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.

• Fats and Oils

EXTRACTION OF OIL FROM SALSEED TO HELP NATIONAL ECONOMY. S.H.P. Gupta (East India Oil Millers' Assn.). *Oils Oilseeds J.*, 24(7,8,9), 29–31 (1972). Seed of the sal tree (*Shorea robusta*) provides a high melting, greenish oil and sal meal. Characteristics of both are given.

PILOT PLANT MILLING OF INDIAN SOYABEAN SEED. M.R. Surendranath, T. Laxminarayana, R.K. Viswanadham, S.D. Thirmala Rao and B.R. Reddy (Oil Tech. Res. Inst., Anantapur). *Oils Oilseeds J.* 24(12), 12–14 (1972). Studies of India-grown soybeans (Clark 63) were made. Seed constituents were kernel 89%, hull 8.5% and germ 2.5%. Proximate composition of the seed was moisture 9.0%, oil 23.2%, protein 35.0% and ash 4.8%. Oil yield varied from 13.7 to 15.6%. The oil and protein contents of soybean oilcakes varied from 7.3 to 10.2% and 40.0 to 49.5% respectively. Refinability data are also given.

OIL PALM OF INDIAN HABITAT. IV. T. Obi Reddy, S.D. Thirumala Rao and B.R. Reddy (Oil Tech. Res. Inst., Anantapur, Andhra Pradesh, India). *Indian Oil Soap J.* 37(4), 75–76 (1971). An indigenous oil palm is under development, and a table of physical characteristics of *Elaeis guineensis* Jacq is given.

STABILITY TESTS FOR EMULSIONS. Ernst-Ludwig Roehl (N.V. Chem. Fabriek "Naarden," Naarden-Bussum, Holland). *Soap, Perfumery Cosmet.* 45(6), 343–50 (1972). Laboratory tests and factory control methods are described.

DETERMINATION OF COPPER-EDTA IN COSMETIC PRODUCTS. B.L. Kabacoff, G. Mohr and C.M. Fairchild (Revlon Res. Center, Inc., 945 Zerega Ave., Bronx, N.Y. 10473). *J. Soc. Cosmet. Chem.* 23(9), 545–8 (1972). Determination of copper-EDTA, the sodium salt of the (ethylenedinitrilo)-tetraacetic acid chelate of Cu(II), which reflects its stability in cosmetic products is described. The analytical method consists of shaking an aqueous dispersion of the cosmetic product with an ion exchange resin, washing the resin free from extraneous matter, and eluting the copper-EDTA from the resin with sodium bisulfate solution. The concentration of copper-EDTA in the eluate is determined by spectrophotometric measurement of its absorbance at 750 nm.

COSMETIC FORMULATION—CLINICAL DATA RETRIEVAL SYSTEMS. S.D. Peluso and L.N. Starker (Warner-Lambert Res. Inst., 170 Tabor Rd., Morris Plains, N.J. 07950). *J. Soc. Cosmet. Chem.* 23(9), 533–43 (1972). Ingredient and clinical data retrieval systems have been developed by the generation of punched cards. A subsequent conversion to Termatrex cards was initiated for the ingredient data, while a computer-generated printout was undertaken to handle the clinical data. The cosmetic ingredient punched cards are used directly in the J-400 Termatrex drill to produce a searchable set of Termatrex cards, and the clinical data punched cards are processed by computer, producing a printout usable directly as a desk-top tool.

FATTY ACID COMPOSITION OF VARIOUS BALSAMS AND ROSINS. I.I. Bardyshev, S.I. Kryuk and A.L. Pertsovskiĭ. *Khim. Prirod. Soed.* 6 No 3, 361–2 (1970). The composition of fatty acids isolated from the balsam (oleoresin), wood and tall oil rosins of *Pinus sylvestris*, from the balsam and wood rosin of *Pinus sibirica* and from the balsam of *Larix sibirica* were studied by GLC separation of their methyl esters. Tabular results show that oleoresins and rosins contain acids having 11–22 C atoms. Unsaturated acids, represented mostly by oleic and linoleic acids, predominate. The principal saturated acid is palmitic. A total of 27 acids is listed. (World Surface Coatings Abs. No. 360)

INFRARED QUANTITATIVE ANALYSIS OF MIXTURES CONTAINING ISOPROPENYL STEARATE, STEARIC ACID, STEARIC ANHYDRIDE AND MIXED STEARIC ACID/ACETIC ANHYDRIDE. M.J. Calhoun and E.S. Dellamonica. *Appl. Spectroscopy* 26 No 1, 96–9 (1972). A method for the determination of individual components of complex mixtures is presented. The technique used is based on I.R. absorbance measurements for stearic acid at 1700 and at 935 cm^{-1} when the concentration range exceeds 0.50% wt./vol.; for isopropenyl stearate at 1145 and at 865 cm^{-1}; for stearic anhydride at 1030 cm^{-1} and mixed stearic acid/acetic anhydride at 1000 cm^{-1}. The baseline method was used in all absorbance measurements. Absorbance-concentration relationships obeyed Beer's law from 0 to 2.0% wt./vol. for most compounds, the exception being stearic acid (at 1700 $cm.^{-1}$), where linearity was limited to a maximum of 0.50% wt./vol. Because of spectral interference between the two anhydrides at low concentration ratios, an empirical percent transmission ratio method was used to estimate the relative concentration of each. Binary and ternary systems were studied and the standard deviations of the differences between theoretical and calculated values indicate that this method is reliable. (World Surface Coatings Abs. No. 361)

CHLORINATED LONG-CHAIN FATTY ACIDS: THEIR PROPERTIES AND REACTIONS. IV. QUANTITATIVE GAS CHROMATOGRAPHY OF CHLORINATED OCTADECANOIC ACIDS PREPARED FROM OLEIC, LINOLEIC AND LINOLENIC ACIDS. G. Pensar, D. Manell, M. Ketola and K. Pihlaja. *Acta Chem. Scand.* 25, 1489–91 (1971). The determination was required to study the fate of fatty acids from wood resin during bleaching of the pulp with Cl. The named acids were converted to their methyl esters and dissolved in tetrahydrofuran (0.5–5 mg. per ml.) containing tetracosane as internal standard. An aliquot portion (1 μl.) was injected on to a coiled glass column (6.5 ft. × 0.125 in.) packed with 1% of SE-30 on acid-washed Chromosorb W-DMCS (80–100 mesh) temp.-programmed from 230 to 290C at 5 deg. per min, and operated with He as carrier gas (40 ml. per min.) and flame ionisation detection. The column was pre-conditioned at 300C for 24 hr. under a stream of He (10 ml. per min.). Retention values relative to tetracosane are tabulated for the 3 esters. The relative response of the detector decreased with increasing number of Cl atoms in the molecule. (World Surface Coatings Abs. No. 361)

ELECTRICAL CHARACTERISTICS OF INGUA, RITHA AND SITAPHAL OILS. M.P. Agnihotri and G.P. Chhalotra. *Vishwakarma* 10 No 3, 9–13 (1969). The above oils are compared with the standard transformer oils and drying oils such as linseed and

tung oils. The permittivity was measured at different frequencies and graphs were plotted. These oils can be used as solidifying oils for impregnation purposes and for making paints and varnishes. They are not suitable for use in transformer insulation owing to high viscosity. Their permittivity at power frequency is between 3 and 5 and they are best suited for impregnation of wood, mica, asbestos and papers. (World Surface Coatings Abs. No. 360)

SELECTIVE HYDROGENATION BY HOMOGENEOUS CATALYSIS. II. APPLICATION OF EXPERIMENTAL DESIGN TECHNIQUES TO THE STUDY OF THE HYDROGENATION OF SOYBEAN METHYL ESTERS BY DICOBALTOCTACARBONYL. E. Ucciani, G. Cecchi and R. Phan Tan Luu (ITERG, Provence Univ.). *Rev. Franc. Corps Gras* 19, 383–90 (1972). Response surface plotting techniques were used to determine the reaction conditions for maximum selectivity. The variables and levels used were temperature, 100, 110, 120C; pressure, 10, 20, 30 bars; catalyst concentration, 0.36, 0.48, 0.60% Co; and time, 90, 120, 150 min. Following the reactions, the oils were analyzed for fatty acid composition, trans isomers, and conjugated dienes. Coefficients of linear regression were determined for each of the responses. The order of importance found for the variables based on the effects produced was temperature > pressure > time >> cobalt concentration. An optimum set of conditions was found within the ranges investigated, but an attempt to use these conditions was not successful.

SELECTIVE HYDROGENATION OF RAPESEED OIL WITH A COPPER-CHROMIUM CATALYST. A. Jakubowski and W. Pezinski (Lipids Inst., Warsaw). *Rev. Franc. Corps Gras* 19, 377–82 (1972). The selectivity of two different catalysts was investigated. One was prepared by coprecipitating the nitrate salts of copper and chromium with urea followed by activation at 350C. The other was prepared by reducing the same nitrate salts with sodium borohydride followed by a similar activation. Temperatures of 160, 170, 180, and 190C were used with 0.1–3% catalyst and a hydrogen flow rate of 2 l/min. Traces of copper were removed most effectively from the oil by treatment with citric acid. A satisfactory selectivity was observed with both catalysts, with linolenic acid being reduced from 7 to 1% in 80–100 min. At the same time, the linoleic acid was reduced from 14 to 10%. The oxidative stability of the oil improved, and a 10C rise in the solidification point occurred.

POURABLE MARGARINE. I.E.M. Wilton and K.L.E. Bauren (Margarinbolaget AB). *U.S. 3,682,656.* The specification describes a pourable margarine of improved stability against phase separation, particularly at use temperature (18C) and at refrigerator temperature (6C). The fatty phase contains 92–99.5% by weight of a liquid vegetable oil and 8–0.5% of a hard fat component. The stability is further improved by the presence of 0.5–20% by volume of gas bubbles, preferably nitrogen bubbles 1–25 microns in size.

SELECTIVE HYDROGENATION BY HOMOGENEOUS CATALYSIS. I. HYDROGENATION OF SOYBEAN METHYL ESTERS BY DICOBALTOCTACARBONYL. G. Cecchi and E. Ucciani (ITERG, Marseille). *Rev. Franc. Corps Gras* 19, 289–96 (1972). Dicobaltoctacarbonyl was used to catalyze the partial hydrogenation (to around 100 I.V.) of soybean methyl esters. The effects of temperature (90–180C), catalyst concentration (0.24–0.96 g/100 g esters), pressure (5–40 bars) and duration on the reaction rate, selectivity and cis-trans isomerization were studied. Details of the catalyst preparation and the rest of the experimental procedure are given. Temperature affected the reaction rate, the stability of the catalyst, selectivity and isomerization; catalyst concentration affected only the reaction rate; and pressure affected the rate and to a lesser extent the selectivity. Isomerization and selectivity were equally dependent on the reaction time. As a result of this study, conditions were established for obtaining selectively hydrogenated products containing 0.2–2% trienes and 20–50% trans isomers. An interpretation of the observed phenomena is proposed on the basis of reaction mechanisms of coordination complexes.

APPARATUS FOR TESTING THE FREE FATTY ACID CONTENT IN EDIBLE OILS. R.L. Husch (Interstate Foods Corp.). *U.S. 3,682,597*. A preassembled, disposable kit for testing for development of excessive free fatty acids in cooking oils is described. A sample of the cooking oil is added to a test solution in a previously-sealed test vial. A color change in the test solution is easily observed through the glass vial.

FATTY ACID ADDITIVE IN THE EVAPORATION OF BRINE FOR CRYSTALLIZING SODIUM CHLORIDE. J.P. Fedosoff and J.R. Trebish (Domtar Ltd., Montreal). *U.S. 3,682,601*. Evaporation of a sodium chloride brine solution containing calcium sulfate as an impurity is carried out at a temperature below 175F in the presence of a higher fatty acid, such as oleic acid. The sodium chloride crystals obtained have a reduced content of calcium sulfate, and the formation of calcium sulfate scale on the walls of the equipment is substantially reduced.

DETOXIFICATION OF GOSSYPOL BY EUMYCOPHYTA. T.C. Campbell (Research Corp.). *U.S. 3,682,645*. Cultivation of a fungal micro-organism of the phylum *Eumycophyta* on cottonseed detoxifies gossypol making the cottonseed suitable for use in a feedstuff suitable for monogastric animals.

PURIFICATION OF OILS. P.W. Wetzold (Paispearl Products, Inc.). *U.S. 3,682,993*. Vile smelling oils, and particularly fish oils, are purified by first subjecting the oil to a steam stripping operation under vacuum and in the presence of a small proportion of an organic solvent, such as an aliphatic hydrocarbon in an amount of 2–10%, so as to remove volatile amines together with wax and wax ester components. The stripped oil is then treated with a quaternary ammonium-acidic clay adduct.

PROCESS FOR PRODUCING COCOA BUTTER SUBSTITUTE FROM PALM OIL. T. Kawada, S. Suzuki, and N. Matsui (Kao Soap Co.). *U.S. 3,686,240*. In the process, the palm oil is cooled to a first temperature to crystallize a high melting fraction which is then filtered off. Then the remainder of the palm oil is cooled to a second temperature to crystallize a middle melting fraction which is filtered off. This middle melting fraction is then hydrogenated under conditions which minimize the formation of trans acids to form the cocoa butter substitute.

PROCESS FOR SELECTIVE HYDROGENATION OF FATS AND FATTY ACIDS. J. Baltes. *U.S. 3,687,989*. The hydrogenation takes place in the presence of a nickel subsulfide alone or together with molybdenum and/or tungsten sulfides. A substantial amount of trans monoene residues is formed in the product.

FUNCTIONAL (BREADMAKING) AND BIOCHEMICAL PROPERTIES OF WHEAT FLOUR COMPONENTS. IX. REPLACING TOTAL FREE LIPID WITH SYNTHETIC LIPID. R.C. Hoseney, K.F. Finney and M.D. Shogren (Kansas St. Univ., Manhattan, Ka. 66502). *Cereal Chem.* 49, 366–71 (1972). Adding sucrose monotallowate to a standard baking formula increased loaf volume from 7 to 18%, depending on the level of shortening in the formula. When two sucroglycerides (sucrose monotallowate and sucrose monopalmitate) were added to petroleum-ether-defatted flour, each replaced the total free flour lipids, and increased loaf volumes 18 and 22%, respectively, above that of the original flour (with shortening). Native free flour lipids could also be replaced with sodium or calcium stearoyl-2-lactylates. However, adding either lactylate, unlike the sucroglycerides, did not increase loaf volumes above that of the control flour. When two nonionic surfactants (pluronic polyols F-108 and F-68) were baked with petroleum ether-defatted flour, loaf volumes were generally comparable to that of the control flour. However, all loaves baked with pluronic polyols had impaired crumb grain.

SUMMARY OF SIX YEARS OF ACTIVITY OF THE FRENCH AND THE E.E.C. ANIMAL FAT INDUSTRIES. FUTURE PROSPECTIVES. A. Moulin (Part 1) and J. Bacquet (Part 2). *Rev. Franc. Corps Gras* 19, 279–88 (1972). The French animal fat industry deals essentially with lard and tallow. The structure of the industry as well as recent production are reviewed. Global production increased by 33% since 1966, principally because of increases in tallow production while lard production remained stationary. Nevertheless, there is a shortage of tallow and a surplus of lard. Reorganizations in management and modernization of production equipment are necessary in the industry. Enlargement of the E.E.C. should have a favorable effect.

PALM OIL PROCESSING. 1. SEPARATION INTO SOLID AND LIQUID FRACTIONS. G.B. Martinenghi (Univ. of Milan). *Oleagineux* 27, 267–72 (1972). Different procedures for producing a fraction from palm oil, which would remain liquid at 15C, were investigated. Crystallization without solvent produced a liquid fraction which congealed at 20C. Crystallization at −20C from an oil/hexane (1:5, v/v) miscella yielded about 45% of liquid oil which remained fluid at 15C. Most of the free acids were concentrated in this fraction. Interesterification of the palm oil followed by fractionation in hexane under similar conditions yielded about 50% of liquid oil with similar properties. Use of acetone in place of hexane offers no technological advantages and is more costly.

TREATMENT AND DISPOSAL OF WASTE WATERS FROM A PALM OIL MILL. J.J. Olie and and T.D. Tjeng (Stork, Amsterdam, N.V.). *Oleagineux* 27, 215–8 and 273–5 (1972). The nature and quantities of palm oil mill effluent to be expected in the near future in Malaysia and the magnitude of its disposal problems are reviewed. The usual methods of waste water

treatment and disposal and their applicability are discussed. For many mills, a possible solution is dewatering the effluent by evaporation in a pond with subsequent mechanical drying. At present, more sophisticated methods, such as biological treatment or sludge dewatering by vacuum filtration or centrifugation, are not economically feasible.

COTTONSEED PHOSPHOLIPIDS. III. ISOLATION AND CHARACTERIZATION OF PURE CEREBROSIDES AND PHYTOGLYCOLIPIDS. A.S. El-Nockrashy and Y. El-Shattory (Lipid Lab., Nat. Res. Center, Dokki, Cairo, U.A.R.). *Rev. Franc. Corps Gras* 19, 233–41 (1972). Isolation of cerebrosides (CER), reported for the first time in cottonseed, and phytoglycolipid (PGL) was achieved by a lengthy procedure using solvent fractionation, column chromatography, and preparative TLC. The isolated CER and PGL were characterized by analysis of the sugar moieties, the long chain bases and GLC of the hydroxy and non-hydroxy fatty acids. Phosphorus, nitrogen, and gossypol were also determined. Infrared spectra of the CER and PGL revealed bands characteristic of these constituents and also evidence for the presence of a phytosphingosine base.

ANTIOXIDANTS: STRUCTURE, MECHANISM OF ACTION, AND APPLICATIONS IN FATS. M. Loury (ENC, Paris). *Rev. Franc. Corps Gras* 19, 243–5 (1972). The applications mentioned in this brief review are in packaging materials, animal fats, foods and feeds.

ANALYSIS OF SOME RED SEA FISH LIPIDS. I. M.M. Amer, A.K.H. Ahmad, and B.A. El-Zeany (Anal. Chem. Dept., Cairo Univ.). *Oleagineux 27*, 153–5 (1972). The physical and chemical constants, fatty acids, and types and amounts of nonglyceride components of the liver oils of 3 sharks and 1 ray caught in the Red Sea near Hurgada, U.A.R. were determined. The oils appear to belong to the fourth group of Elasmobranch fish liver oils as characterized by a rather high saturated acid content and relatively small amounts of unsaponifiable matter.

FATTY ACIDS IN FOODS SERVED IN A UNIVERSITY FOOD SERVICE. L. Guild, D. Deethardt and E. Rust (Dept. Home Economics, S. Dakota Agricultural Expt. Station, Brookings, S.D.). *J. Am. Dietetic Assoc.* 61, 149–54 (1972). Samples of 56 foods offered in a cafeteria line in a university food service were analyzed by GLC for fatty acids. Data are reported for 11 major fatty acids and for other unidentified peaks. The latter, although usually representing less than 1%, accounted for 10% or more of the total fatty acids in some foods. At least 53 different fatty acid peaks were found although no single sample had more than 40.

EFFECT OF DEAERATION AND OF VACUUM ON THE THERMAL STABILITY OF FRYING OILS. V.F. Usenko et al. *Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol.* 1972(2), 80–1. A partially hydrogenated sunflower oil was used in the frying tests. One sample was deaerated prior to frying, another was fried under vacuum, and the third served as control. Results showed that prior deaeration had practically no effect on the oxidative breakdown of the oil whereas very little breakdown occurred in the oil fried under vacuum. (Rev. Franc. Corps Gras)

PROCESS IMPROVEMENTS FOR TREATING SUNFLOWER SEEDS RICH IN OIL. I. Ju. P. Macuk et al. *Tr. Vses. Nauchn.-Issled. Inst. Zhirov* 28, 20–31 (1971). In processing plants where it is possible to control the kernels and size the seeds prior to decortication, there can be obtained a kernel with only 3–4% hull and a hull fraction containing less than 0.6% oil. Sunflower seeds are preferably separated into three fractions; the fraction containing small seeds (10–20% of the seeds) is separated before storage and treated separately. Sizing of the seeds into an average-sized fraction (30–40%) and large-sized fraction (60–70%) should be done in production and before the cleaning. (Rev. Franc. Corps Gras)

PROCESS IMPROVEMENTS FOR TREATING SUNFLOWER SEEDS IN OIL. II. *Ibid.*, 32–40. Data are presented to show the economic and processing advantages of a centrifugal decorticator (A1-MRC) over the conventional disintegrator type of decorticator. The centrifugal decorticator has a daily throughput of 200 tons whereas the other one can handle 55 tons per day. With seeds containing 47.36–48.98% oil, 5.10–10.76% moisture, and acid value of the oil of 1.22–4.77, the centrifugal decorticator yielded 31.79% of nondecorticated and partially decorticated seeds, 11.82% fines, and an oil content of the husk of 2.39%. The other machine gave figures of 20.34, 18.94 and 2.78%, respectively. (Rev. Franc. Corps Gras)

OBTAINING AN EASILY HYDRATABLE SUNFLOWER OIL. Ju. P. Macuk et al. *Tr. Vses. Nauchn.-Issled. Inst. Zhirov* 28, 41–8 (1971). Under production conditions, short time, high temperature heating of sunflower meal to a temperature of 80–85C and a moisture content of 8.5–9% results in inactivation of phospholipases and lipases. Inactivation of the enzymes is most rapid and complete in the continuous screw cooker where heating of the meals occurs at a rate of 3C per second. As a result of the inactivation, the amount of non-hydratable phosphatides in the oil from prepressing is less than 0.02%. The acid values are lowered an average of 0.6. (Rev. Franc. Corps Gras)

PROTEIN CONCENTRATES AND ISOLATES FROM OILSEEDS. A. Rutkowski. *Przemysl Spozywczy* 26(4), 152–8 (1972). Economic and technical data are presented to show that the future of high protein foods and food supplements resides in the soybean. Use of the soybean offers many advantages over other oilseeds and especially over petro-protein. (Rev. Franc. Corps Gras)

COMPARISON OF DRYERS FOR SUNFLOWER SEEDS. B.N. Kirievskij et al. *Tr. Vses Nauchn.-Issled. Inst. Zhirov* 28, 12–19 (1971). The rotary dryer with a fluidized bed is the most effective for drying sunflower seeds because it assures even drying and cooling of all the seeds during a rigorously controllable drying cycle. It also permits the automatic control of the moisture in the seeds leaving the dryer. (Rev. Franc. Corps Gras)

EFFECT OF THE TEMPERATURE OF HEATING DURING FLUIDIZED BED DRYING ON THE QUALITY OF SUNFLOWER SEEDS. L.V. Romanova et al. *Tr. Vses. Nauchn.-Issled. Inst. Zhirov* 28, 3–8 (1971). Use of a fluidized bed for drying sunflower seeds allows more severe drying conditions to be used and the temperature of the seeds to be raised to 120–130C. The free fatty acids and the peroxide value of the oil do not begin to increase significantly until a temperature of 130–140C is reached. (Rev. Franc. Corps Gras)

THE EFFECTS OF DEGUMMING AND OF CAUSTIC REFINING OF EDIBLE OILS ON THE CONTENT OF 3,4-BENZOPYRENE. L.T. Grigorenko et al. *Tr. Vses. Nauchn.-Issled. Inst. Zhirov* 28, 243–7 (1971). Under industrial conditions, degumming and caustic refining of edible oils are ineffective for eliminating 3,4-benzopyrene from the oils. (Rev. Franc. Corps Gras)

DEVELOPING ELECTROSTATIC IMAGES EMPLOYING FATTY ACID ESTERS TO INHIBIT DEVELOPER BUILD-UP. J. Mammino and A.B. Amidon (Xerox Corp.). *U.S. 3,692,520.* An electrostatic imaging system wherein a hydrogenated vegetable oil derivative is added to the photoconductive surface in the presence of a liquid developer is described. The vegetable oil derivative may be added separately or be dispersed in the liquid developer to provide improved cycling ability of the imaging surface.

(Continued on page 510A)

Notice

Edgar O. Johnston, Superintendence Co., Inc., P.O. Box 9132, Houston, Tex. 77011, has applied for a Referee Certificate on Oil Cake and Meal, Protein Concentrates, Soybean Oil and Tallow and Grease.

Larry Lee Kennon, K-Testing Laboratory, Inc., P.O. Box 2081, Memphis, Tenn. 38102, has applied for a Referee Certificate on Cottonseed, Oil Cake and Meal, Protein Concentrates, Cottonseed Oil, Soybean Oil and Other Fatty Oils.

Deropha J. Porter, Porter Testing Laboratory, 6 S.E. Fourth St., P.O. Box 25303, Oklahoma City, Okla. 73125, has applied for a Referee Certificate on Cottonseed, Peanuts, Oil Cake and Meal and Protein Concentrates.

Interested parties wishing to comment on these certifications should contact Edward R. Hahn, Chairman of the Examination Board, Hahn Laboratories, P.O. Box 1177, Columbia, S.C. 29202.

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EVALUATION OF THE PRINCIPLE EXTRACTION METHODS FROM THE POINT OF VIEW OF INTRADIFFUSION. V.V. Beloborodov et al. *Tr. Vses. Nauchn.-Issled. Inst. Zhirov* 28, 102–8 (1972). The authors have studied continuous and discontinuous processes of diffusion beginning with particles of different form, dimension and internal structure, with different lengths of time for diffusion and for the total process. They found a tendancy toward an increase in the ease of continuous diffusion compared with discontinuous diffusion in proportion to the increase of the coefficient of internal diffusion, with the time of diffusion, and with the decrease of the geometric parameter of the particles. The ease of discontinuous diffusion increases with increase in the number of repeated steps. The yield from De Smet and Lurgi type extractors can be increased by increasing the speed of the carrier element. (Rev. Franc. Corps Gras)

• Biochemistry and Nutrition

SERUM FATTY ACIDS OF WOMEN LIVING IN A SEMI-DESERT CLIMATE. M.A. Kight and E.T. Sheehan (School of Home Economics, Univ. of Arizona, Tucson, Ar.). *J. Am. Dietetic Assoc.* 61, 152–4 (1972). Seven women dietitians living in Tucson served as subjects to learn baseline values for serum lipids as influenced by climate. Self-selected diets to maintain constant weight were followed for 10 weeks. Mean values for total lipids were between 428 and 662 mg/100 ml serum. Fatty acids represented 25-30% of total lipids. Total cholesterol ranged from 147 to 233 mg/100 ml with a mean of 172. The authors suggest that linoleic acid intake greater than 1% of calories might be in excess of needs of women of the age group (18-47 years) and the environmental conditions studied.

PLASMA FREE FATTY ACID TRANSPORT DURING PROLONGED GLUCOSE COMSUMPTION AND ITS RELATIONSHIP TO PLASMA TRIGLYCERIDE FATTY ACIDS IN MAN. P.J. Barter and P.J. Nestel (Dept. of Clinical Sci., John Curtin Schl. of Med. Res., Australian Natl. Univ., Canberra, ACT, Australia 2601). *J. Lipid Res.* 13, 483–90 (1972). Plasma free fatty acid (FFA) transport in human subjects has been studied during the course of prolonged ingestion of different amounts of glucose. Compared with the fasting state, hypocaloric glucose intake resulted in marked suppression of net transport of FFA with no change in (fractional) turnover rate. There was no further suppression of net transport of FFA when the intake was increased to isocaloric or hypercaloric levels, but there was a significant increase in the (fractional) turnover rate, indicating an enhancement of clearance mechanisms. During the 20–24 hr period of fasting after isocaloric glucose consumption, the (fractional) turnover rate quickly fell to that found in the fasting individual, whereas net transport remained suppressed for much longer. This suggested that ingestion of glucose maintains an influence on lipolysis longer than on esterification. During this period of fasting after glucose administration, the contribution of plasma FFA to circulating triglyceride fatty acids increased with time and was positively and significantly correlated with the changes in the net transport of plasma FFA.

PURIFICATION AND PROPERTIES OF CAROTENE 15,15′-DIOXYGENASE OF RABBIT INTESTINE. M.R. Lakshmanan, Hansa Chansang and J.A. Olson (Dept. of Biochem., Faculty of Sci., Mahidol Univ., Rama VI Rd., Bangkok, Thailand). *J. Lipid Res.* 13, 477–82 (1972). Carotene 15,15′-dioxygenase, which oxidizes carotenoids to retinal, has been purified up to 200-fold from rabbit intestine by ammonium sulfate fractionation, heat treatment and acetone precipitation. With β-apo-10′-carotenol as the substrate, the purified enzyme has a pH optimum of 7.8, a K_m of 6.7×10^{-5}M, and a V_{max} at 37C of 9 nmoles of retinal/mg protein/hr. The purified enzyme is inhibited by ferrous ion-chelating agents such as α,α′-dipyridyl and *o*-phenanthroline, and by sulfhydryl-binding agents such as iodoacetamide, N-ethylmaleimide and *p*-chloromercuribenzoate. The latter inhibitory effects are reversed by reduced glutathione. The cleavage of β-apo-10′-carotenol is competitively inhibited by its acetylenic analog, 15,15′-dehydro-β-apo-10′-carotenol. The enzyme is present in the intestinal mucosa of several mammals, the chickens, the tortoise and a freshwater fish, but it is absent from cat intestinal tissue.

BASE EXCHANGE REACTIONS OF THE PHOSPHOLIPIDS IN RAT BRAIN PARTICLES. J.N. Kanfer (Eunice Kennedy Shriver Center for Res. in Mental Retardation, W.E. Fernald State Schl., Waltham, Mass. 02154). *J. Lipid Res.* 13, 468–76 (1972). A

particulate fraction from rat brain catalyzes the incorporation of ^{14}C-choline, ^{14}C-ethanolamine, and L-^{14}C-serine into phosphatidylcholine, phosphatidylethanolamine, and phosphatidylserine, respectively. The reaction appears to be energy-independent since Mg^{2+}, CTP, ATP and NaF have no stimulatory action. The incorporation is inhibited by EDTA and activated by Ca^{2+}. The pH optimum for the incorporation of choline is 9.5, for ethanolamine it is 9.0, and for L-serine it is 8.5. Tris, bicine and imidazole buffers are inhibitory. The incorporations are inhibited by a variety of structurally related alcohols and are stimulated by isoserine (α-hydroxy, β-aminopropionic acid).

QUANTITATIVE ANALYSIS OF UPTAKE OF FREE FATTY ACID BY MAMMALIAN CELLS: LAURIC ACID AND HUMAN ERYTHROCYTES. A.A. Spector, J.D. Ashbrook, Elsa C. Santos and J.E. Fletcher (Depts. of Biochem. and Int. Med., Univ. of Iowa, Iowa City, Iowa 52240). *J. Lipid Res.* 13, 445–51 (1972). Quantitative aspects of the binding of free fatty acid to human erythrocytes were studied by measuring the distribution of various amounts of lauric acid-1-^{14}C between washed human erythrocytes and defatted human plasma albumin. Incubations were done at 37C in an isotonic phosphate-buffered salt solution. Laurate uptake approached a steady state value within 1 hr of incubation over the range of laurate-albumin molar ratios that were tested. Uptake was due primarily to a transfer of laurate from albumin to the cell, not to incorporation of the intact laurate-albumin complex. The fatty acid binding sites of the erythrocyte are located predominantly on or within the cell membrane. The binding model which best fitted the laurate uptake data consisted of two classes of erythrocyte binding sites. This model contains a small number of sites, 2.0×10^{-13} moles/10^6 cells, that have an average apparent association constant of 1.8×10^6 M^{-1} for laurate. Thus, the average strength of these sites is of the same order of magnitude as the stronger laurate binding sites of albumin. The binding model also contains a relatively large number of weaker fatty acid binding sites, 1.3×10^{-11} moles/10^6 cells, that have an average apparent association constant of 1.3×10^4 M^{-1} for laurate. These sites are too weak to bind appreciable amounts of laurate unless the fatty acid-albumin molar ratio is elevated.

HETEROGENEITY OF HUMAN VERY LOW DENSITY LIPOPROTEINS BY GEL FILTRATION CHROMATOGRAPHY. S.H. Quarfordt, Anne Nathans, Marie Dowdee and Helen L. Hilderman (Dept. Med., Duke Univ. Med. Center and the Cooperative Lipid Lab., Vet. Admin. Hosp., Durham, N.C. 27705). *J. Lipid Res.* 13, 435–44 (1972). Very low density lipoproteins were separated by gel filtration on Sepharose 4B. A decrease in mean particle diameter and flotation rate was seen with increasing elution volumes. The smaller lipoproteins had relatively more protein and phospholipid and less triglyceride than the larger ones. No differences were noted in the relative contents of the various phospholipids or partial glycerides between small and large lipoproteins. Fatty acid patterns of triglycerides and cholesteryl esters were also similar for the various lipoproteins. Relatively more lecithin containing linoleoyl acyl groups was found in smaller lipoproteins of some subjects. More of the protein of smaller lipoproteins was apo-LDL protein. Apo-HDL peptide was lost from the very low density lipoprotein as a consequence of the gel filtration.

IDENTIFICATION OF A XYLOSE-CONTAINING CEREBROSIDE IN THE SALT OF THE HERRING GULL. Karl-Anders Karlsson, Bo E. Samuelsson and G.O. Steen (Dept. Med. Biochem., Univ. Göteborg, Fack, 400 33 Göteborg 33, Sweden). *J. Lipid Res.* 13, 169–76 (1972). A pentose-containing cerebroside has been identified in the salt gland of the herring gull, using mass spectrometry of acetyl and trimethylsilyl derivatives. A detailed interpretation of the spectra allowed a conclusion concerning the major long-chain base (the C_{20} homolog of sphingosine) and the major fatty acids (C_{22}-C_{25} 2-hydroxy fatty acids), using reference spectra of synthetic galactosylceramides. A six-membered glycose ring (aldopyranose) was demonstrated by mass spectrometry of the acetyl derivative of periodic acid-oxidized and sodium borodeuteride-reduced pentosylceramide. By gas-liquid chromatography and mass spectrometry of methanolysis products, the pentose was shown to be identical with xylose. The procedures were applied to 25–50 μg of glycolipid.

EFFECTS OF PROSTAGLANDIN E_2 ON RAT SKIN: INHIBITION OF STEROL ESTER BIOSYNTHESIS AND CLEARING OF SCALY LESIONS

Call for Nominations: Award in Lipid Chemistry

Sponsored by Applied Science Laboratories

In April 1964 the Governing Board of the American Oil Chemists' Society established an Award in Lipid Chemistry under the sponsorship of the Applied Science Laboratories Inc., State College, Pa. Previous awards were presented as follows: Erich Baer, August 1964; Ernest Klenk, October 1965; H.E. Carter, October 1966; Sune Bergstrom, October 1967; Daniel Swern, October 1968; H.J. Dutton, October 1969; E.P. Kennedy, September 1970; E.S. Lutton, October 1971; and A.T. James, September 1972.

The award consists of $2500 accompanied by an appropriate certificate. It is now planned that the 10th award will be presented at the AOCS Fall Meeting in Chicago, September 16-19, 1973.

Canvassing Committee Appointees

Policies and Procedures governing the selection of award winners have been set by the AOCS Governing Board. An Award Nomination canvassing Committee has been appointed. Members are: T.J. Weiss, Chairman; C.D. Evans; D. Firestone; G. Fuller; and T.H. Smouse. The function of this committee is to solicit nominations for the 10th award. Selection of the award winner will be made by the Award Committee whose membership will remain anonymous.

Rules

The rules prescribe that nominees shall have been responsible for the accomplishment of original research in lipid chemistry and must have presented the results thereof through publication of technical papers of high quality. Preference will be given to individuals who are actively associated with research in lipid chemistry and who have made fundamental discoveries that affect a large segment of the lipid field. For award purposes, the term "lipid chemistry" is considered to embrace all aspects of the chemistry and biochemistry of fatty acids, of naturally occurring and synthetic compounds and derivatives of fatty acids, and of compounds that are related to fatty acids metabolically, or occur naturally in close association with fatty acids or derivatives thereof. The award will be made without regard for national origin, race, color, creed or sex.

Letters of nomination together with supporting documents must be submitted in octuplicate to T.J. Weiss, Hunt-Wesson Foods, Inc., 1645 W. Valencia Dr., Fullerton, Calif. 92634 before the deadline of April 15, 1973. The supporting documents shall consist of professional biographical data, including a summary of the nominee's research accomplishments, a list of his publications, the degrees he holds, together with the names of the granting institutions, and the positions held during his professional career. There is no requirement that either the nominator or the nominee be a member of the American Oil Chemists' Society. In addition, letters from at least three other scientists supporting the nomination must be submitted in octuplicate.

Remember the DEADLINE, April 15, 1973

IN ESSENTIAL FATTY ACID DEFICIENCY. V.A. Ziboh and S.L. Hsia (Depts. of Dermatol. and Biochem., Univ. of Miami Schl. of Med., Miami, Fl. 33136). *J. Lipid Res.* 13, 458–67 (1972). Severe scaly lesions in the skin, especially in the feet and tail, of the rat were induced by feeding a diet deficient in essential fatty acids (EFA). Analysis of the fatty acids in skin lipids of these EFA-deficient rats showed a marked increase of monoenoic acids (16:1 and 18:1) and eicosatrienoic acid (20:3), with concomitant decreases of dienoic acid (18:2) and tetraenoic acid (20:4). Topical application of prostaglandin E_2 (PGE_2) to the scaly lesions resulted in clearance of the lesions, but did not significantly alter the composition of fatty acids in the skin. Intraperitoneal injection of PGE_2 had no observable effect on the skin lesions. Furthermore, incubation of skin specimens from the EFA-deficient rats with ^{14}C-labeled glucose showed a 4-5 fold increase of incorporation of glucose carbon into lipid fractions, particularly the sterol esters, and a 3–4 fold increase in pentose cycle activity. Addition of PGE_2 to the incubation mixture resulted in approximately 70% inhibition of sterol ester biosynthesis by skin of the EFA-deficient rats. These results suggest that the effects of PGE_2 in clearing the scales may be associated with its inhibitory effect on abnormal sterol esterification in the skin of the EFA-deficient rats.

METABOLISM OF LONG-CHAIN POLYUNSATURATED ALCOHOLS IN MYELINATING BRAIN. Kwei Lee Su and H.H.O. Schmid (Univ. of Minn., The Hormel Inst., Austin, Minn. 55912). *J. Lipid Res.* 13, 452–7 (1972). *cis*-9-Octadecenol-1-^{14}C, *cis,cis*-9,12-octadecadienol-1-^{14}C, and *cis,cis,cis*-9,12,15-octadecatrienol-1-^{14}C were administered intracerebrally to 18-day-old rats. Incorporation of radioactivity into the constituent alkyl, alk-1-enyl and acyl moieties of the ethanolamine phosphatides of brain was determined after 3, 6, 24 and 48 hr. Incorporation of radioactivity from each precursor proceeded at approximately the same rate leading to mono, di- and triunsaturated alkyl and alk-1-enyl glycerols. In addition, the labeled alcohols were found to be oxidized to the corresponding fatty acids which were incorporated into acyl groups; radioactivity derived from di- and triunsaturated alcohols was found mainly in acyl moieties produced through chain elongation and desaturation reactions of di- and triunsaturated fatty acids.

CHOLESTEROL CONTENT OF FOODS. R.M. Feeley, P.E. Criver and B.K. Watt (U.S.D.A., Hyattsville, Md.). *J. Am. Dietetic Assoc.* 61, 134–49 (1972). Data to update and expand the information on cholesterol content of foods previously published in Agriculture Handbook No. 8 are tabulated on three bases: household measure, 100 g edible portion, and edible part of 1 lb food as described. Data for over 240 items are listed. The percentage of fat in the foods is also listed. Sources which formed the basis for the values listed in Handbook No. 8 were re-examined and supplanted or supplemented by additional information published through 1971, and by new unpublished research. Some background information about the values derived for the products in the different food groups is also presented.

SERUM CHOLESTEROL FROM PRE-ADOLESCENCE THROUGH YOUNG ADULTHOOD. E.E. Wein and E.B. Wilcox (Dept. Nutr. and Food Sci., Utah St. Univ., Logan, Ut.). *J. Am. Dietetic Assoc.* 61, 155–8 (1972). Follow-up data on 86 young adults, ages 19–22, who had previously served as subjects during adolescence were obtained on hemoglobin, serum cholesterol, dietary intake and body weight. Serum cholesterol values for most individuals remained similar over the entire 13 year span of the study, although actual values varied greatly by individual. Through adolescence, obese girls had the highest mean serum cholesterol, but obese men had the highest values in young adulthood. Thirty-six per cent had diets high in animal fats, with a larger proportion of men than women reporting high and moderate intakes.

CHANGES IN THE COMPOSITION OF DEPOT FATS AS AFFECTED BY NEW TECHNIQUES OF RAISING ANIMALS. INTRODUCTION. J. Flanzy (I.N.R.A.-C.N.R.Z., 78-Jouy-en-Josas). *Rev. Franc. Corps Gras* 19, 359–64 (1972). The digestion and absorption of dietary lipids are fundamentally different in polygastric animals as compared with monogastrics because of the effects of the rumen in the former case. In monogastrics, the depot fat is a reflection of dietary fat, but in ruminants (e.g., cows, sheep), rumen bacteria hydrogenate the unsaturated dietary fat. In many cases, the depot fat of ruminants fed an oil such as cottonseed oil is more highly saturated than when they are fed their normal diet. Polyunsaturated fatty acids have been successfully incorporated into the depot fats of ruminants provided the dietary oils had been encapsulated with formaldehyde-treated casein. Another method for increasing the unsaturation of body fats involves restrictive feeding practices. Other factors such as location, age, sex and breed can also affect body fats.

(Continued on page 527A)

U of C at Davis hosts Northern California Section

On October 27th the Northern California section was hosted on the University of California campus at Davis, by two of its members, Lloyd Smith and Harold Olcott, in an all day technical session followed by a dinner meeting.

Spouses of members participated in a special program including a tour of old Sacramento, joining their mates for lunch and later for a social hour before dinner.

Bernard Schweigert, Chairman of the Department of Food Science, gave a welcoming address, and papers were given by Paul Knowles, Marie Pangborn, Harold Olcott and Robert Hodges. The subjects included "Current Research on Safflower and Sunflower Oils," "Relating Sensory Evaluations to Physical and Chemical Measurements," "Present Status of Antioxidant Research" and "The Link Between Lipids and Heart Disease." Much lively discussion was enjoyed throughout the day. A particularly pleasant feature of the program was a tour by "Elephant Train" to all parts of the campus. ■

Call for Nominations 1973 Honored Student Awards

Nominations are being solicited for the 1973 AOCS Honored Student Awards. Graduate students at any North American institution of higher learning, in any area of science dealing with fats and lipids, who are doing research toward an advanced degree and who are interested in the areas of science and technology fostered by this Society, are eligible. The student must be a registered graduate student at the time of application. To receive the award he must remain a registered graduate student, and must not have received his degree or begun career employment, prior to the AOCS meeting he is to attend. Selection of awardees is on the basis of educational qualifications and performance.

The awards provide funds equal to travel costs plus $75.00 to permit attendance at a national meeting of the AOCS. In 1973 these meetings will be held April 29-May 3 in New Orleans and September 16-20 in Chicago. Students will be awarded travel to the nearer meeting to allow as many awards as possible from the available funds.

Nomination forms may be obtained from AOCS headquarters (508 S. Sixth, Champaign, Ill. 61820) or from the chairman of the Honored Student Award Committee. Completed nominations should be returned to: Ralph T. Holman, HSA Committee Chairman, The Hormel Institute, University of Minnesota, Austin, Minn. 55912. ■

(Continued from page 514A)

VITAMIN E IN COSMETICS. H. Goldschmeidt. *Soap/Cosmetics/Chemical Specialties* 48(8), 40–2 (1972). The author discusses some of the biochemical functions of vitamin E, especially those which may ameliorate some of the effects of aging. Some potential uses in cosmetics are mentioned, and a formula for a skin cream containing vitamin E is given.

FACTORS AFFECTING THE COMPOSITION OF DEPOT LIPIDS IN SWINE. Y. Henry (I.N.R.A.-C.N.R.Z., 78-Jouy-en-Josas). *Rev. Franc. Corps Gras* 19, 367–76 (1972). In swine, depot lipids are affected both qualitatively and quantitatively by nutritional, genetic and environmental factors. The nutritional factors include the specific influence of dietary lipids, the nature of dietary cereals, especially corn and oilseed presscake, the level of feeding and the use of dietary additives, in particular copper. Swine are being bred to produce less fat per animal with higher levels of unsaturation. Ambient temperature affects body fat composition, with greater levels of unsaturation being produced at lower temperatures. The level of external light and the degree of crowding have negligible effects.

EFFECT OF HORMONES ON MEAT PRODUCTION AND CARCASS QUALITY. ELABORATION AND ROLE OF FATTY RESERVES. A. Vezinhet (Center for Agronomic Res. at Montpellier). *Rev. Franc. Corps Gras* 19, 447–53 (1972). The history of the use of hormones to improve meat production is retraced. Elaboration of adipose reserves results from two competitive phenomena; lipogenesis and lypolysis of cellular triglycerides. There is a relationship between the levels of circulating hormones and the metabolic events which they influence. It should be possible in the future to produce carcasses having the fat levels desired by consumers through the use of hormones.

EFFECT OF CASTRATION AND SLAUGHTERING STAGE OF THE BOAR ON THE COMPOSITION OF DEPOT FATS AND THEIR SEX ODOR. B. Desmoulin (I.N.R.A.-C.N.R.Z., 78-Jouy-en-Josas). *Rev. Franc. Corps Gras* 19, 437–45 (1972). Early castration of male pigs has been traditional. However, it reduces the quantity of meat in the slaughtered animal and increases the amount of depot fat. Data are presented to show that carcass quality can be improved by either postponing castration or slaughtering the animals at 80 kg instead of 100 kg live weight. In addition, the amount of off-odor detected in the heated fat or tasted in the meat is reduced.

EFFECT OF THE NATURE OF THE FATS INCORPORATED IN MILK REPLACERS ON THE COMPOSITION OF DEPOT FATS IN THE MARKET LAMB. M. Theriez and B. Aurousseau (C.R.Z.V., 63-Thiex). *Rev. Franc. Corps Gras* 19, 431–6 (1972). Four different fats were used. They were coconut oil, tallow, palm oil, and a control group nursed by their mothers. The lambs were weaned at 45 days and thereafter received the same concentrated feed. Of these four groups, the best weight gains were observed in the group fed coconut oil, and this finding would permit slaughter at a younger age. In addition, the subcutaneous fat depots of the coconut oil fed group were closest to those of the control in terms of the total content of saturated fatty acids. Weight gains with tallow were below those produced by mother's milk, and the depot fats contained less total saturation. Palm oil produced even poorer weight gains, and the fats contained even less total saturation.

EVALUATION OF METHODS FOR DETERMINING AFLATOXIN B_1 IN PEANUT PRESSCAKE. S. Kmieciah and H. Niewiadomski (Ecole Polytechnique, Gdansk). *Rev. Franc. Corps Gras* 19, 455–60 (1972). Results given by A.O.A.C. methods (Celite and Best Foods) based on short time extraction with aqueous methanol are about 50% lower than those given by Dutch method RIV and methods using chloroform (TPI method according to Lee and the one in use in Poland). The lower recovery by the A.O.A.C. methods may be explained by a solvent system which is inappropriate for extraction of samples of low oil content (0.5–1%). The TPI method has been judged the best for peanut meals. The best separation of aflatoxins on chromatographic plates has been obtained with chloroform-acetone (9:1). Variance and confidence limits have been calculated for visual measures of fluorescence on chromatographic plates.

THIAMIN DEFICIENCY. EFFECT OF FATTY ACIDS ON GLUCOSE SYNTHESIS IN KIDNEY CORTEX SLICES FROM THIAMIN-DEFICIENT RATS. R.J. Paquet and M.A. Merlman (Dept. of Biochem., Univ. Nebraska College of Med., Omaha, Neb. 68105). *J. Biol. Chem.* 247, 4905–7 (1972). Glucose synthesis from pyruvate or lactate is significantly decreased in kidney slices from thiamin-deficient rats. The addition of octanoate or preliminary incubation of the tissue with thiamin relieved the impaired rate of glucose synthesis. Moreover, oral administration or intraperitoneal injection of octanoate significantly increased glucose synthesis by kidney slices from both pair-fed control and thiamin-deficient rats.

PROOF OF STRUCTURE OF STEROID CARBOXYLIC ACIDS IN A CALIFORNIA PETROLEUM BY DEUTERIUM LABELING, SYNTHESIS, AND MASS SPECTROMETRY. W.K. Seifert, E.J. Gallegos and R.M. Teeter (Chevron Oil Field Res. Company and Chevron Res. Company, Richmond, Cal. 94802). *J. Amer. Chem. Soc.* 94, 5880–7 (1972). Discovery and proof of structure of four stereoisomeric C_{22}–C_{24} steroid acids in virgin petroleum in admixture with thousands of C_{18}–C_{31} petroleum carboxylic acids are described. The position of the carboxys groups was fixed *via* reduction to alcohols and tosylation and reduction with lithium aluminum deuteride. The identity of synthetic deuterium-labeled and unlabeled 20-methyl-5α-pregnanes and 5α- and 5β-cholanes with the derivatives of the natural products is demonstrated by gas chromatography (gc) combined with mass spectrometry (ms). Final proof for the presence of two stereoisomers of 5α-pregnane-20ζ-carboxylic acid and of 5α- and 5β-cholanic acid was obtained by gc-ms of natural product and synthetic perfluoroalcohol esters. Both animal sources (bile acids) and plant sources (i.e., unsaturated sterols) are proposed to explain the presence of the steroid acids in their observed ratios.

EFFECT OF DIETARY LIPID ON VARIOUS LIVER ENZYMES AND ON IN VIVO REMOVAL OF 3,4-DIMETHOXYPHENYLETHYLAMINE, 5-HYDROXYTRYPTOPHAN IN RATS. B. Century (L.B. Mendel Res. Lab., Elgin State Hosp., Elgin, Ill. 60120). *J. Nutr.* 102, 1067–78 (1972). Feeding various dietary lipids to rats resulted in a 10-fold range in liver glucose-6-phosphate dehydrogenase activities.. Highest rates were observed in rats fed beef fat or low levels of corn oil, intermediate activities were found in corn oil-fed rats, and lowest activities in animals fed menhaden or linseed oils. Similar but lesser differences in NADP-linked malic enzyme activities were also observed. These dietary lipid effects were related to the fatty acid composition of the lipid ingested and not to the dietary level of total lipid. Isocitric dehydrogenase (NADP-linked) and malic and lactic dehydrogenases (NAD-linked) were not affected by the dietary lipid. Liver tyrosine aminotransferase activities were lower in rats fed linseed or menhaden oils, in comparison with animals fed low polyunsaturated fatty acid-containing diets. In vivo utilization of injected dimethoxyphenylethylamine in rat liver was more rapid in animals fed high polyunsaturated fatty acid-containing diets, in comparison with rats fed 0.5% corn oil, 7% beef fat or 6.7% beef fat + 0.3% corn oil. No differences were found in the in vivo decarboxylation of *dl*-HTP regardless of the dietary lipid or the dose level of either amine precursor.

EFFECTS OF DIETARY CHOLESTEROL ON THE ACTIVITY OF SOME CARBOHYDRATE METABOLISM ENZYMES IN THE LIVER OF RATS. A.C. Tsai and I.A. Dyer (Washington State Univ., Pullman, Wash. 99163). *J. Nutr.* 102, 1039–44 (1972). The effect of cholesterolcholic acid feeding on the activity of several carbohydrate metabolism enzymes in the liver of rats was studied. Glucose-6-phosphate dehydrogenase, NADP-malic enzyme, hexokinase, glucokinase and pyruvate kinase activities were determined in the hepatic tissue from rats which were fed the following: a) sucrose diets containing 0 or 1% cholesterol + 0.5% cholic acid for 12 weeks and then killed while being fed ad libitum or refed after a period of starvation; b) sucrose or starch diets with or without cholesterol-cholic acid supplementation for 12 weeks and then killed in a fed state; and c) sucrose diets with or without cholesterol-cholic acid supplementation for 12 days and killed in a fed state. The results show that liver glucokinase, glucose-6-phosphate dehydrogenase and NADP-malic enzyme activities were significantly reduced by cholesterol-cholic acid feeding under all of the conditions tested. Hexokinase and pyruvate kinase were not significantly changed except when the rats were refed after a period of starvation. A dietary regimen of fasting and refeeding elevated the activity of these two enzymes.

The alterations in enzyme activities are interpreted as regulatory effects exerted by dietary cholesterol-cholic acid supplementation.

EFFECT OF ESSENTIAL FATTY ACIDS ON THE FATTY ACID SYNTHESIS IN EPIDIDYMAL FAT CELLS OF THE RAT. Julie T. Du and F.A. Kruger (Dept. of Physiological Chem., College of Med., Ohio State Univ., Columbus, Oh. 43210). *J. Nutr.* 102, 1033–8 (1972). The effect of dietary essential fatty acids (EFA) on lipogenesis in epididymal fat cells from glucose was investigated in an in vitro system. Adipocytes from rats fed a fat-free diet compared to those on a 5% corn oil diet incorporated eight to ten times more radioactivity from uniformly labeled glucose into fatty acids and also twofold more radioactivity into carbon dioxide. The rate of ^{14}C-glycerol synthesis in adipocytes was the same in the two groups of rats. Only diets containing linoleate in the form of linoleate or corn oil markedly suppressed hyperlipogenic activity, and diets containing methyl oleate or hydrogenated coconut oil had little effect. These results indicate that dietary linoleate plays a regulatory role in fatty acid synthesis using glucose as the substrate.

A COMPARISON OF THE TOXICITY OF ERGOCALCIFEROL AND CHOLECALCIFEROL IN RHESUS MONKEYS (MACACA MULATTA). R.D. Hunt, F.G. Garcia and R.J. Walsh (New England Regional Primate Res. Center, Harvard Med. Schl., Southborough, Mass. 01772). *J. Nutr.* 102, 975–86 (1972). Daily oral doses of 50,000, 100,000 and 200,000 IU of ergocalciferol and cholecalciferol in rhesus monkeys (*Macaca mulatta*) demonstrated that cholecalciferol was significantly more toxic than ergocalciferol in this species. All animals given cholecalciferol developed hypercalcemia, died and had extensive soft tissue mineralization. Hypercalcemia occurred in ergocalciferol-supplemented monkeys, but the animals survived and comparable soft tissue mineralization was not evident after sacrifice. A unique feature of the lesion of cholecalciferol toxicity was the deposition of crystals resembling urates with an associated granulomatous reaction. A relationship to relative vitamin A deficiency was suggested.

PREPARATION AND PROPERTIES OF NEXUSES AND LIPID-ENRICHED VESICLES FROM MOUSE LIVER PLASMA MEMBRANES. W.H. Evans and J.W. Gurd (Natl. Inst. for Med. Res., Mill Hill, London NW7 1AA, U.K.). *Biochem. J.* 128, 691–700 (1972). Extraction of mouse liver plasma membranes with 4% (w/v) N-laurylsarcosinate-tris buffer, pH 7.8, solubilized 80–90% of the protein and 60% of the 5′-nucleotidase activity. The membrane residue remaining after extraction was resolved on sucrose gradients into two fractions; a vesicular membrane fraction and a fraction characterized by the presence of large numbers of nexuses in an amorphous background. The vesicular fraction had a phospholipid/protein weight ratio of 7:1, it contained most of the plasma-membrane glycolipids, and polyacrylamide-gel electrophoresis indicated the presence of only five to eight proteins, including two or three glycoproteins. The 5′-nucleotidase and leucine naphthylamidase specific activities were 23- and 6-fold higher respectively than in the plasma membranes.

^{13}C AND ^{1}H NUCLEAR MAGNETIC RESONANCE RELAXATION MEASUREMENTS OF THE LIPIDS OF SARCOPLASMIC RETICULUM MEMBRANES. J.D. Robinson, N.J.M. Birdsall, A.G. Lee and J.C. Metcalfe (Med. Res. Council, Molecular Pharmacology Unit, Med. Schl., Hills Road, Cambridge). *Biochemistry* 11, 2903–9 (1972). ^{13}C nuclear magnetic resonance spectra of sarcoplasmic reticular membranes yield several well-defined resonances from the membrane lipids, identified as the terminal methyl, $(CH_2)_n$, and olefinic carbons of the fatty acid chains and the N^+Me_3 of the choline head group of lecithins. The spectra correspond in intensity to 60–90% of the membrane lipids which is substantially more than is observed in the sharp components of the ^{1}H spectrum. An independent estimate of the extent of the bilayer in the membranes from measurement of the binding of the spin-label 2,2,6,6-tetramethylpiperidine-1-oxyl is consistent with the ^{13}C intensity and relaxation data.

KINETIC STUDIES ON SUBSTRATE-ENZYME INTERACTION IN THE ADRENAL CHOLESTEROL SIDE-CHAIN CLEAVAGE SYSTEM. S. Burstein, Jane Dinh, Nana Co, M. Gut, H. Schleyer, D.Y. Cooper and O. Rosenthal (Div. of Steroid Chem., Inst. for Muscle Disease, New York, N.Y. 10021). *Biochemistry* 11, 2883–91 (1972). A study was made of the kinetics of the oxidative metabolism of (20S)-20-hydroxycholesterol, (22R)-22-hydroxycholesterol and (20R,22R)-20,22-dihydroxycholesterol with adrenocortical heme protein P-450 preparations under various incubation conditions at relatively low substrate concentrations. When the substrate was added last to the complete system, first-order kinetics (within the experimental error) were observed until approximately 10% of the substrate was left; at longer times a decrease in the rate was seen.

INSULIN INSENSITIVITY OF LARGE FAT CELLS. J.N. Livingston, P. Cuatrecasas and D.H. Lockwood (Depts. of Med. and Pharmacology and Exptl. Therapeutics, Johns Hopkins Univ. Schl. of Med., Baltimore, Md. 21205). *Science* 177, 626–8 (1972). Large insulin-insensitive adipocytes from adult rats have normal binding capacities and affinities for insulin. Diminished insulin-like responses to spermine and reduced rates of glucose oxidation are also evident in these cells. The results indicate that the defect responsible for this insulin-resistant state exists in a step subsequent to insulin binding, possibly in transmission of the insulin-receptor "signal" since insensitivity occurs under conditions where glucose transport and oxidative processes are not apparently impaired.

CHOLESTEROL SOLUBILITY IN LECITHIN-BILE SALT SYSTEMS. D. Mufson, Krisna Meksuwan, J.E. Zarembo and L.J. Ravin (Smith Kline and French Labs., Philadelphia, Pa. 19101). *Science* 177, 701 (1972). The method of sample preparation can markedly influence the rate of dissolution and attainment of supersaturated states of cholesterol. The equilibrium solubility of cholesterol, studied as a function of its physical state in a model bile system, is almost half that of previously accepted values. Slow attainment of the equilibrium state may have acted to bias previous studies. Extrapolation of our data to the clinical situation reveals that many persons considered normal by present standards actually possess bile that is supersaturated with respect to cholesterol and are thus potential gallstone formers.

RING HYDROXYLATION OF DI-T-BUTYLHYDROXYTOLUENE BY RAT LIVER MICROSOMAL PREPARATIONS. Y. Shaw and C. Chen (Dept. of Biochem., Northwestern Univ. Med. and Dental Schls., Chicago, Ill. 60611). *Biochem. J.* 128, 1285–91 (1972). 3,5-Di-t-butyl-hydroxytoluene (compound I) was converted into 4-hydroperoxy-4-methyl-2,6-di-t-butylcyclohexa-2,5-dienone (compound II), 4-hydroxy-4-methyl-2,6-di-t-butylcyclohexa-2,5-dienone (compound III) and 2,6-di-t-butyl-4-hydroxymethylphenol (compound IV) by rat liver microsomal preparations in the presence of NADPH and air. The oxidation of com-

pound (I) by *m*-chloroperbenzoic acid also produced the same compounds. These results suggest that hydroperoxide can be an intermediate in aromatic hydroxylation and that biological oxygenations resemble per-acid reactions.

FATTY ACID BIOSYNTHESIS IN RABBIT MAMMARY GLAND DURING PREGNANCY AND EARLY LACTATION. C.R. Strong and R. Dils (Dept. of Biochem., The Med. Schl., Univ. of Nottingham, Nottingham NG7 2RD, U.K.). *Biochem. J.* 128, 1303–9 (1972). The pattern of fatty acids synthesized by mammary-gland explants from rabbits during pregnancy and early lactation has been studied. From day 12 to day 18 of pregnancy, long-chain ($C_{14:0}$–$C_{18:1}$) fatty acids were the major products. From day 18 to day 21 of pregnancy there was an increase of up to 12-fold in the rate of fatty acid synthesis per unit wet weight of tissue that was almost exclusively caused by the synthesis of octanoic fatty acid and decanoic fatty acid, which are characteristic of rabbit milk. These medium-chain fatty acids were mainly incorporated into triglycerides. From day 22 to day 27 of pregnancy there was little change in the rate of fatty acid synthesis and the proportions of fatty acids synthesized were essentially the same as those synthesized by the lactating gland, i.e. 80–90% octanoic acid plus decanoic acid. About 2–4 days before parturition a second lipogenic stimulus occurred, although the pattern of fatty acids synthesized did not change.

ADRENOCORTICOTROPIN. SYNTHESIS OF [6-PHENYLALANINE]-α^{1-19}-ADRENOCORTICOTROPIC HORMONE AND ITS STEROIDOGENIC, MELANOCYTE-STIMULATING AND LIPOLYTIC ACTIVITY. J. Blake and C.H. Li (Hormone Res. Lab., Univ. of Cal., San Francisco, Cal. 94122). *Biochemistry* 11, 3459–61 (1972). [6-Phenylalanine]-α^{1-19}-adrenocorticotropic hormone has been synthesized by the solid-phase method. A comparison of its steroidogenic, melanocyte-stimulating and lipolytic activity to that of α^{1-19}-adrenocorticotropic hormone indicates that the replacement of histidine by phenylalanine results in a marked lowering of the biological activity.

ACYL CARRIER PROTEIN. XVII. PURIFICATION AND PROPERTIES OF β-HYDROXYACYL ACYL CARRIER PROTEIN DEHYDRASE. Claire H. Birge and P.R. Vagelos (Wash. Univ. Schl. of Med., Dept. of Biol. Chem., St. Louis, Mo. 63110). *J. Biol. Chem.* 247, 4930–8 (1972). β-Hydroxyacyl acyl carrier protein (ACP) dehydrase has been purified 2900-fold from extracts of *Escherichia coli*. The enzyme catalyzes the reversible dehydration of β-hydroxyacyl-ACP thioesters to yield specifically trans-2-enoyl-ACP products. It is active with trans-2-enoyl-ACP thioesters of chain lengths from 4 through 16 carbon atoms. The enzyme catalyzes the hydration of cis-5-trans-2-dodecadienoyl-ACP, an intermediate in unsaturated fatty acid synthesis, as well as the trans-2-enoyl-ACP substrates that are intermediates in saturated fatty acid synthesis. Thus this enzyme can function in the synthesis of both saturated and unsaturated fatty acids. The lowest enzyme activity was noted with trans-2-decenoyl-ACP. The relevance of this finding with respect to the activity of β-hydroxydecanoyl thioester dehydrase, which specifically catalyzes the conversion of β-hydroxydecanoyl-ACP to cis-3-decenoyl-ACP is discussed as a possible factor in control of saturated versus unsaturated fatty acid synthesis. Attempts to separate or to show distinguishing characteristics of β-hydroxyacyl-ACP dehydrase activities with short, medium or long chain substrates were unsuccessful, and these activities are therefore attributed to a single enzyme.

DIFFERENCES IN ANTIPODAL SPECIFICITY IN THE BINDING OF STEROIDS TO SERUM PROTEINS. Nora Varsano-Aharon and S. Ulick (Vet. Admin. Hosp., Bronx, N.Y. 10468). *J. Biol. Chem.* 247, 4939–43 (1972). Differences in the binding of *d* and *l*-steroids to serum proteins were determined by a method which did not require a pure sample of each antipode. A known mixture of tritium-labeled racemic steroid and *d*-^{14}C-labeled steroid was added to the protein and differences in the binding of *d* and *l* forms deduced from changes in ^{3}H:^{14}C ratio after separation of bound and unbound steroid fractions by gel filtration or equilibrium dialysis. The *d*- but not the *l*-enantiomers of progesterone and aldosterone were bound to corticosteroid-binding globulin. Similarly, only *d*-aldosterone was bound to an antiserum prepared against *d*-aldosterone hapten. In contrast, bovine and human serum albumin exhibited no antipodal preference, but bound equally both enantiomers of progesterone and aldosterone.

POLYPEPTIDE HORMONE INTERACTION. II. GLUCAGON BINDING TO LYSOLECITHIN. A.B. Schneider and H. Edelhoch (Clin. Endocrinology Branch, Natl. Inst. of Arthritis and Metabolic Diseases, Natl. Inst. of Health, Bethesda, Md. 20014). *J. Biol. Chem.* 247, 4986–91 (1972). The binding of glucagon to lysolecithin has been evaluated by fluorescence techniques. Fluorescence spectra and polarization measurements indicate that the hormone is bound to lysolecithin micelles. Since the rate of micelle dissociation below its critical micelle concentration is rather slow, binding is observed at all concentrations of lysolecithin. By similar criteria, the polypeptide hormone calcitonin, but not adrenocorticotropic hormone, was bound to lysolecithin micelles. Phosphatidyl serine showed very weak binding and lecithin no binding of glucagon. The colloidal properties of lysolecithin were evaluated from its interactions with two fluorescent dyes, *i.e.* eosin and 8-anilino-1-naphthalene sulfonate.

III. CONFORMATIONAL CHANGES OF GLUCAGON BOUND LYSOLECITHIN. *Ibid.*, 4992–5. The effect of lysolecithin micelles on the optical activity of the peptide group and the absorption of the aromatic groups of glucagon has been evaluated. The changes in these parameters suggest that conformational changes take place when glucagon is bound. Deshistidyl glucagon, but not smaller fragments, is bound to lysolecithin.

METABOLIC PATHWAYS IN TETRAHYMENA. ESTIMATION OF RATES OF THE TRICARBOXYLIC ACID CYCLE, GLYOXYLATE CYCLE, LIPID SYNTHESIS AND RELATED PATHWAYS BY USE OF MULTIPLE LABELED SUBSTRATES. R.J. Connett and J.J. Blum (Dept. of Physiology and Pharmacol., Duke Univ. Med. Center, Durham, N.C. 27710). *J. Biol. Chem.* 247, 5199–5209 (1972). The incorporation of ^{14}C into CO_2 from ten labeled substrates: [1-^{14}C]- and [2-^{14}C]- acetate; [1-^{14}C]-, [3,4-^{14}C]-, and [5-^{14}C]glutamate; [1-^{14}C]-, [4-^{14}C]-, and [U-^{14}C]aspartate, [1-^{14}C]- and [U-^{14}C] alanine was measured under steady state conditions in *Tetrahymena pyriformis* cultures at three different stages of growth. The rate of oxygen consumption and the incorporation of ^{14}C from [1-^{14}C]- and [2-^{14}C]acetate into lipid and glycogen were measured under the same conditions. An isotopic and metabolic steady state model of carbon flow through the tricarboxylic acid cycle, the glyoxylate cycle, and the gluconeogenic and lipogenic pathways in *Tetrahymena* was developed. Fitting of the model to experimental data requires separation of mitochondrial and extramitochondrial pools of aspartate, oxalacetate, malate and acetyl-CoA, as well as two pools of phosphoenolpyruvate. These structural requirements, necessary to fit the experimental data, were independently justified by information on enzyme compartmentation. By using the data in conjunction with the model, quantitative estimates of the flux rates through the major pathways of intermediary metabolism were obtained. The pattern of intracellular flow of metabolites underlying the observed changes in glycogen content and lipid content with culture age are analyzed.

THE REGULATION OF GLYCERIDE SYNTHESIS IN ISOLATED WHITE-FAT CELLS. THE EFFECTS OF PALMITATE AND LIPOLYTIC AGENTS. E.D. Saggerson (Dept. of Biochem., Univ. College London,

Gower St., London WC1E 6BT, U.K.). *Biochem. J.* 128, 1057–67 (1972). Palmitate (0.5 mM) stimulated incorporation of [U-^{14}C]glucose into glyceride glycerol and fatty acids in normal fat cells in a manner dependent upon the glucose concentration. In the presence of insulin the incorporation of 5 mM-glucose into glyceride fatty acids was increased by concentrations of palmitate, adrenaline and 6-N-2′-O-dibutyryladenosine 3′:5′-cyclic monophosphate up to 0.5 mM, 0.5 μM and 0.5 mM respectively. It is suggested that low concentrations of free fatty acids stimulate fatty acid synthesis from glucose by increasing the utilization of ATP and cytoplasmic NADH for esterification of these free fatty acids. When esterification of free fatty acids does not keep pace with their provision, inhibition of fatty acid synthesis occurs. Provision of free fatty acids far in excess of the esterification capacity of the cells leads to uncoupling of oxidative phosphorylation and a secondary stimulation of fatty acid synthesis from glucose.

• Drying Oils and Paints

CURING OF EPOXY RESINS WITH MALEINISED LINSEED OIL. M.P. Chagin and O.V. Bogdanova. *Lakokras. Mat.* 1971, No 6, 21–3. Curing of epoxy resin E-41 with maleinised linseed oil containing 25% maleinised oil optionally neutralised with NH_3 and used in conjunction with metal driers has been investigated. The films were cured for 15–120 min. at 150, 170 and 180C. and the dependence of physicomechanical characteristics on curing agent and curing conditions has been evaluated. Good results are obtained and the cost of coating compositions is reduced. (World Surface Coatings Abs. No. 361)

OXIDATION OF CASTOR OIL AND METHYL RICINOLEATE BY MOLECULAR OXYGEN. S.V. Anantakrishnan, N. Gopalakrishnan and A. Sabesan. *Indian J. Chem.* 9 No 11, 1304–5 (1971). Chromatographically purified castor oil and methyl ricinoleate do not absorb any oxygen and give back the starting materials, in contrast to the ordinary samples which undergo oxidation at the double bond. This is ascribed to the fact that the purified sample is free from transition metals like Fe, Cu and Mn. The presence of these metals in the unpurified sample, as revealed by neutron activation analysis, initiates autoxidation in castor oil and methyl ricinoleate. (World Surface Coatings Abs. No. 361)

AQUEOUS DISPERSION OF A PRODUCT FORMED BY HEATING A FATTY ACID ESTER ADDUCT WITH A POLYAMIDE. J.M. Keyman and A.E. Maschke (Mobil Oil Corp.). *U.S. 3,692,714.* A drying oil fatty acid ester, and especially an epoxy resin ester, is adducted with an unsaturated polycarboxylic acid, such as maleic anhydride, to provide a resin. The resin is cooked with another resin having amine and acid functionality such as a polyamide having terminal amino and carboxylic acid groups. This latter resin may be made by the self-condensation of an amino acid. The reaction product can be dispersed in water with the aid of a base and deposited at the anode by a unidirectional current.

MODIFIED NON-GELLED ALKYD RESIN COMPOSITION. W.J. Blank and J.N. Koral (American Cyanamid). *U.S. 3,692,717.* The composition comprises a mixture of the esterification product of an oxatetracyclo undecanol and an unsaturated higher fatty acid, followed by α-addition or Diels-Alder reaction with an α,β-ethylenically unsaturated dicarboxylic acid and further modified by a mixture of a polymerizable styrene and an α,β-ethylenically unsaturated monocarboxylic acid.

• Detergents

CORROSION OF ON-GLAZE COLORS BY ALKALINE DETERGENT COMPONENTS. M. Hellsten (MoDoKemi AB, Stenungsund, Sweden). *Tenside* 9(4), 178–82 (1972). Pieces of china with twelve different on-glaze colors were treated with solutions containing Na_2SiO_3 (I), Na_2CO_3 (II), $Na_5P_3O_{10}$ (III) and nonylphenol-polyglycol ether (IV) at 60 and 70C. I and IV had little effect on the colors, but II and III had a strong corrosive action. The higher temperature increased corrosion only when II was present. Two types of gold colors were tested with I, II and III, and also $NaBO_3 \cdot 4\ H_2O$ (V) and NaClO (VI) at 70C. III reduced corrosion when combined with I. VI was more corrosive than V. The colors were analyzed spectrometrically, and a subsequent multiple regression analysis of these values, combined with the corrosion results, gave the equation

$$\text{Corrosion (points)} = 1.36 + 0.008(\%\text{Pb}-28.1) + 0.065(\%\text{Fe}-1.6) + 0.21(\%\text{Cr}-0.72).$$

The corrosive effects of II and III, as well as the action of fatty acid soaps, mono-, di- and polyphosphates, may be explained by the formation of lead complexes or sparingly soluble lead compounds. Small amounts of Cr in the glaze seem to increase the corrosion rate, but in the case of Fe the effect is not proven.

THE DETERMINATION OF NONIONIC SURFACTANTS IN RIVER AND WASTE WATER. R. Wickbold (Chem. Werke Hüls AG, Marl). *Tenside* 9(4), 173–7 (1972). Determination of small concentrations of nonionic surfactant by precipitation with Dragendorff's reagent has been improved on by a novel isolation of the surfactants and potentiometric titration of the bismuth contained in the precipitate. Efficiency of the method was demonstrated when used for analyzing river water and in biodegradability tests.

MATHEMATICAL INVESTIGATION ON THE GRADIENT PLATE METHOD. H. Bellinger (Microbiological Lab., Henkel & Cie GmbH, Dusseldorf). *Tenside* 9(4), 190–4 (1972). Using a mathematical model, the author carried out tests to find whether the assumption of a linear concentration gradient is justified in the gradient plate method for the determination of microbiostatistical limit inhibiting concentrations. It is proved that this assumption holds true only under certain conditions rather than generally.

DRY PATCH FORMATION INDUCED BY HEAT TRANSFER WHEN A SURFACTANT FILM FLOWS DOWN A VERTICAL SURFACE. A.B. Ponter, A.P. Boyes and S. Durepos (Dept. Chem. Eng., Univ. of New Brunswick, Fredericton, Canada). *Tenside* 9(4), 182–4 (1972). Minimum wetting rates necessary to maintain discrete films of water and aqueous valeric acid solutions flowing down a vertical copper surface are reported for the condition when heat is being transferred from the solid wall to the film. Results suggest the addition of surfactant complicates the phenomenon of film rupture by inhibiting wave development and by retarding the film surface velocity. The interaction of these terms produces a discontinuity in the minimum wetting rate-concentration relationship.

DETERGENT POWDERS VIA NEW PROCESS. A. Davidson (M. Ballestra, S.p.a., Milan, Italy). *Soap/Cosmetics/Chemical Specialties* 48(8), 27–30, 44–6 (1972). The "Combex" process is described in detail. The basic part of the process consists of a special mixing/dispersing unit in which a powder containing active ingredients which are difficult to spray dry is produced. This relatively high density powder is blended with beads coming from the spray drying plant. Advantages of the process are that it permits much greater latitude with regard to the formulations which can be made and it permits close control of product density. Air pollution problems are minimized with the system.

LOW FOAMING RINSING, WASHING, AND CLEANING COMPOSITIONS. H. Schnegelberger and T. Altenschopfer (Henkel & Cie). *U.S. 3,679,589.* The compositions consist of a surface active

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agent, builder salts, and at least one alkoxylated melamine having a molecular weight of 700–20,000. The weight ratio of alkoxylated melamine to other components ranges from 1:3 to 1:999.

LOW FOAMING HARD SURFACE CLEANERS. H.J. Aubert and E.C. Gemperle (Procter & Gamble). *U.S. 3,679,608.* The cleaners comprise a foaming surfactant, a sequestrant builder, and, as a suds suppressor, the condensation product of a straight chain random secondary alcohol with 0 to about 3 moles of ethylene oxide.

CLEANING AND CONDITIONING CONCENTRATE. C.S. Castner (Schuyler Development Corp.). *U.S. 3,679,609.* The composition is made up of lower alcohols, 30–40 parts; a selected glycol, 14–18 parts; methyl Cellosolve, 7–11 parts; ammonia, 3–6 parts; higher alcohols and ethers, 2–4 parts; detergents, 1.5–2.5 parts; alkaline earth borates, pyrophosphates, orthophosphates or orthosilicates, 0.5–1.5 parts; ethylene diamine tetra-acetate, 0.25–0.75 parts; sodium or potassium hydroxide, 0.1–0.5 parts; and water, 20–30 parts. The compositions are effective cleansers and conditioners for a variety of hard surface finished, soft goods, fiber, and fabric materials.

DETERGENT FORMULATIONS. R.D. Harken (Monsanto). *U.S. 3,689,418.* Detergent formulations comprising tetra alkali metal ethene tetracarboxylate as a detergency builder in combination with conventional surfactants provides effective cleaning action.

TOILET BAR. M.H. Yueh (General Mills). *U.S. 3,689,419.* A soap or toilet bar and a method for preparing and using the bar are disclosed. The bar contains a nucleoprotein material.

DETERGENT COMPOSITIONS CONTAINING A SYNERGISTIC MIXTURE OF PVP AND PVA. R.P. Berni and R.A. Grifo (GAF Corp.). *U.S. 3,689,435.* The mixture is a soil anti-redeposition agent.

WASHING AGENTS CONTAINING A TEXTILE SOFTENER. M. Berg, W. Fries and A. Lohr (Henkel & Cie). *U.S. 3,689,424.* The compositions contain 5–100% of surface-active agents and 95–0% of other customary components of detergents. The surface-active agents consist of 20–90% of customary compounds utilizable in neutral to alkaline textile washing baths and 80–10% of a textile softener consisting of 100–20% of a fatty acid hydroxyalkylpolyamine condensation product of glyceride of higher fatty acids with a hydroxyalkyl-alkylpolyamine. The condensation product contains 5–40% of fatty acid partial glycerides. The remainder of the softener is quaternary ammonium compounds.

DETERGENT COMPOSITIONS CONTAINING OPTICAL BRIGHTENING AGENTS. N.N. Crounse (Sterling Drug Inc.). *U.S. 3,689,425.* 2-Benzoxazol-6-yl-2H-naphtho(1,2-d) triazoles and similar compounds having attached at the 2-position of the benzoxazol-6-yl ring a substituent having 8–18 carbon atoms and 4–8 conjugated double bonds are optical whitening and brightening agents having particularly desirable shades of fluorescence.

PHOSPHONATE DETERGENT BUILDERS. J.K. Stamm, E.R. Loder, C.A. Brungs and H. Kerst. *U.S. 3,689,436.* The compositions consist of amino tri(lower alkylidenephosphonic acids) and a member of the group consisting of (1) a water soluble acrylic or methacrylic polymer; (2) a water soluble organic complexing polymer; and (3) nitrilotriacetic acid. Also disclosed are methods for enhancing the building activity of the compounds in hard water cleaning solutions.

MALLEABLE DETERGENT PRODUCT. J.H. McLaughlin (Center for New Product Development). *U.S. 3,689,437.* Detergent products suitable for molding into various shapes are prepared from a mixture comprising (A) 20–55% of a water soluble salt of a fatty acid ester and isothionic acid, (B) 10–35% water, (C) 4–10% gelatin, (D) mineral oil or paraffin or mixtures of the two. The combined weight of (C) and (D) is 12–33%. The remaining 0–50% consists of filler material.

OLEFIN SULFONATE DETERGENT COMPOSITION. E. Ichiki, K. Iida, Y. Inoue and K. Uyeo (Sumitomo Chemical Co.). *U.S. 3,691,108.* The active ingredients in the composition are a sulfonate of a straight chain α-olefin containing 1.05–1.7 bonded SO_3 radicals and a sulfonate of a vinylidene olefin containing the same number of bonded SO_3 radicals. The former material is present at levels of 25–75% by weight, and the latter at 75–25%.

DETERGENT. G.O. Hentschel (V.S.E. Hentschel, Goteborg, Sweden). *U.S. 3,692,684.* The detergent contains alkaline salts of organic aliphatic and/or aromatic carboxylic acids and/or their anhydrides with one or several carboxyl groups. These salts replace phosphates in the composition. ■

Smith elected president of peanut association

The American Peanut Research and Education Association (APREA) has elected as its president for 1972-73 Olin D. Smith, peanut breeder in the Department of Soil and Crop Sciences, Texas A & M University, College Station.

As president-elect, the APREA chose Edwin L. Sexton of Best Foods Research Center, CPC International, Inc., Union, N.J. Sexton has been an AOCS member since 1956.

Leland Tripp, Department of Agronomy, Oklahoma State University, Stillwater, was re-elected executive secretary-treasurer. Reed Hutchison, National Peanut Research Laboratory, Dawson, Ga., was named as USDA representative to the board of directors.

Registered attendance of 215 people for the fourth annual meeting in Albany, Ga., was the largest ever. A total of 44 research papers was presented at the meeting, giving a review of all phases of peanut research being conducted by state experiment stations, the USDA and the commercial peanut industry.

The Southwest Section will host the next annual meeting of APREA, at the Lincoln Plaza, in Oklahoma City, July 15-18, 1973. ■