

ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, S.F. Herb, F.A. Kummerow, T. Mares, Biserka Matijasevic, E.G. Perkins, and R.W. Walker

• Fats and Oils

STUDIES CONCERNING SPECIFIC VOLUME, SURFACE TENSION AND VISCOSITY IN SOLUTIONS OF OLIVE OIL-HEXANE SOLUTIONS. V. Flores Luque, J. Penada Marin, J. Cabrera Martin and C. Gomez Herrera (Dept. de Quimica Tecnica de las Univ. de Sevilla y de Granada, e Inst. de la Grasa y sus Derivados, Seville, Spain). *Grasas Aceites* (Seville, Spain) 25, 18-28 (1974). For each of the three solution properties investigated, differences between the calculated value for a theoretical solution (based on the additivity rule) and the corresponding experimental observed value were determined. Curves representing these differences versus molar fractions of solution components, show a maximum. The position of the maximum was independent of temperature (20-30C), oil origin and oil acidity (1-25%). The lack of surface activity is attributed to dimer formation by linking of two acid molecules by hydrogen bonds. In order to account for the positions of the maxima, an hypothesis is proposed relating to the "spatial sites" which the hydrocarbon chains of hexane, those of the glycerides and the free acids of oil would occupy in the three-dimensional "lattice" formed by them in their solution.

STUDIES ON TRANSESTERIFICATION. V. HYDROGEN EVOLVED IN THE REACTION NaK-FAT. F. Amat Guerri and J.L. Cosme Jimenez (Inst. de Productos Lacteos y Derivados Grasos, Arganda del Rey, Madrid, Spain). *Grasas Aceites* (Seville, Spain) 25, 6-9 (1974). The hydrogen evolved when a NaK 1:1 emulsion is added, at 20C and 40C, to a toluene solution of purified cocoa butter, in the proportions used to catalyze transesterification of fats, has been determined. The evolved hydrogen increases with an increase in NaK alloy, reaching a maximum at about 8% alloy; beyond this point, the hydrogen evolved remains a constant, even at high alloy concentrations. These results are attributed to nonquantitative reactions with the water and the free acids in solution and are probably due to solvation of part of the components by the hydroxides and the soaps formed.

PHYSICO-CHEMICAL STUDIES ON GROUND OLIVE PASTES. XXX. AMPLIFICATION OF THE MECHANICAL ANALOGIC MODEL FOR PRESSING. J.M. Martinez, C. Gomez Herrera and J. Cabrera Martin (Inst. de la Grasa y sus Derivados, Seville, Spain). *Grasas Aceites* (Seville, Spain) 25, 10-17 (1974). Research data on olive oil yields permit amplification of the original model proposed in 1963. The amplified model is derived from simple rheological elements (i.e., Newtonian dashpots, friction elements, Hookean springs, etc.) and takes into account the mutual displacements of olive oil, vegetation water and other components of these pastes, as well as their motions near or on the press surfaces.

POTATO AND POTATO CHIP FLAVOR AND AROMA. S.S. Chang and B.R. Reddy (Research Corp.). *U.S. 3,814,818*. A flavor and aroma reminiscent of potato and potato chip is prepared by heating methionine or a mixture of methionine and a reducing sugar, such as glucose, in the presence of an edible oil. This oil can be used as an ingredient in a food product or as a frying oil in order to impart the flavor and aroma to the product. Methionine incorporated into a food product, such as a starch-based snack food, which is to be fried will cause the potato chip flavor to be imparted to the product. A potato chip of improved taste can be obtained by adding methionine to the potato slices prior to frying or by using

the methionine- or methionine and glucose-containing oil as the frying medium.

TREATMENT OF OIL-CONTAINING SEEDS. S. Mihara, Y. Inaba, K. Tachibana and T. Endo (Nakataki Pharm. Industry Co., Inc.). *U.S. 3,816,339*. Oilseed material such as oilseeds or oil-containing bran containing a substantial amount of undenatured protein and in excess of 6% water are ground under wet milling conditions in the presence of 1.5-4 times its weight of methanol, ethanol, acetone, or mixtures of these, containing no more than 2% water. Water, carbohydrates, pigments, wax, odor and taste principles, and free fatty acids are thus removed, and the material is preconditioned by opening the cell structure. The solid material is re-extracted with the solvent and then separated into a fine particle fraction high in undenatured protein and a coarse particle fraction high in fiber.

PROCESS FOR OBTAINING WOOL FAT. L. Schibler (Ciba-Geigy AG). *U.S. 3,816,487*. The wool is first washed in an aqueous solution containing a reactive tenside. This tenside is then cross-linked, and the wool fat together with the emulsified constituents are separated from the clarified waste water. The wool fat is then extracted from the separated phase with an organic solvent.

PREPARATION OF LINEAR FATTY ACIDS. J.F. Knifton (Texaco, Inc.). *U.S. 3,819,669*. Linear fatty acids and esters are prepared from alpha-olefins and carbon monoxide in the presence of homogeneous platinum complexes.

NUTMEAT COATING COMPOSITIONS FOR CONFECTIONERY PRODUCTS. M.J. Pichel (Swift & Co.). *U.S. 3,819,839*. The compositions comprise a blend of nuts and a broad plastic range fat. Confections and dairy products can be coated with it.

• Fatty Acid Derivatives

CARBOXYLIC ACID AMIDE PREPARATION. A. Werdehausen, H. Weiss and H. Schutt (Henkel & Cie). *U.S. 3,816,483*. An improved method comprises reacting ammonia and carboxylic acids of 8-24 carbon atoms, or esters, in the presence of a reaction soluble catalyst of a metal from group IVb and Vb of the Periodic Table.

LIPOPHILIC CELLULOSE SPONGES. J. Teng and M.C. Stubits (Anheuser-Busch Inc.). *U.S. 3,819,390*. A cellulose fatty acid ester sponge which picks up oil and nonpolar solvents is disclosed. The sponge has a bulk density of 0.02-0.06 g/cm³, and the degree of substitution of the cellulose is 1.2-2.9. The sponge is made by reacting a cellulose sponge with fatty acid derivatives, specifically lauroyl chloride, under controlled conditions. The esterified sponge has a bulk density of 0.5-3 g/cm³.

WINDOW CLEANER SURFACTANT MIXTURE. B.J. Zmoda and R.S. Brown (Colgate-Palmolive Co.). *U.S. 3,819,522*. The composition consists of a mixture of a nonionic surface active agent having the basic structure of a glycol, or the reaction product of the glycol with ethylene oxide, and an anionic or nonionic surfactant in the ratio of 1:50-1:1. A window cleaner containing 0.1-3% of this surfactant has desirable anti-fogging properties.

• Biochemistry and Nutrition

VITAMIN A DEFICIENCY AND THE GLYCOPROTEINS OF RAT CORNEAL EPITHELIUM. Yang-Cha Lee Kim and G. Wolf (Dept. of Nutr. and Food Sci., Mass. Inst. of Technol., Cambridge, Mass. 02139). *J. Nutr.* 104, 710-18 (1974). The effect of vitamin A deficiency on in vitro incorporation of labeled precursors into glycoproteins of rat corneal epithelium was investigated. Whole corneas from deficient and pair-fed normal rats were incubated with radioactive precursors of glycoproteins; glycoproteins from the separated epithelial tissue were extracted and digested to yield glycopeptides. The glycopeptides eluted between 0.35 and 0.42 N LiCl by a continuous gradient from a DEAE-Sephadex column were found to be significantly

• Meetings.

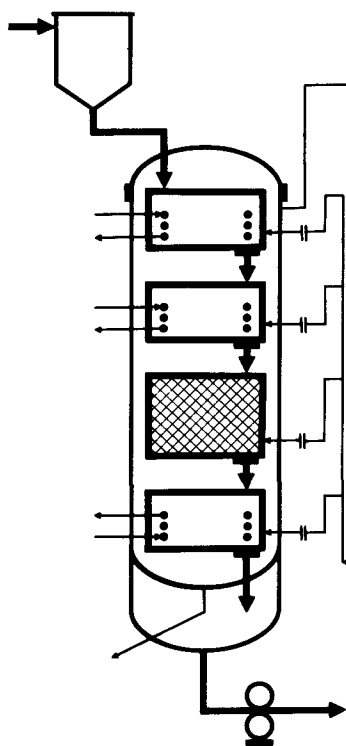
(Continued from page 632A)

mer House, Chicago, Ill. Contact: Joel Henry, AICHE, 345 E. 47th St., New York, N.Y. 10017.

Aug. 3-9, 1975-X International Congress of Nutrition, sponsored by International Union of Nutritional Sciences, Kyoto International Conference Hall, Kyoto, Japan. Contact: Mr. Masao Kanamori, c/o Kyoto International Conference Hall, Takara-ike, Sakyoku, Kyoto 606, Japan. ■

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affected by vitamin A deficiency. These affected glycopeptides were further separated by polyacrylamide gel electrophoresis and their carbohydrate content was assayed by gas-liquid chromatography. The results showed no fucose content and a much higher molar ratio of sialic acid to hexosamine (1.5 to 1.9) than that (0.3) of a similar vitamin A-sensitive glycopeptide previously isolated from rat small intestinal mucosa. It can be concluded that cornea contains a vitamin A-sensitive glycoprotein from which the affected glycopeptide is derived.

THE MECHANISM OF INTERFACIAL ACTIVATION OF PHOSPHOLIPASE A₂. M.A. Wells (Dept. of Biochem., College of Med., Univ. of Az., Tucson, Az. 85724). *Biochemistry* 13, 2248-57 (1974). The activating effect of substrate aggregation on the activity of *Crotalus adamanteus* phospholipase A₂ was investigated. Kinetic analyses were carried out using dibutyl-, dihexanoyl-, and dioctanoyllecithin at 45° both below and above the critical micelle concentration. The major source of the enhanced rate of hydrolysis of the aggregated substrates lies in a much lower entropy of activation. It is suggested that the origin of this entropy difference probably arises from the fact that in the aggregated state, only the reactive end of the substrate molecule is presented to the enzyme during collisions. An additional factor might arise from conformational constraints placed on the glycerophosphoryl group of the substrate in the aggregate state. Data are presented which suggested that a negative charge is present at the surface of the aggregate which markedly influences the pH dependence of the reaction and the apparent kinetic mechanism. These effects are sensitive to the addition of salts such as KCl or MgCl₂, which influence the surface charge. The validity of the steady-state kinetic analysis of aggregate substrates was investigated and conditions were defined under which meaningful kinetic data can be collected.

A PHOSPHOLIPASE A₂ MODEL SYSTEM. CALCIUM ENHANCEMENT OF THE AMINE-CATALYZED METHANOLYSIS OF PHOSPHATIDYLCHOLINE. *Ibid.*, 2258-65. In methanolic solutions octylamine catalyzes a random methanolysis of phosphatidylcholine to produce lysophosphatidylcholine. The rate of the reaction is enhanced several hundredfold in the presence of CaCl₂. Analysis of the kinetics of the reaction suggests that the reactive intermediate is a calcium-phosphatidylcholineamine complex. The

enhancement is relatively specific for Ca with relative rates Ca > Sr >> Ba > Mg. Monovalent ions such as Li and Na and the rare earth ion, cerium, did not enhance the reactions. The reaction proceeds more rapidly in methanol than in ethanol or *n*-propyl alcohol. The reaction in the presence of calcium is inhibited by water. The methanolysis in the absence of CaCl₂ is subject to inhibition by CH₃OD. In the presence of CaCl₂ there is no deuterium isotope effect. It is suggested that Ca²⁺ lowers the pK of the methanol, thereby facilitating proton abstraction by the amine generating a methoxide ion which attacks the carbonyl group of the phosphatidylcholine. Such a mechanism can also be applied to the hydrolysis of phosphatidylcholine by phospholipase A₂.

CHEMICAL COMPOSITION OF ATHEROSCLEROTIC LESIONS OF AORTAS FROM PIGEONS WITH NATURALLY OCCURRING OR CHOLESTEROL-AGGRAVATED ATHEROSCLEROSIS. R.W. St. Clair, J.J. Toma, Jr. and H.G. Lofland (Arteriosclerosis Res. Center, Dept. of Pathol., The Bowman Gray Sch. of Med., Winston-Salem, N.C. 27103). *Proc. Soc. Exp. Biol. Med.* 146, 1-7 (1974). The content of free and esterified cholesterol, phospholipid, free fatty acid, triglyceride, and calcium of normal, fatty streak, and atherosclerotic plaque was determined in aortas from pigeons with cholesterol-aggravated or naturally occurring atherosclerosis. The concentration of all lipid classes was greater in fatty streak and plaque than in normal tissue. Normal tissue from pigeons with atherosclerosis, although having no grossly visible lesions, had a higher concentration of cholesteryl esters than aortic tissue from pigeons without atherosclerosis. Atherosclerotic plaques from pigeons with cholesterol-aggravated atherosclerosis contained about twice the concentration of cholesteryl esters as plaques from birds with naturally occurring atherosclerosis, even though there was no difference in the content of free cholesterol. Calcium content was greatest in plaques, particularly in the naturally-occurring disease, but never accounted for more than 1% of the lipid free dry weight of the aorta.

ENDOGENOUS STEROID CONCENTRATION IN HUMAN BREAST TUMOURS DETERMINED BY HIGH-RESOLUTION MASS FRAGMENTOGRAPHY. D. Millington, D.A. Jenner, T. Jones and K. Griffiths (Tenovus Inst. for Cancer Res., Welsh Natl. Sch. of Med., Health Park, Cardiff CF4 4XX, U.K.). *Biochem. J.* 139, 473-5 (1974). A pilot study of the endogenous steroid concentrations in human breast tumours was performed. The technique of high-resolution molecular-ion monitoring during combined g.l.c.-mass spectrometry was used to determine oestrone, oestradiol-17β and oestriol in concentrations above 1 ng/g wet wt. of tissue and dehydroepiandrosterone, testosterone, androsterone (3α-hydroxy-5α-androstan-17-one) and 3β-hydroxy-5α-androstan-17-one in concentrations exceeding 5 ng/g, in extracts of five primary breast tumours.

INFLUENCE OF SEX HORMONES ON VITAMIN K DEFICIENCY AND EPOXIDATION OF VITAMIN K IN THE RAT. J.T. Matschner and A.K. Willingham (Dept. of Biochem., Univ. of Neb. College of Med., Omaha, Neb. 68105). *J. Nutr.* 104, 660-5 (1974). The effect of sex hormones on vitamin K deficiency was studied in intact and castrated male and female rats. The onset of vitamin K deficiency after castration was enhanced in the female and retarded in the male. Castrated male and female rats developed vitamin K deficiency to about the same extent. Plasma prothrombin levels in castrated male and female rats fed vitamin K-deficient diet dropped after the injection of testosterone and rose or remained high after the injection of estradiol. Castration did not prevent hyperprothrombinemia in adult female rats fed adequate amounts of vitamin K. Phenobarbital, methyl cholanthrene and DDT, like testosterone, appeared to enhance the onset of vitamin K deficiency in castrated male rats; estradiol virtually prevented the onset of deficiency; and progesterone was without effect compared to uninjected controls. The activity of phyloquinone epoxidase in liver microsomes varied with the degree of vitamin K deficiency. Activity of the enzyme was highest when prothrombin levels in plasma were lowest. A proposal is made that prothrombin is formed more rapidly and at a lower effective concentration of vitamin K in female or estrogen-treated rats.

STUDIES ON UBIQUINONE. DEMONSTRATION OF THE TOTAL BIOSYNTHESIS OF UBIQUINONE-9 IN RAT LIVER MITOCHONDRIA. B.L. Trumpower, R.M. Houser and R.E. Olson (Dept. of Biochem., St. Louis Univ. Sch. of Med., St. Louis, Mo. 63104). *J. Biol. Chem.* 249, 3041-8 (1974). The total biosynthesis of ubiquinone-9 from *p*-hydroxy-[U-¹⁴C] benzoate has been demonstrated in mitochondria isolated from rat liver slices pre-

incubated with mevalonic acid. Two partial reactions were also demonstrated. These were the conversion of *p*-hydroxybenzoate to 5-demethoxyubiquinone-9 and sequentially, the conversion of 5-demethoxyubiquinone-9 to ubiquinone-9. Furthermore, these reactions were found to be catalyzed by the inner membrane of the mitochondrion. It appeared that the only external requirements for this mitochondrial system are ATP, *p*-hydroxybenzoate, and a source of isopentenyl pyrophosphate. Conversion of 5-demethoxyubiquinone-9 to ubiquinone-9, which involves one hydroxylation and one methylation, is dependent upon molecular oxygen, S-adenosylmethionine, and reducing equivalents as indicated by a preference for succinate over malate. The over-all reaction is inhibited by CO but not by KCN. External ATP was essential for the conversion of *p*-hydroxybenzoate to 5-demethoxyubiquinone-9, but not for the conversion of 5-demethoxyubiquinone-9 to ubiquinone-9. These data suggest that the inner membrane of liver mitochondria is capable of the hydroxylation and methylation of aromatic precursors of ubiquinone.

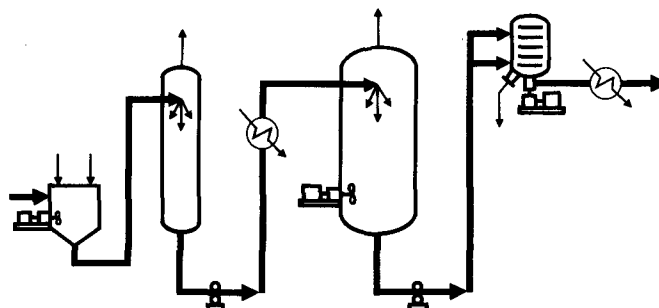
LATERAL PHASE SEPARATION OF LIPIDS IN PLASMA MEMBRANES: EFFECT OF TEMPERATURE ON THE MOBILITY OF MEMBRANE ANTIGENS. V.A. Petit and M. Eddin (Biol. Dept., John Hopkins Univ., Baltimore, Md. 21218). *Science* 184, 1183-5 (1974). Cooling populations of newly formed mouse human heterokaryons has effects on the intermixing of mouse and human surface antigens which indicate the occurrence of phase separations in membrane lipids. Antigen mixing, previously shown to be due to diffusion in the plane of the membrane, is retarded when cells are cooled from 37° to 21°C, but is then speeded by further cooling to 15°C. This result is in accord with observations on phase separations of lipids in artificial and bacterial membranes.

METABOLIC CONSEQUENCES OF LIMITED PHOSPHOLIPID SYNTHESIS IN ESCHERICHIA COLI. L.I. Pizer, J.P. Merlie and M. Ponce De Leon (Dept. of Microbiol., Schl. of Med., Univ. of Penn., Philadelphia, Penn. 19174). *J. Biol. Chem.* 249, 3212-24 (1974). Mutants of *Escherichia coli* limited in their ability to synthesize phosphatidic acid become severely restricted in their capacities for growth and macromolecular synthesis. The reduction in the rate of lipid synthesis correlates well with the reduction in macromolecule synthesis and growth rate and suggests a rapid mechanism for coordination of these processes. Inhibition of lipid synthesis causes a specific reduction in the size of the ATP pool and it is postulated that an activation of ATPase by altered membrane environment may be the possible mechanism of ATP reduction and subsequent loss of synthetic capacities.

STREPTOLYSIN O: SUPPRESSION OF ITS ANTIGENICITY BY LIPIDS EXTRACTED FROM SKIN. E.L. Kaplan and L.W. Wannamaker (Depts. of Pediatrics and Microbiol. Univ. of Minn., Minneapolis, Minn. 55455). *Proc. Soc. Exp. Biol. Med.* 146, 205-8 (1974). Chloroform:methanol extractable lipid(s) from rabbit dermis and epidermis has the ability to prevent hemolysis of erythrocytes by streptolysin O, an extracellular antigen of Group A streptococci. The data from this study also indicate that these same lipid preparations are able to suppress the immune response to this streptococcal antigen. These experimental data appear to provide a logical explanation for the epidemiologic finding that the antistreptolysin O response is feeble following streptococcal impetigo. They may also bear on the clinical observation that rheumatic fever fails to develop after Group A streptococcal infections of the skin.

25-HYDROXYCHOLECALCIFEROL (25-OH-D₃). III. EFFECT OF DOSAGE ON SOFT TISSUE INTEGRITY AND VITAMIN D ACTIVITY OF TISSUE AND MILK FROM DAIRY COWS. W.G. Olson, N.A. Jorgensen, A.N. Bringe, L.H. Schultz and H.F. Deluca (Depts. of Dairy Sci., and Biochem., Univ. of Wis., Madison, Wis. 53706). *J. Dairy Sci.* 57, 677-82 (1974). In Trial I, eight cows, two per treatment, were given the following doses of 25-hydroxycholecalciferol: 1.0 mg orally daily for 14 days, 4.0 mg, 8.0 mg, or 16.0 mg intramuscularly in 5 ml sesame oil. No clinical or pathologic evidence of hypervitaminosis D was found. Tissue from animals slaughtered 14 to 35 days after treatment revealed no evidence of tissue irritation and less than a twofold increase in vitamin D content. Tissue from control animals contained 18 to 26 IU of vitamin D per 100 g compared to 20 to 48 IU per 100 g from treated animals. In Trial II, the mean vitamin D content of milk taken on Day 4 postpartum from seven orally-treated cows was not greatly different than that of seven control cows, 35 compared to 31 IU per liter. Similar

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values for seven intramuscularly injected cows were 75 IU vitamin D per liter compared to 38 for five control cows. Thus, short-term administration of 25-hydroxycholecalciferol at dosages that effectively reduce the incidence of parturient paresis appear safe for the animal, and the products produced by these animals safe for human consumption.

INFLUENCE OF CHOLIC ACID ON THE UTILIZATION OF FATS IN THE GROWING CHICKEN. M.X. Gomez and D. Polin (Poultry Sci. Dept., Mich. State Univ., East Lansing, Mich. 48824). *Poultry Sci.* 53, 773-81 (1974). The influence of 0.2% cholic acid in a purified type diet on the utilization of tallow (TLW), lard (LD), hydrogenated soybean oil (HSBO) or corn oil (CNO) was studied using chicks two to four weeks of age. The fats were added to the diet to replace either 50 or 100% of the metabolizable energy from glucose. The presence of cholic acid significantly improved the apparent absorbability of all fats by an average of 2.1 percent, despite their high absorbability (average 92.7%). This was substantiated by significant increases in the metabolizable energy (M.E.) of most diets as follows: (a) fats substituted isocalorically for 50 percent of TLW diet, +4.4%; LD diet, -1.1%; HSBO diet, +9.8%; CNO, +8.5%; and (b) fats substituted isocalorically for 100 percent of the glucose; TLW diet, +15.8%; LD, diet +2.2%; HSBO diet, +4.9%; CNO diet, +2.5%. The M.E. values for the fats in the diets without cholic acid and those with cholic acid were 13 to 21%, and 20 to 41%, respectively, higher than reported M.E. values. The extra caloric effect of dietary lipids appeared to be derived from the non-lipid components of the diet.

A COMPARISON OF THE EFFECTS OF DIETARY PROTEIN AND LIPID DEPRIVATION ON LIPID COMPOSITION OF LIVER MEMBRANES IN RATS. T. Gerson (Applied Biochem. Div., Dept. of Sci. and Ind. Res. Palmerston North, N.Z.). *J. Nutr.* 104, 701-9 (1974). The effects of protein- and fat-free diets on lipid-protein ratios, lipid composition and phospholipid fatty acids were compared in rat liver outer mitochondrial membranes, the endoplasmic reticulum and plasma membranes. Both experimental diets brought about decreases in the proportions of cholesterol and phospholipids and increases in that of neutral lipids. Changes in phospholipid composition of the endoplasmic reticulum and outer mitochondrial membranes included decreases in phosphatidyl choline and increases in

phosphatidyl ethanolamine (except a decrease in the endoplasmic reticulum of rats fed a fat-free diet) and sphingomyelin. The experimental diets also resulted in a decrease of arachidonic and increases in C18 acids in the phospholipids. Fat-free rats had major proportions of eicosatrienoic acid (20:3) in all membranes, whereas rats fed a protein-free diet had lesser amounts of acids with 20 and 22 carbons, and, with the exception of plasma membranes, more linoleic acid (18:2) than rats fed a control diet. The similarity of many of the observed changes suggest that dietary protein and lipid deficiencies induced similar changes in the lipid and fatty acid patterns of liver membranes.

THE EGG YOLK VERY LOW DENSITY LIPOPROTEINS OF FRESH AND STORED SHELL EGGS. R.J. Evans, D.H. Bauer and C.J. Flegal (Depts. of Biochem. and Poultry Sci., Mich. State Univ., East Lansing, Mich.). *Poultry Sci.* 53, 645-52 (1974). Very low density lipoproteins were isolated from fresh eggs and from eggs which had been kept in cold storage for 6 months. No changes in structure of the very low density lipoproteins were observed to have taken place during cold storage of the eggs when structure was studied by the action of unfolding agents, detergents, reducing agents, phospholipases, or proteolytic enzymes on the lipoproteins followed by extraction of liberated lipids with ether. Very low density lipoproteins isolated from fresh eggs and those isolated from stored eggs contained similar percentages of lipid. The molecular weight ranges and the proportions of the total very low density lipoproteins in each size were similar as were the average sizes when determined by electron microscopy. No differences in isoelectric point (pH 7.0) nor in paper electrophoretic mobility between the isolated very low density lipoproteins of fresh and stored shell eggs were observed.

PURIFICATION AND PROPERTIES OF PHOSPHATIDYLSERINE DECARBOXYLASE FROM *ESCHERICHIA COLI*. W. Dowhan, W.T. Wiekner and E.P. Kennedy (Dept. of Biol. Chem., Harvard Med. Schl., Boston, Mass. 02115). *J. Biol. Chem.* 249, 3079-84 (1974). Phosphatidylserine decarboxylase, a membrane-bound enzyme of *Escherichia coli*, catalyzes the final step in the biosynthesis of phosphatidylethanolamine, the principal phospholipid of that organism. The enzyme has now been extracted from the membranes with the nonionic detergent Triton X-100 and has been purified about 3600-fold to near homogeneity. The detergent was present throughout the purification, which includes steps of solvent fractionation, ion exchange chromatography, gel filtration, and gradient centrifugation. Electrophoresis on disc gels in the presence of sodium dodecyl sulfate revealed the presence of a single polypeptide estimated to be of molecular weight 36,000. The amino acid composition of this purified membrane protein is not strikingly different from that of the total protein of *E. coli*. The enzyme is completely dependent for activity on added detergent in the test system and is highly sensitive to inhibition by reagents that attack carbonyl groups. Other properties of the enzyme are described.

FACTORS INFLUENCING THE QUANTITY OF ABDOMINAL FAT IN BROILERS. 2. CAGE VERSUS FLOOR REARING. J.W. Deaton, L.F. Kubena, T.C. Chen and F.N. Reece (U.S. Dept. of Agr., ARS, South Central Poultry Res. Lab., Mississippi State, Miss.). *Poultry Sci.* 53, 574-6 (1974). A practical-type diet was fed to broilers reared in cages and litter-floor pens. A temperature of 29°C was maintained for the entire growing period. Results show that more abdominal fat and ether extract percentage of body weight were obtained for broilers reared in cages as compared to birds reared in litter-floor pens.

STIMULATION OF STEROL SYNTHESIS IN PERIPHERAL LEUKOCYTES OF LEUKEMIC MICE. H.W. Chen and H.-J. Heiniger (Jackson Lab., Bar Harbor, Me. 04609). *Cancer Res.* 34, 1304-7 (1974). Bone marrow cells and peripheral blood leukocytes from leukemic AKR/J mice synthesize sterols from acetate at a vastly greater rate than the respective cells from normal AKR/J mice, i.e., approximately 20- and 100-fold. The controlling enzyme of sterol synthesis, 3-hydroxy-3-methylglutaryl coenzyme A reductase, is readily detectable in gradient-purified leukocytes from leukemic mice whereas normal leukocytes, fractions of red blood cells, and platelets express very low activity. The increased rate of sterol synthesis in leukocytes and bone marrow cells of leukemic animals does not result in an elevated plasma cholesterol level.

FAT ABSORPTION INDICATOR FOR THE DIGESTIVE TRACT. H.S. Bayley and W.E. Carlson (Canadian Patents and Development Ltd.). *U.S.* 3,817,089. As a fat absorption indicator for

determining fat absorption during its passage through the digestive tract, a fully etherified fat soluble, polyalkyl polyol, particularly trialkyl glyceryl ethers, and preferably tridodecylglyceryl ether, is administered in a dietary feed composition containing a fat.

METHOD OF DETECTING AND MEASURING LIPASE ACTIVITY. N.E. Harris and E.T. Reese (U.S. Secy. of the Army). *U.S.* 3,817,838. A suspected fat-containing material is extracted with an aqueous solution of polyoxyethylene (20) sorbitan monolaurate. The extract is incubated and then assayed by measuring the reduction in ester groups of the polyoxyethylene (20) sorbitan monolaurate resulting from lipase-induced deesterification.

METHYLATION OF TOCOPHEROLS. W.S. Baldwin and K.W. Keeney (General Mills Chemicals, Inc.). *U.S.* 3,819,657. Tocopherols are converted to α -tocopherol using formaldehyde in the presence of an orthophosphoric acid catalyst with catalytic hydrogenation.

• Edible Proteins

TOTAL NITROGEN AND SULFUR AMINO ACIDS IN DIFFERENT LINES OF BEANS (*PHASEOLUS VULGARIS*). W.G. Jaffe and O. Brucher (Escuela de Biología. Facultad de Ciencias, Univ. Central de Venezuela). *Nutricion* (Caracas, Venezuela) 24(1), 107-13 (1974). Analytical data are presented on the protein levels and on the methionine and cystine contents in the protein of 100 pure lines of beans. A negative correlation was observed between protein content and the level of cystine and methionine.

EVALUATION OF THE PROTEIN QUALITY OF FOODS OF LOW PROTEIN QUALITY CONTENT. L.G. Elias, R. Bressani and J. Antolin del Busto (Inst. de Nutricion de Centro America y Panama, Guatemala, C. A.). *Nutricion* (Caracas, Venezuela) 24(1), 81-96 (1974). This report describes a method for the evaluation of low-protein containing foods, which could not be evaluated by standard procedures. It compares weight gains in relation to protein intake, of diets containing 0-8% protein. Results obtained, when this method was applied to samples of rice, corn, potatoes and cassava, indicate an inverse relationship between protein content in the cereal grain and protein quality, a relationship not evident when conventional methods were applied.

PRODUCTION OF COTTONSEED PROTEIN ISOLATES. R.L. Olson and D.R. Frazier (Grain Processing Corp.). *U.S.* 3,814,748. Cottonseed flour or flakes are extracted for a short time with alkali. The extract is acidified to a pH in the range of 7.0-8.0 to produce a major protein isolate substantially devoid of objectionable color.

VEGETABLE AERATING PROTEINS. R.C. Gunther (A.E. Staley Mfg. Co.). *U.S.* 3,814,816. Oil-free vegetable protein, preferably soya, is hydrolyzed in the presence of acid or alkali to give a predetermined degradation as determined by viscosity measurements of aqueous solutions. The hydrolyzed protein is then further modified with pepsin. The resulting protein product, in the presence of water and sugar, whips at a rapid rate to give products of low density.

MEAT ANALOGS HAVING THE FIBER STRUCTURE OF MEAT. J.H. Yang and R.A. Olsen (Procter & Gamble). *U.S.* 3,814,823. The process involves forming a protein mix containing a heat-coagulable protein, adjusting the moisture content of the protein mix to 20-80%, mixing it to provide a coherent workable dough, and thereafter subjecting the dough to non-turbulent stretching and heat to provide unidirectional parallel meat-like fibers.

BREAKFAST CEREALS CONTAINING SOY MATERIAL AND SODIUM BICARBONATE. W.T. Bedenk and E.R. Purves (Procter & Gamble). *U.S.* 3,814,824. The incorporation of 0.2-2% sodium bicarbonate in a soy protein-fortified cereal food results in the removal of objectionable soy flavor and the emergence of a high intensity, well-rounded, pleasant, flavor.

PREPARATION OF POLYCELLULAR PROTEIN PRODUCTS. C. Akin (Standard Oil Co.). *U.S.* 3,819,610. Protein containing microorganisms are chemically made into a product having sufficient intercellular bonds between individual cells to render the product nondispersible in water. In the process, certain functional groups in the individual cell walls, such as hydroxide groups, amine groups, and disulfide groups, are first chemically

activated and then induced to form bonds with the walls of adjacent cells. The product thus prepared is suitable as an additive or a substitute for natural foods and also in the preparation of biodegradable containers, packing materials, and utensils.

• Detergents

HARD SURFACE TREATING COMPOSITIONS. R.E. Atkinson (Procter & Gamble). *U.S. 3,810,846*. The compositions contain surface active agents able to exist in substantive cationic or non-substantive noncationic form and a buffering agent. Methods of treating hard surfaces to provide soil release properties are also disclosed.

PREPARATION OF FREE FLOWING α -OLEFIN SULFONATE POWDERS. A. Kristiansen (Mo Och Domsjo Aktiebolag). *U.S. 3,810,847*. The process comprises drying the α -olefin sulfonate under sultone-hydrolyzing conditions in the presence of sufficient alkali to neutralize any free sulfonic acids present as well as free alkene sulfonic acids formed by hydrolysis of sultones.

STABLE OIL IN WATER EMULSION HAIR DYE COMPOSITION. R. DeMarco (Clairol Inc.). *U.S. 3,811,330*. The dye is dissolved or finely dispersed in the oil phase. A coupling agent, e.g., water soluble alkylene glycols or alkylene glycol ether alcohols; long chain fatty acid soaps; or long chain fatty compound polyoxyalkyl or polyhydroxyalkyl derivatives, imparts stability to the emulsion. The composition may contain a propellant and be dispensed from an aerosol container.

NONGELLING HEAVY DUTY LIQUID LAUNDRY DETERGENT. J.T. Inamorato (Colgate-Palmolive Co.). *U.S. 3,812,041*. The composition comprises a nonionic detergent having the molecular configuration of the condensation product of a higher fatty alcohol and ethylene oxide, an anionic detergent higher fatty alkyl polyethenoxy sulfate, a brightening agent, water and a lower monohydric alcohol. Small proportions of sequestering agents and salt forming bases may also be present. The composition is neutral or slightly alkaline and cleans soiled laundry to a degree comparable with that obtained utilizing phosphate built alkaline detergents. In addition, the composition is biodegradable.

CLEAR LIQUID DETERGENT PACKAGE. D. Verdier (Colgate-Palmolive Co.). *U.S. 3,812,042*. The package comprises a transparent plastic container and a clear, stable liquid detergent composition consisting of 10-60% of a C_{10} - C_{20} alkyl sulphonate solubilized in an aqueous liquid vehicle which may include up to 15% of urea, C_2 - C_3 alkanol, and/or sulphonated hydrotrope as a solubilizing agent.

DETERGENT COMPOSITION. D.S. Connor and H.K. Krummel (Procter & Gamble). *U.S. 3,812,044*. The composition comprises a water soluble organic synthetic detergent and, as a detergency aid, a sequestering agent. This agent is a water soluble salt of a polyfunctionally substituted aromatic acid.

DISHWASHING COMPOSITION. F.W. Gray (Colgate-Palmolive Co.). *U.S. 3,812,045*. The composition is prepared by first converting an alkali metal trimetaphosphate to the alkali metal triphosphate hexahydrate by reaction with sodium hydroxide in the presence of a sulphonated alkyl naphthalene wetting agent. The remainder of the product is formulated with the traditional materials for this type of product.

GERMICIDAL LIQUID CLEANER. A.J. Lanz (Colgate-Palmolive Co.). *U.S. 3,812,046*. The phosphate-free cleaner contains an alkyl dimethyl benzyl ammonium chloride, a nonionic surfactant, nitrilotriacetic acid trisodium salt builder and sodium bicarbonate stabilizer.

TOILET BARS. A. Alsbury (Lever Bros. Co.). *U.S. 3,812,060*. The bars consist if a mixture of C_{10} - C_{20} straight chain primary alkane sulphonate and C_{14} - C_{24} alkene sulphonate, the weight ratio of the two sulphonates being, respectively, 4:1-2:3. Preferably, the alkane sulphonate contains at least 75% of C_{10} - C_{16} material, and the alkene sulphonate consists predominantly of C_{11} - C_{15} material.

LIQUID DETERGENT COMPOSITION. A.B. Wolfson (Procter & Gamble). *U.S. 3,813,349*. Two phase liquid detergent emulsions maintain their stability without the use of additional stabilizing agents. They are made up of anionic, zwitterionic or semipolar compounds, electrolytes, alcohols and water. Autostabilized emulsions are capable of supporting water-insoluble particulate material.

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JOBGING TOILET AND PERFUMERY SOAPMAKER PROBLEMS FACING ITS CUSTOMER DESIDERATA. C. Lorin (Parfums Hermes, Levallois). *Rev. Franc. Corps Gras* 20, 547-51 (1973). The author defines the role of the jobbing soapmaker. The problems which the jobber faces during soapmaking, stamping and conditioning are reviewed. The laboratory is necessary to adjust the formulation (dye-stuffs, perfumes, preservatives, additives) and to control the stability of toilet soaps.

RECENT PROGRESS IN TOILET SOAPS FINISHING. L.J. Monticelli (Societe G. Mazzoni S.p.A.). *Rev. Franc. Corps Gras* 20, 541-46 (1973). Toilet soap industry has recently seen important developments with the: (I) toilet soaps multiple composition, (II) multicolored toilet soaps, (III) toilet soaps of unusual form and (IV) microsized. The author describes the special machines developed at Mazzoni S.p.A. for these purposes: BDM systems for I; three new systems for II, in which the dye is added according to three different ways; the vertical stamping machine "STO-C" for III and the high speed stamping machine "STH-V" for IV.

OECD DETERGENT/TOILETRIES OUTPUT. G. Hartwig. *Soap/Cosmetics/Chemical Specialties* 50 (3), 50-4 (March, 1974). Statistical data covering the years 1970 and 1971 are presented. The figures were taken from a report published by the Organization for Economic Cooperation and Development. Data are listed for 12 European countries, including the United Kingdom, and for Canada, the United States, Japan and Australia in the following categories: production of synthetic detergents for use in detergent powders, scouring powders or liquid detergents; production of soap for use in seven different types of product; unit value of soap, detergents and scouring powders; imports and exports of shaving creams, soaps and washing preparations; and production in the perfumery sector (dollar value).

SPRAY DRIED DETERGENT COMPOSITION. T.C. Lemoff (Procter & Gamble). *U.S. 3,801,511*. The method of producing crisp, free-flowing granules comprises first forming an aqueous slurry of sodium carbonate, a water soluble detergent and, as an anti-caking agent, a water soluble compound having a greater solubility than does the sodium carbonate. The slurry is then spray dried. The water soluble compound when added to the

slurry prior to spray drying imparts the desired physical properties to the resultant composition.

DETERGENT-SOFTENER COMPOSITIONS. B. Sundby and H.E. Wixon (Colgate Palmolive Co.). *U.S. 3,803,063*. The compositions consist of a builder salt and a detergent selected from the group consisting of water soluble sulfosuccinates of polyhydroxy tertiary amines. The reaction mixture consists of sulfonated mono-, di-, and/or triesters, depending on the number of reactive hydroxyl groups in the alcoholamine and the amount of dicarboxylic acid utilized. The sulfonated esters and their salts possess both detergency and softening properties.

CLEANING COMPOSITIONS. F.W. Gray (Colgate Palmolive Co.). *U.S. 3,803,040*. A composition capable of inhibiting overglaze attack contains an aluminum compound selected from the group consisting of aluminum silicate and aluminum chlorhydroxide, and at least one boron compound selected from the group consisting of boric acid and boron trioxide. The weight ratio of the aluminum compound to the boron compound is within the range 0.025-1.

EXTRUSION OF DETERGENT COMPOSITIONS. E.R. Jensen (CPC International). *U.S. 3,803,285*. The compositions comprise 10-90% detergent surfactant selected from the group consisting of anionic, nonionic, zwitterionic, ampholytic detergent surfactant, and mixtures of these, and 10-90% modified carbohydrate.

CLEANER COMPOSITIONS. C.D. Mukai and B. Weinstein (American Home Products Corp.). *U.S. 3,806,460*. The compositions comprise (1) a noncaustic inorganic cleaner, (2) an amine and/or ammonia, (3) an organic solvent insoluble or partially soluble in water, and (4) a water soluble amide. The compositions are useful in removing deposits such as grease, oil and food from surfaces such as oven walls.

TRIGLYCERIDE CHOLESTEROL ANALYSIS. R.B. Smernoff (Analytical Products, Inc.). *U.S. 3,814,255*. A process for preparing a liquid sample for triglyceride and cholesterol analysis is described. The sample is prepared from a plasma- or a serum-lipid solvent composition, the preferred one being isopropyl alcohol. The cholesterol and triglyceride, along with most of the solvent, are separated from the composition by passing it through a column comprising activated porous inorganic oxide particles. These particles are most preferably alumina. They must have a limited amount of fines and a particle size in the range 15-200 mesh.

FREE FLOWING SOAP-NONIONIC DETERGENT. J.H. Mostow (Colgate-Palmolive Co.). *U.S. 3,814,692*. Particulate blends of soap and liquid nonionic surfactants and a method for preparing them are disclosed. The method includes the combination of an appropriate fatty acid with the liquid nonionic surfactant before saponification of the acid. The blends are dry, nontacky, and free flowing and are suitable for post addition to spray dried detergent powders or for use by themselves or with builders as final detergent formulations.

CLEANSING COMPOSITION. H. Kudler. *U.S. 3,814,693*. An aqueous based cleansing composition contains ammonium hydroxide, an inorganic water soluble builder salt, an admixture of potassium chloride and potassium carbonate, an aqueous saturated soap solution of alkali metal salts of saturated fatty acids containing 8-18 carbon atoms, and an organic solubilizing agent. The compositions are especially useful for cleaning glass surfaces.

SOAP COMPOSITION. P.J. Ferrara, G. Dalby, C.A. Barnes, Jr. and R. Gordon. *U.S. 3,814,698*. Solid soap such as framed and milled toilet soap contains 5-100%, based on the weight of free fatty acid components, of at least one "bath oil." The process for making this product differs from the usual in that the bath oil is added to the liquid saponification mixture, rather than just prior to the framing step.

LOW FOAMING DETERGENT COMPOSITIONS. J.T. Inamorato, R.T. Hunter and R.E. Dickson (Colgate-Palmolive Co.). *U.S. 3,814,705*. The composition comprises a synthetic organic detergent, alkaline builder salts, and a 1,1-dialkyl urea as a foam suppressing agent.

DETERGENT. G.O. Hentschel (Walter S. E. Hentschel). *U.S. 3,816,318*. The detergent compositions contain monoesters produced through esterifying dibasic or polybasic organic aliphatic carboxylic acids and/or dibasic or polybasic aromatic carboxylic acids with alcohols. These monoesters replace phosphates.

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ACTIVATION OF PEROXIDE WASHING AND BLEACHING BATHS. P. Sarot, M. Delattre and A. Decamps (Solvay & Cie). *U.S. 3,816,319*. The acylation products of dioximes are used as activators for washing and bleaching baths containing a peroxide compound.

LAUNDERING AID. D.C. Kleinschmidt (Procter & Gamble). *U.S. 3,816,321*. The laundering aid comprises a water insoluble, polyurethane-polyalkyleneimine material releasably combined with a detergent composition. The aid provides a means of introducing a detergent composition into a laundry bath and at the same time serves to adsorb dirt and vagrant anionic dyes from the aqueous laundry medium, thereby improving the laundering process.

BLEACHING COMPOSITIONS. L.W. Fine, M. Grayson and V.S. Grayson. *U.S. 3,816,324*. A dry bleaching composition which is useful at relatively low water temperatures is provided. The composition contains a hydrogen peroxide releasing compound and an activating amount of an N-acyl azole. A typical composition is a mixture of sodium perborate and N-acetyl imidazole in a 1:1 mol ratio.

DISHWASHING COMPOSITIONS. D.S. Corliss (FMC Corp.). *U.S. 3,816,329*. A dishwashing composition having high stability against loss of available chlorine is formulated to contain 0.5-10% of sodium dichloroisocyanurate dihydrate, 5-65% of an alkali metal silicate, 20-60% of a compound having water softening and detergent building properties, usually sodium tripolyphosphate, 0.5-10% of a low-foaming, chlorine-compatible nonionic surface active agent, and 0-50% of filler, usually sodium carbonate.

INDUSTRIAL CAR WASH COMPOSITION. A.J. Lancz (Colgate-Palmolive Co.). *U.S. 3,816,351*. Powder car wash compositions contain a major amount of water soluble builder or mixture of builders and minor amounts of nonionic synthetic detergent and a stabilizing agent.