suda (Dept. of Biochem., College of Agri. and Life Sci., Univ. of Wisc., Madison, Wisc. 53706). *Biochemistry* 11, 4251–5 (1972). A metabolite of vitamin D_3 found in normocalcemic and hypercalcemic animals has been isolated in pure form from chicken kidney homogenates. It has been identified as 24,25-dihydroxycholecalciferol by means of mass spectrometry, ultraviolet absorption spectrophotometry and specific chemical reactions.

EFFECTS OF REGRESSION OF ATHEROSCLEROTIC LESIONS ON THE CONTENT AND ESTERIFICATION OF CHOLESTEROL BY CELL-FREE PREPARATIONS OF PIGEON AORTA. R.W. St. Clair, T.B. Clarkson and H.B. Lofland (Arteriosclerosis Res. Center, The Bowman Gray Schl. of Med. of Wake Forest Univ., Winston-Salem, N.C. 27103). *Circulation Res.* 31, 664–71 (1972). Aortic atherosclerosis was produced in White Carneau pigeons by feeding them an atherogenic diet for 1–8 months. The birds were then switched to a cholesterol-free diet for 6 months for the regression phase of the experiment. Following the regression phase, no changes were noted in the atherosclerotic index or the free-cholesterol content of aortas from pigeons that had received the atherogenic diet for 1–5 months; however, a reduction in both of these parameters was seen in aortas from pigeons fed the atherogenic diet for 8 months. These studies suggest that local cholesterol esterification might be of considerable importance in maintaining the large amount of cholesteryl esters found in the atherosclerotic lesion and that changes in the rate of cholesterol esterification are associated with the early events in both progression and regression of atherosclerosis.

FAILURE OF DEAE SEPHADEX FEEDING TO LOWER BLOOD AND MILK LIPIDS OF COWS. T.R. Wrenn, J. Bitman, J.R. Weyant, R.W. Miller and L.P. Dryden (Animal Sci. Res. Div., USDA, Beltsville, Md. 20705). *J. Dairy Sci.* 55, 1597–1601 (1972). DEAE Sephadex, the diethylaminoethyl derivative of a cross-linked dextran, in some species has lowered serum sterols, phospholipids and triglycerides by binding bile acids in the intestinal tract and increasing lipid excretion in feces. This research examines its effect in dairy cows. First, in in vitro incubation tests at 39C, the compound was not degraded by rumen microorganisms. When fed to Holstein cows at 0, 1, 2 and 4%, Sephadex had no effect on blood or milk cholesterol and other lipids. These results contrast with those of others in simple-stomached animals in which serum lipids are lowered and fecal excretion of fats increased when Sephadex is fed. When a simulated cow diet was given to rats, the excretory fat augmentation by DEAE Sephadex was essentially abolished. This suggests that failure of cows to respond to DEAE Sephadex may derive from the nature of the ruminant diet.

• Drying Oils and Paints

THE MEASUREMENT OF FORCES BETWEEN PARTICLES IN DISPERSE SYSTEMS. L. Barclay, A. Harrington and R.H. Ottewill (School Chem., Univ. of Bristol, Bristol (England). *Koll.-Z. u. Z. Polymere* 250, 655–66 (1972). An experimental method is described for measuring the forces between particles in a dispersion as a function of the distance of separation of the surfaces. Experimental results have been obtained for plate-like particles, sodium montmorillonite, and spherical particles, polystyrene latices. The force measured was always repulsive, increasing the concentration of 1:1 electrolyte from 10^{-4} to 10^{-1}, at a constant separation distance for plates and constant volume fraction for spheres, caused a decrease in the force of repulsion between the particles. The experimental results for sodium montmorillonite were compared with theoretical calculations based on a model of two interacting flat plates at constant potential. The experimentally measured repulsion at close distances was higher than that predicted theoretically.

MECHANISM OF OIL POLYMERIZATION, PART III. S.N. Koley (Dept. Applied Chem., Calcutta-9). *Indian Oil Soap J.* 37(7), 143–150 (1972). A review.

DIMER ACIDS. Anon. (Unilever-Emery N.V.). *Austral. O.C.C.A. Proc. & News* 9 No 3, 5–14 (1972). The commercial dimer acid described is a viscous liquid produced by polymerisation of unsaturated C_{18} fatty acids. Its combination of high mol. wt, long aliphatic chains and polycarboxylic structure has no counterpart among existing commercially available dibasic acids. This paper outlines the relevant chemistry and describes the uses of dimer acids in polyamide and polyester polymers, epoxy resins, urethane intermediates, soaps, corrosion inhibitors, surface coatings and printing inks. (World Surface Coatings Abs. No. 363)

DRYING OILS. J.D. von Mikusch-Buchberg (Lever Bros.). *U.S. 3,711,307.* A quick-drying agent is prepared by reacting an epoxidized oil with a polyethylenically unsaturated acid at 180–270C followed by heating the reaction product at 260–350C until the desired viscosity is reached. Part of the unsaturated fatty acid is distilled off during the latter heating stage. A preferred binding agent has a viscosity of 20–200 poises at 20C, an acid value of 6.0–12.0, a saponification value of 180–200, and a refractive index of 1.4830–1.4930 at 20C.

LIQUID COATING COMPOSITION. T. Watanabe, K. Murata, N. Iwasawa and T. Okinaga (Kansai Paint Co., Ltd.). *U.S. 3,711,434.* The composition comprises 5–40 parts of amino resins, 95–60 parts of vinyl-modified alkyd resins, and an organic solvent or a mixture of the organic solvent and water. The vinyl-modified alkyd resins are obtained by graft-polymerizing a vinyl monomer or a mixture of vinyl monomers onto alkyd resins. The alkyd resins are obtained by reacting polyalcohol with carboxylic acids. They contain 5–60% of hexahydrophthalic acid and/or its anhydride.

POLYESTERAMIDES FROM LINSEED AND SOYBEAN OILS FOR PROTECTIVE COATINGS: ALKYD-TYPE POLYMERS. W.J. Schneider, L.E. Gast, V.E. Sohns and J.C. Cowan (Northern Reg. Res. Lab.

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Agr. Res. Service, Peoria, Ill. 61604). *J. Paint Tech.* 44(575), 58–63 (1972). By a simplified synthesis, "alkyd" polyesteramides and urethane derivatives have been prepared and their film properties evaluated in the laboratory. This synthesis involves aminolysis of linseed or soybean oil with diethanolamine to produce a mixture of N,N-bis(2-hydroxyethyl)-fatty amide, glycerol, mono- and diglyceride, and unreacted diethanolamine. Direct esterification of this mixture with dibasic acids or anhydrides forms hydroxyl-terminated prepolymers of several desired hydroxyl levels. Subsequent reaction with tolylene diisocyanate forms urethane-polyesteramides. Air-dried films of these urethane-polyesteramides exhibit improved properties over the more linear products prepared previously. They dry faster to harder films; resist 5% hydrochloric acid for slightly longer times; and show excellent xylene resistance, much improved alkali resistance and good adhesion to metal.

On quasicrystalline structure by the flocculation of montmorillonite and the formation of diffuse ionic double layer in nitrobenzol. G. Lagaly, H. Stange and A. Weiss (Inst. for Inorganic Chem., Univ. München). *Koll.-Z. u. Z. Polymere* 250, 675–82 (1972). With Na-montmorillonites as examples, the structure of the interlayer space between flat colloidal particles are discussed for the stable and the flocculated sol. In stable sols with interlayer distances >30 Å the gegen ions form diffuse ionic double layers. With smaller distances the cations and water molecules arrange themselves to a quasicrystalline structure with two or four water layers between the silicate sheets. This rearrangement is connected with a change in the electrostatic interaction energy, which is positive (=repulsion) for diffuse ionic double layers and negative (=attraction) for the quasicrystalline structure. In the second part, structural effects are discussed in case of layer silicates with organic gegen ions (N-n-alkylpyridinium ions) and organic liquids (methanol, nitrobenzene). At room temperature the alkylpyridinium beidellites under methanol or nitrobenzene having quasicrystalline structures. Under nitrobenzene, however, diffuse ionic double layers can be formed at higher temperatures.

• Detergents

Tests of cleaning products and rinsing agents for mechanical dishwashing. T. Altenschöpfer (Labs. Henkel & Cie. GmbH, Dusseldorf). *Seifen-Öle-Feete-Wachse* 98(23), 763–6 (1972). Tests are cited relating to soil types, corrosion phenomena, hardening test, demixing, glass detriment, foam formation and clear-drying effect.

Micellar behabior in solutions of bile-acid salts. VI. The solutions of the three-component system bile-acid salt, n-decanol and water. K. Fontell (Swedish Inst. for Surface Chem., Stockholm, Sweden). *Koll.-Z. u. Z. Polymere* 250, 825–35 (1972). The density, electrical conductivity, viscosity, light-scattering and the low-angle X-ray diffraction have been examined in the solution region of the ternary systems of sodium cholate or desoxycholate and n-decanol and water at 20C. The phase diagrams show a continuous transition from homogeneous solutions of bile-acid salt in water to homogeneous solutions of bile-acid salt and water in decanol. Along the bile-acid salt-water axis there are micellar solutions containing micelles of the "normal" type where the polar groups are directed outwards, and these micelles can solubilize decanol without initially undergoing any change in their basic structure. Above a critical value, however, the micellar structure is determined by the decanol molecules, and at large decanol contents there is an inversion that results in the formation of "reversed" micelles, with the polar groups and water now located within the core of the micelles.

Application of physical chemistry in product development. H.Y. Saad and E.G. Shay (Avon Products, Inc., Suffern, N.Y. 10901). *J. Soc. Cosmet. Chem.* 23, 899–911 (1972). Basic physical-chemical theories are related to formulation parameters. Designing a product on the basis of these principles aids the chemist in understanding the mechanisms involved, and enables him to modify and alter the physical features and chemical properties of the product to be marketed. The effects of electrokinetic phenomena and of critical micelle concentration on a variety of product types are discussed in a manner which provides guidance for future work. The physical-chemical principles of emulsion formulation are discussed and related to emulsion separation, creaming and graininess. Particle size, pigment wetting, particle-particle aggregation and adhesion are related in a physical-chemical manner to typical cosmetic products. Shelf-life determination and performance characteristics are demonstrated to be associated with several of these principles.

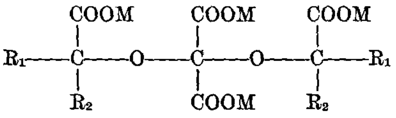
Methods used in the analysis of shampoos. R.F. Schubert and P.H. Ko (Gillette Co., Personal Care Div., Chicago, Ill. 60654). *J. Soc. Cosmet. Chem.* 23, 887–98 (1972). Modern shampoos are designed not only to clean the hair and scalp, but to impart conditioning properties, fragrance, luster and other attributes to hair. As a consequence the analysis of shampoo becomes a complicated exercise in separation and identification of components, calling on many of the disciplines of modern analytical chemistry. The literature on shampoo analysis is reviewed and some older schemes of analysis are discussed. A proposed scheme for the analysis of a modern shampoo using a combination of solvent extraction and ion exchange separation is presented.

Stability of lyophobic colloids in the presence of metal chelates and chelating agents. E. Matkjevic (Inst. Colloid and Surface Science and Dept. Chem., Clarkson Coll. Tech., Potsdam, N.Y. 13676). *Koll.-Z. u. Z. Polymere* 250, 646-54 (1972). Coagulation, electrophoresis and adsorption data of various metal chelates and chelating agents on silver halide sols, PVC latex, and montmorillonite clay have been shown. The effects are most pronounced with the silver halide sols which are believed to be due to the coordination of the chelates and chelating agents with the crystal lattice ions of the colloidal particles. The PVC latex stability in the presence of the same solute species depends strongly on the concentration of the stabilizing surface active agent (dodecyl sulfate ions).

Phosphoric esters in acid detergents. G.K. Köhler. *Seifen-Ole-Fette-Wachse* 98(19), 622-4 (1972). The specific properties of the phosphoric esters make them valuable for use in acid detergents. Formulations are given and are discussed.

Anionic detergent containing ternary foam control composition. J.T. Inamorato (Colgate-Palmolive). *U.S. 3,704,267.* A built anionic detergent composition having an inverse foam to temperature relationship is disclosed. This relationship is provided by a synergistic mixture of a C_8–C_{30} fatty acid, a particular group of oxazolines, and a C_{12}–C_{20} polyethoxylated linear alcohol containing 10–50 moles of ethylene oxide.

Detergent formulations. K.P. Lannert (Monsanto Co.). *U.S. 3,704,320.* Compounds having the formula



$$\mathrm{R_1{-}\underset{R_2}{\overset{COOM}{C}}{-}O{-}\underset{COOM}{\overset{COOM}{C}}{-}O{-}\underset{R_2}{\overset{COOM}{C}}{-}R_1}$$

where M is an alkali metal or ammonium and R_1 and R_2 are hydrogen or methyl in combination with surfactants provide effective detergent formulations.

Hlavacek joins Best Foods

R.J. Hlavacek, formerly associate director of research at Hunt-Wesson Foods Inc., Fullerton, Calif., has joined Best Foods Div. of CPC International as vice-president of research and quality control.

Hlavacek, an AOCS member since 1964, served as board member-at-large for the 1972-73 term and is a candidate for re-election to that post. ∎

Detergent composition with thermo-controlled foaming capacity. H. Barth, M. Knausenberger, H. Lange, H.-U. Menz and W. Griess (Lever Bros.). *U.S. 3,706,675.* Foaming at low washing temperatures is obtained without over-foaming at high temperatures with a foam control agent derived from cyclized C_{12}-C_{33} unsaturated fatty acids and their sodium salts. The agent is used in compositions comprising 10–30% of a water soluble anionic detergent and a polyphosphate builder.

Bleaching compositions. F.W. Gray (Colgate-Palmolive). *U.S. 3,706,670.* The compositions comprise a chloride bleach, an optical brightener, preferably of the sulfonated triazole class, and a reducing agent such as inorganic sulfites, organic sulfinates, water-soluble phosphites, and inorganic alkaline materials combined with hydrogen peroxide. The presence of the reducing agent enables the composition to enhance brightening of the fabric being cleaned without adversely affecting the bleaching. A detergent or surface active agent may optionally be added.

Detergent composition containing proteolytic enzymes elaborated by Thermoactinomyces vulgaris ATCC 15734. C.E. Johnson (Procter & Gamble). *U.S. 3,707,504.*

Enzyme-containing detergent composition. I. Maeda, Y. Nomura, K. Hashimoto, A. Shimizu, K. Mitsugi and R. Yoshida (Ajinomoto Co.). *U.S. 3,707,505.* The enzymes present in an enzyme-containing detergent composition are stabilized by small amounts of N-acyl amino acids whose acyl groups are derived from saturated or unsaturated fatty acids having 6–20 carbon atoms. The enzymes are also stable in detergents in which the N-acyl amino acids are the primary surfactant ingredients.

Nonionic detergent compositions for cleaning polyester fabrics. W. Lozo (BASF Wyandotte Corp.). *U.S. 3,707,506.* There is disclosed an aqueous washing solution containing 0.01–5.0% of a two-part detergent composition. Part A of the composition consists of a mixture of (1) nonionic surface active agents such as primary oxyalkylated aliphatic alcohols having 8–22 carbon atoms in the aliphatic portion and 3–50 oxyalkalene units in the other portion and (2) nonionic surface active agents such as secondary oxyalkylated aliphatic alcohols of the same molecular size. Part A represents 20–80% of the detergent; part B, representing the remainder, consists of kerosene.

Anionic detergent compositions containing foam-boosting succinic acid derivatives. V. Lamberti, H. Lemaire, and A. Cahn (Lever Bros.). *U.S. 3,707,511.* The succinic acid derivatives are water soluble and contain nitrogen. They are characterized by an alkyl or 2-alkenyl substituent containing 10–16 carbon atoms.

Glycose hydrocarbon sulfonate surfactants. R.A. Gray, E.T. Kittleman, and G.C. Ray (Phillips Petroleum Co.). *U.S. 3,707,512.* There is disclosed the use in a synthetic detergent composition of an ingredient which is a glycose hydrocarbonsulfonate wherein the hydrocarbon moiety is an alkyl or cycloalkyl radical containing 6–25 carbon atoms.

2-Olefin sulfonate for liquid detergents. W.A. Sweeney (Chevron Research Co.). *U.S. 3,708,437.* The olefin sulfonates consist of substantially linear mono-olefin of 10–24 carbon atoms. At least 40% of them are 2-olefin sulfonates. They have low cloud points in aqueous solutions of inorganic salts.

Highly viscous, acidic base materials for detergents. Y. Sugahara and M. Tanaka (Mizusawa Industrial Chemicals, Ltd.). *U.S. 3,709,823.* The method consists of converting silica hydrogel or silica alumina hydrogel into a hydrosol with water by wet grinding and then contacting the hydrosol with mineral acid. The mineral acid content of the hydrosol is 3–20%.

Cleaning composition. W. Chirash and B.J. Zmoda (Colgate-Palmolive). *U.S. 3,709,825.* The single phase, aqueous liquid composition comprises anionic and nonionic detergents, a glycol ether, a nitrilo compound such as nitrilotriacetic acid or alkali metal and ammonium nitrilotriacetates, and a salt such as alkali metal and ammonium metal and ammonium borates. The composition has a pH of at least 8.5.

Built anionic detergent. J.T. Inamorato (Colgate-Palmolive). *U.S. 3,709,836.* The detergent composition has an inverse foam to temperature relationship which is provided by a synergistic mixture of a fatty acid having 14–20 carbon atoms and a high molecular weight primary, secondary, or tertiary amine containing 8–30 carbon atoms in the alkyl chain.

Detergents containing sodium-potassium double silicate. H.H. Weldes (Philadelphia Quartz Co.). *U.S. 3,709,837.* A method for increasing the silicate content of spray dried detergents without decreasing the spray dryer throughout involves the preparation of detergent slurries with high solids contents. Alkali metal silicates are added to the slurries in the form of sodium-potassium double silicate glass. The amount of water which must be removed in the drying tower is thus reduced and/or the silicate content is increased when compared with slurries prepared with sodium silicate solutions.

Liquid detergent compositions. M.L. Mausner and A.H. Dater (Witco Chemical Co.). *U.S. 3,709,838.* Polyfunctional, essentially 100% active, stable liquid detergent compositions consist of (a) 30–90% of an ethanolamine salt of a C_8–C_{18} alkyl benzene- or alkyl toluene-sulfonic acid, (b) 5–35% of a nonionic water soluble surfactant in the form of an ethoxylated or propoxylated ether of (i) an aliphatic monohydric alcohol containing at least 8 carbon atoms or (ii) an alkyl phenol in which the alkyl radical contains 5–18 carbon atoms, and (c) 5–35% of a C_{10}–C_{16} fatty acid monoethanolamide, diethanolamide or monoisopropanolamide.

Novel bleaching compounds. P. Robson and F.E. Hardy (Procter & Gamble). *U.S. 3,711,413.* N-halogenated compounds having the general formula $R–SO_2–N(X)–(CH_2)_3–SO_3M$ in which R is an alkyl, aryl or substituted aryl group, X is bromine or chlorine, and M is an alkali metal, are useful as bleaching agents and as disinfectants.

High foaming antistatic detergent composition. G.T. Hewitt (Colgate-Palmolive). *U.S. 3,711,414.* A clear, homogeneous, liquid detergent composition having an antistatic conditioning effect on hair, wool and other fibers is described. It comprises 5–25% of a trialkyl amine oxide containing at least one long chain alkyl radical of 10–18 carbon atoms, 5–25% of an anionic surface active agent, 0.5–10% of a quaternary ammonium salt having at least one long chain hydrophobic radical of 10–20 carbon atoms, and 50–90% of inert solvent and water. Preferred compositions contain soap as the anionic surface active agent.

Optical brightener compounds. W.I. Lyness, R.T. Amel and G.E. Booth (Procter & Gamble). *U.S. 3,711,474.* The compounds are defined as 2-benzisothiazolonyl-S-dioxide, *o*-disulfophenylimidinyl, and benzisothiazolyl-S-dioxide. They brighten a wide variety of natural and synthetic fabrics and may be used in laundry detergent compositions and hypochlorite bleach containing compositions.

Cleaning compositions. P.G. Hall (Lever Bros.). *U.S. 3,708,429.* The substantially anhydrous compositions contain a surface active agent, an alkaline catalyst and an acid release agent in a lower aliphatic alcohol. The undiluted composition is strongly alkaline and is effective for removing fatty soils from pans and the like. When the composition is added to water, the acid release agent lowers the alkalinity to an acceptable level for dishwashing purposes.

Detergent builders. R.B. Thompson, P.G. Pappas and J.M. Sandri (Nalco Chemical Co.). *U.S. 3,708,436.* A synergistic mixture of polymeric maleic anhydride (PMA) with sodium nitrilotriacetate (NTA) or sodium tripolyphosphate (STP) is used as a detergent builder with or without purification of the PMA. Maleic anhydride also has a synergistic effect with purified PMA. NTA has a synergistic effect with maleic anhydride-methacrylate copolymers, vinyl acetate-maleic anhydride copolymers and with styrene-maleic anhydride copolymers.

Assessment of sodium nitrilotriacetate as builder in detergent formulations: Determination of the anti-redepositing power of sodium nitrilotriacetate compared with some inorganic builders. S. Gafà and B. Lattanzi (Lab. Tech. Detergent, Montecatini-Edison, Rho (Milano)). *Tenside* 9(6), 309–17 (1972). The anti-redeposition properties of sodium nitrilotriacetate are compared with those of sodium tripolyphosphate and potassium pyrophosphate operating in the presence of hardness due to calcium salts, in a system consisting of a natural or synthetic fiber as substrate and a pigment or oily emulsion as a soil model. The performance of the three builders is assessed using a Terg-O-Tometer, according to a standard test that is widely described in the literature. Ca^{++}/builder interaction mechanisms are proposed which differ for sodium nitrilotriacetate compared with the two polyphosphates studied. Moreover, the true water-softening capacities of the three builders are assessed; they do not coincide with the chelating properties examined in a previous study. ■