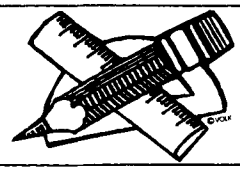
Abstracts



• Fats and Oils

THE TIME FACTOR IN THE CONVERSION OF FATS INTO METHYL ESTERS. R.M. Utrilla, M. Juárez and I. Martinez (Instito de Productor Lácteos. C.S.I.C. Arganda del Rey, Madrid) Grasas Aceites (Seville) **27**, 309–22 (1976). Four of the most used methods for fats methoxylation, using as catalysts H_2SO_4, BF_3, CH_3OK and KOH, are compared. With n-pentadecane, n-nonadecane and n-tetracosane as inert internal standards, the relative abundance in methyl esters changing the reaction time in each method is determined by gas chromatography. The progress of the reaction with the two later catalysts is also followed by thin layer chromatography.

TAILORING RAPESEED AND OTHER OILSEED CROPS TO THE MARKET. R.K. Downey. *Chem. Ind.* **1976**, 401–6. The fatty acid composition of rapeseed oil may be widely varied by genetic tailoring. The erucic acid content may be varied from about 50% to 1% and an oil with a linoleic acid content of 40% is a possibility. Industrial uses of the various grades of rapeseed oil are discussed. (World Surface Coatings Abs. No. 411)

ISOMERISATION OF UNSATURATED ESTERS. *Brit. 1,408,189* (Hoechst AG). Esters of fatty acids with isolated double bonds, e.g. methyl esters of soya fatty acids, or soyabean oil, are isomerised to esters with conjugated double bonds by treatment with at least 0.8% of an alkali metal alcoholate, e.g. potassium methylate, in presence of a strongly polar aprotic solvent, e.g. dimethyl sulphoxide or dimethylformamide. Conjugation levels >90% may be achieved. (World Surface Coatings Abs. No. 407)

DETERMINATION OF TOCOPHEROLS IN VEGETABLE OILS BY GAS CHROMATOGRAPHY. J.B. Riera. *Anales Bromatologica* **27** 287–96 (1975). The alpha, beta + gamma and delta tocopherols are separated from the unsaponifiable matter of the oil by thin-layer chromatography on silica gel/boric acid plates, the tocopherols recovered from the separated bands, squalene is added as internal standard, and the tocopherols are determined by GLC on an SE-30 silicone column. Results are reported for crude and refined soyabean oil, safflower oil and other oils. (World Surface Coatings Abs. No. 411)

MINERAL LUBRICATING OILS: ESTIMATION OF CONTAMINATION BY VEGETABLE OILS. S. Farmer. *Chem. Ind.* **1975**, No 24, 1061. Contamination by vegetable oil of mineral lubricating oil used in the bearings of oil expellers may be estimated by shaking the oil sample with 4 volumes of dioxane containing 30.6% (V/V) of furfural. The lubricating oil separates as a clear upper layer, the vol. of which can be measured. (World Surface Coatings Abs. No. 407)

RECOVERY AND RECYCLING OF VEGETABLE OILS AND PHTHALATE PLASTICISERS. W.G. McDonald. *Pig. Resin Tech.* **5** No 3, 3, 5 (1976). Recovery processes which have been carried out by solvent extraction, mainly with aliphatic hydrocarbon solvent, include the recovery of vegetable oils from fuller's earth, press cake, wax coatings from paper, and ester plasticisers from carbon filters used for clarification. (World Surface Coatings Abs. No. 411)

CYCLIC PEROXIDES AND THE THIOBARBITURIC ASSAY. N.A. Porter, J. Nixon and R. Isaac (Paul M. Gross Chem. Lab., Duke Univ., Durham, N.C. 27706) *Biochim. Biophys. Acta* **441**, 506–12 (1976). Several monocyclic peroxide compounds and two acyclic hydroperoxides have been tested for activity in the thiobarbituric acid test. All cyclic peroxides tested which have β dioxygen functionality on non-tertiary carbons gave positive thiobarbituric acid tests at 532 nm. ($\epsilon = 10^3$–10^4) Two acyclic unsaturated hydroperoxides which were derived from γ-linolenic acid also gave positive thiobarbituric acid tests. In addition to the 532-nm-absorbing species, all peroxidic compounds tested showed a transient absorption at 450 nm during the thiobarbituric acid test. The species responsible for this 450 nm absorption appears to be an intermediate in a series reaction sequence. This intermediate is converted, in time, to the 532-nm-absorbing species. Thiobarbituric acid assay of the crude autoxidation product mixture of γ-linolenic acid also shows this transient 450-nm-absorbing species. Added ferric ion enhances the 532 nm absorbance of the thiobarbituric acid assay of cyclic peroxides.

SOYA STEROLS: FUNCTIONAL PLANT DERIVED INGREDIENTS FOR TOILETRIES. PART I. B.L. Lundmark, H. Chun, and A. Melby (Cosmedia Group, General Mills Chemicals, Inc., Minneapolis). *Soap, Cosmet. Chem. Spec.* **52**(12), 33–40 (December, 1976). In this part of the article, the composition and functionality of plant sterols of soya origin are described. The soya sterols of concern have the following composition: sitosterol, 56%; campestrol, 28%; stigmasterol, 4%; sterol hydrocarbons and cholesterol, 4–6%; triperpene alcohols, ketosteroids, and other steroidal-like constituents, 4–6%. Ethoxylation of the phytosterols to different degrees produces a series of compounds with a range of hydrophilic/lipophilic characteristics. As the degree of ethoxylation increases, the melting point decreases. If surface tension is plotted against log soya sterol concentration, a straight line is obtained up to the critical micelle concentration (CMC). The CMC value of ethoxylated soya sterol is high relative to other nonionic surfactants such as polyoxyethylene (9) octylphenyl ether (Triton X-100). A linear decrease was observed in interfacial tension with increasing degree of ethoxylation. The 16 mole adduct was found to foam best in both distilled water and hard water.

CONTINUOUS PRODUCTION OF HYDRATED LIPIDS. T.B. Galusky (SCM Corp.). *U.S. 3,993,580.* A process for producing a hydrated product from hydratable lipid particulates comprises (a) forming a suspension of the particulates in water at a temperature where substantially no hydration occurs; (b) passing the suspension continuously into a swept-surface indirect heater in which the stream is heated to pumpable hydration temperature while mechanically working it into a plastic mass; (c) continuously withdrawing the plastic mass; (d) subjecting the withdrawn exit stream to shear stress sufficient for increasing its smoothness; (e) continuously passing the smoothed stream into a swept-surface indirect cooler in which the stream is cooled to a stabilizing yet pumpable temperature; and (f) continuously withdrawing the cooled, smoothed stream from the cooler.

ANTILIPEMIC AGENT CONTAINING A SOYBEAN OIL FRACTION. T. Kaneda and T. Tabata. *U.S. 3,993,756.* The agent comprises a nonsaponifiable fraction of soybean oil containing 40–50% plant sterols, 18–22% tocopherols, and the balance fatty acids. The fraction is obtained by steam distilling crude soybean oil to obtain an extract in the trap of the distillation apparatus, converting the fatty acids in the extract to methyl esters, and removing them from the nonsaponifiable fraction by molecular distillation. The resulting antilipemic composition is effective in suppressing the lipid content of blood serum.

EMULSIFIER SYSTEMS. P.C. Harries (Internationale Octrooimaatschappij). *U.S. 3,995,069.* An emulsifier blend comprises 50–88% C_{14}–C_{22} monoglyceride, 2–40% C_{14}–C_{22} saturated fatty acid, 0–30% C_{14}–C_{22} diglyceride, and 2–6% ionic surfactant.

DEWAXING OF VEGETABLE OILS. W.P. Gibble and J.S. Rhee (Hunt-Wesson Foods, Inc.). *U.S. 3,994,943.* A method of dewaxing a high wax content sunflower oil comprises the steps of (a) adding to the oil 5–25% of an aqueous treating agent including 0.05–5% of an inorganic phosphate degumming agent and a mixture of surfactants comprising 5–25 ppm of a sulfosuccinate alkyl ester and 0.01–0.5% of a second surfactant selected from fatty acid sulfate and lower alkyl-aryl sulfonate salts containing 8–20 carbon atoms; (b) mixing the oil and the treating agent at 60–90 F to form an emulsion; and (c) centrifuging the emulsion to separate a wax-containing aqueous phase from the oil.

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• **Abstracts** . . . . . (Continued from page 214A)

PROCESS OF MAKING SUCROSE ESTERS. K.J. Parker, R.A. Khan, and K.S. Mufti (Tate & Lyle Ltd.). *U.S. 3,996,206.* The process comprises reacting solid particulate sucrose with a triglyceride in the presence of a basic transesterification catalyst at 110–140 C at atmospheric pressure without distilling off any of the components. No solvent is present.

OLEAGINOUS FOOD FLAVORED WITH CETRAIN ALPHA CARBOXY ACIDS AND/OR ESTERS THEREOF. R.R. Allen (Anderson, Clayton & Co.). *U.S. 3,997,682.* There is claimed a composition of matter comprising a blend of a neutral oleaginous food and 1–100 ppm of at least one of the alpha carboxy acids selected from the group consisting of butyric, isobutyric, valeric, isovaleric, caproic, capric, and caprylic acid.

STUDIES ON A STANDARDIZATION OF FAT STABILITY TESTS ON AUTOXIDATION. I. RESULTS OF COLLABORATIVE TESTS FROM FIRST TO FOURTH EXPERIMENTS. G. Kajimoto et al. (Faculty of Nutrition, University of Kobe Gakuin, Kobe). *Yukagaku* 25(9), 525–33 (1976). For the purpose of standardizing the method of fat and oil stability test by both oil mills and oil users, the stability test on autoxidation was taken up as the 1st step, and collaborative tests were implemented by AOM test, oven test, organoleptic evaluation method and weighing method. In inverse proportion to the length of storage period of soybean oil the induction period became shorter. Comparing capped oil with uncapped oil, there was no deviation in AOM stability between 15 days stored oil and 30 days stored oil. In the case of 108 days stored soybean oil, uncapped stored oil clearly showed much shorter induction period, compared with capped oil. Deviations among the collaborators were small. Each collaborator admitted the tendency that the more the storage period of the soybean salad oil was prolonged, the earlier did the turning point come, but that further P.O.V. showed big deviations, which depended on different storage periods. There was no deviation between capped stored oil and uncapped stored oil, provided that the storage period was 30 days respectively. In the case of soybean oil stored for 108 days, the uncapped oil had a little shorter induction period than the capped oil. The time generating slight odor in each stored soybean oil varied among the collaborators data. The collaborators having prior experience of making organoleptic evaluation perceived a faint odor earlier and/or at the lower point of P.O.V. than inexperienced collaborators. The results of organoleptic evaluation were generally essentially similar among the experienced collaborators. In inverse proportion to the length of storage period, the induction period (the point where the weight increased by 0.5%) became shorter, and the turning odor point was recognized earlier than the induction point by 24 to 48 hours. When the collaborators followed different specification of thermostat, the deviations on the results obtained were very big, and the inconsistency between maximum and minimum reached approx. 100 hours. The results of test by weighing method based on sample weight of 1 g., 2 g., and 3 g., respectively showed big deviations. It was impractical to point out the most suitable weight after all. In general, it was considered to be the most meritorious to use 1 gram sample of all, because of its least quantity and earliest results.

THE PEROXIDE-INDUCED ADDITION OF ACETIC ACID TO ETHYLENE BY CONTINUOUS FEEDING OF ETHYLENE AND A PEROXIDE. Y. Suhara (National Chemical Laboratory for Industry, Tokyo), *Yukagaku* 25(9), 522–4 (1976). Butyric, hexanoic, octanoic, decanoic, and lauric acids were formed by the peroxide-induced addition of acetic acid to ethylene in which ethylene and di-t-butyl peroxide were fed into acetic acid continuously. 2-Ethylbutyric, 2-ethylhexanoic, and 2-ethyloctanoic acids, and neutral substances were also formed. Major neutral substances formed were assumed to be dibutyl and di(2-ethylhexyl) phthalates, and 3,4-dibutyl-3-butyl-4-hexyl-, and 3,4-dihexyl-2,5-oxolanediones.

THE FATTY ACID COMPOSITION OF THE SEED OIL OF LINDERA STRYCHNIFOLIA (SIEB. ET ZUCC.) F. VILL., AND ITS PECULIARITY. K. Furukawa, H. Nii, M. Iwakiri and T. Kubota (Ibaraki Research Laboratory of Nagaoka Perfumery Co., Ltd, Ibarakishi). *Yukagaku* 25(9), 534–7 (1976). The fatty acids of the seed oil of *Lindera strychnifolia* (Sieb. et Zucc.) F. Vill, isolated by distillation, column chromatography and preparative gas chromatography were identified by gas chromatography, infrared, mass and nuclear magnetic resonance spectroscopy. The fatty acids identified were decanoic, dodecanoic, cis-4-dodecenoic, tetradecanoic, cis-4-tetradecenoic, hexadecanoic, hexadecenoic, octadecanoic, oleic, linoleic and eicosenoic acid. The major component was cis-4-tetradecenoic acid.

SYNTHESIS OF γ-BUTYROLACTONES CONTAINING ETHER GROUPS AND UNSATURATED γ-BUTYROLACTONES USING LITHIUM NAPHTHALENIDE. Y. Fujita, K. Suga, S. Watanabe, Y. Toguchi and K. Sakurai (Dept. of Applied Chemistry, Faculty of Engineering, Chiba University, Chiba), *Yukagaku* 25(8), 480–4 (1976). Lithium naphthalenide reacts with carboxylic acids in the presence of diethylamine to give the dianions of carboxylic acids. Reactions of these dianions with various glycidyl ethers give the corresponding γ-hydroxy acids in good yield. The γ-hydroxy acids easily cyclize to give γ-butyrolactones containing ether group. In the case of α,β-unsaturated crotonic acid, the dianion of crotonic acid reacts with various epoxides to give unsaturated γ-butyrolactones.

PHOSPHONOSPHINGOGLYCOLIPID, A NOVEL SPHINGOLIPID FROM THE VISCERA OF TURBO CORNUTUS. A. Hayashi, F. Matsuura and T. Matsubara (Dept. of Chemistry, Faculty of Science and Technology, Kinki University, Osaka), *Yukagaku* 25(8), 501–2 (1976). This paper reports the occurrence of a new lipid, phosphonosphingoglycolipid, in the viscera tissues of a marine shellfish belonging to Gastropoda, TURBO CORNUTUS.

SULPHATION OF GLYCERINATED RICE BRAN OIL AND COFFEE MEAL OIL. I.S. Gupta, M. Singh, P. Singh and K. Singh (Dept. of Chem. Engg. & Technology, Panjab Univ., Chandigarh, India) *Res. Ind.* 20, 61–2 (1975). Glycerinated rice bran and coffee meal oils have been sulfated with 98% sulfuric acid to prepare surface active agents. The characteristics of the samples prepared under different conditions in respect of duration and temperature of reaction and composition of the reaction mixture have been found to be comparable with those of the products obtained from the costlier castor oil.

PAPER CHROMATOGRAPHIC DETECTION OF GROUNDNUT OIL IN CASTOR OIL. S. Chand, C. Srinivasulu and S.N. Mahapatra (Regional Res. Lab., Bhubaneswar 4, Orissa, India) *Res. Ind.* 19, 66–7 (1974). A descending paper chromatographic method using undecane impregnated paper and ethanol-acetic acid-water (20:5:2) is described for the detection of groundnut oil. The detection is done using iodine vapour. Up to 1% groundnut oil can be detected in castor oil.

LARGE SCALE TRIALS FOR STABILIZATION OF RICE BRAN WITH STEAM. C.S. Viraktamath (Central Food Technol. Res. Inst., Mysore 13, India) *J. Food Sci. Technol.* 2, 191–3 (1974). Large scale trials for stabilization of rice bran were carried out with conventional steaming equipment used in oil expelling and parboiling. Bran thus treated could be stored up to 25 days without appreciable lipolysis.

DETOXIFICATION OF GROUNDNUT OIL. T. Shantha and V. Sreenivasa Murthy (Central Food Technol. Res. Inst., Mysore 13, India) *J. Food Sci. Technol.* 12, 20–2 (1975). The efficiency of several extractants such as NaCl solution, aqueous acetone, NaOH and NH_4OH were tested for removing aflatoxin from crude groundnut oil. Extraction with 10% NaCl solution at 80 C is ideal for removing about 85% of the toxin, with minimum of emulsion problems and maximum oil recovery.

EFFECT OF AGING ON THE PERFORMANCE OF NICKEL FORMATE AS A CATALYST IN OIL HYDROGENATION. D.D. Nanavati (National Chem. Lab., Poona 8, India) *Indian J. Technol.* 12, 61–3 (1974). Nickel formate changes its composition even at room temp. when exposed to atmosphere for a long time. These changes tend to give non-selective hydrogenation. For a systematic study of this phenomenon, Ni catalysts prepared from different samples of nickel formate, precipitated under identical conditions but preserved under different conditions were used for oil hydrogenation. It was found that the selectivity of the exposed nickel formate can be regained by raising the reduction temp. to 242–246 C instead of 238–242 C used for unexposed nickel formate.

CHEMICAL COMPOSITION AND FATTY ACID PATTERN OF SOME BRASSICA SPECIES. K.S. Dhindsa, S.K. Gupta, R. Singh and T.P. Yadava (Dept. of Plant Breeding, Haryana Agric. Univ., Hissar, India) *Indian J. Nutr. Diet.* 12, 85 (1975). Differences were noted in the compositions of 11 Brassica species grown under identical agro-climatic conditions. Oil and protein contents varied in the range of 32.7–42.5 and 24.1–31.9% respectively. Oleic, linoleic, linolenic and erucic acids were found in the range of 10.9–26.0, 10.3–17.1, 10.8–20.4 and

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32.7–60.4%, respectively. *B. napus* and *B. chinensis* contained the lowest erucic acid content (32.7 and 33.3%) whereas *B. campestris* (T 151) contained the highest (60.4%).

STRUCTURES OF FATTY ACIDS FROM THE OIL OF ARGEMONE MEXICANA. S.B. Mahato, N.P. Sahu, A. Narayanaswami, R.N. Chakravarti and D. Chakravarti (Indian Inst. of Exptl. Med., Calcutta 32, India) *J. Indian Chem. Soc.* **52**, 626–8 (1975). On storage at near 0 C solvent extracted *A. mexicana* oil yielded small quantity of 2 fatty acids. By using IR, NMR, mass and chemical techniques these were identified as 11-oxo-triacontanoic and 11-hydroxy-triacontanoic acids.

EFFECT OF THERMAL OXIDATION ON THE FATTY ACID COMPOSITION OF GHEE. B.S. Bector and K.M. Narayanan (National Dairy Res. Inst., Karnal, India) *J. Food Sci. Technol.* **11**, 224–6 (1974). GLC and UV analysis showed that on heating ghee, unsaturated acids decreased in concentration.

INDIAN SUNFLOWERSEED OIL, ITS CHEMICAL CONSTITUENTS AND CHARACTERISTIC COLOR TEST. P. Sengupta, A.R. Sen and B.R. Roy (Central Food Lab., Calcutta 16, India) *Res. Ind.* **20**, 215–6 (1975). Samples of sunflowerseed oil were obtained by extracting seed samples collected from different parts of India and analysed for butyrorefractormeter (BR) reading at 40 C, saponification value, iodine value, Bellier's turbidity temp. and free fatty acids. The results showed that through the BR reading at 40 C and iodine values are highly variable, 75% of the former fall within the range 58.2–59.2 and more than 68% of the latter between 107.3 and 111.7. The variation in saponification value and Belliers turbidity temp. was more or less uniform from 190.1 to 194.2 and 25.8 to 27.8, respectively. Except in two samples, the free fatty acid content did not exceed 1.1%. A simple and rapid test was worked out using antimony trichloride for the detection of sunflowerseed oil in other oils. Equal quantities of oil and saturated solution of antimony trichloride in chloroform are mixed in a test tube and the colour is observed. With sunflowerseed oil, a dark red colour is developed which turns to reddish brown.

DETECTION OF ADULTERATION IN MUSTARD OIL. D.N. Dhar and S.C. Suri (H.B. Technol. Inst., Kanpur, India) *J. Inst. Chem., Calcutta* **46**, 173 (1974). Oil sample was developed on Alumina G plate (10 × 20 cm) with chloroform to 15 cm height. The chromatogram after evaporation of solvent was either viewed under long range UV light or sprayed with Dragendorff reagent. Argemone oil could be detected up to 50 ppm.

DETECTION OF SUNFLOWERSEED OIL IN OTHER OILS BY THIN-LAYER CHROMATOGRAPHY. P. Sengupta, A.R. Sen, S. Sil and B.R. Roy (Central Food Lab., Calcutta 16, India) *Res. & Ind.* **20**, 208–9 (1975). TLC of sunflowerseed, sesame, groundnut and rapeseed oil was carried on Silica gel G plates using petroleum ether-ether-acetic acid (60:40:2) for elution and 2′,7′-dichloro-fluorescein for spraying. Viewed under UV light, 3 spots were visible in the case of sunflowerseed oil but only one spot was observed near the solvent front in case of others. TLC of unsaponifiable matter from the respective oils was carried out using modified anisaldehyde reagent for spraying and observing the coloured spots after heating at 105–110 C for 5 to 10 min. Six coloured spots appeared in the case of sunflowerseed oil, 4 in the case of sesame and only one in the case of groundnut and rapeseed oils. It was found that sunflowerseed oil can be successfully detected in other oils at a level down to 5% as it gives additional spots in the detection region.

PURIFYING VEGETABLE OILS. S.V. Anantakrishnan, N. Gopalakrishman and A.A. Sabesan (Madras Christian College, Madras, India) *Indian 131,137*. Fe, Cu, Mn complex compounds were removed from vegetable oils by passing through cation exchange resin and agitation with α-cellulose. Peroxides from oxidised oil were removed by passing through alumina.

REFINING KARANJA OIL. C.S. Rao and P.A. Vetkaencherry (Hindustan Lever Ltd., Andheri, Bombay 93, India) *Indian 130,178*. Karanja oil was first treated with sulfuric acid and then with aqueous alcoholic alkali and bleached with 0.5% carbon at 95 C. Hydrogenation at 180 C gave an oil with m.p. 60 C.

TWITCHELL SPLITTING OF METHYL ESTERS OF FATTY ACIDS. S.D. Vidya, V.V.R. Subrahmanyam and J.G. Kane (Dept. of Chemical Technology, Univ. Bombay, Bombay 19, India) *Indian J. Technol.* **13**, 528–36 (1975). The equilibrium split value for the Twitchell hydrolysis was found to be much lower for fatty acid methyl esters (55%) than for the triglycerides (93%).

LECITHIN FROM OIL CAKES. **N.K. Garg, S.K. Bose and S.** Ghatak (Div. of Biochem., Central Drug Res. Inst., Lucknow, India) *Res. Ind.* **20**, 58–60 (1975). With a view to selecting suitable indigenous sources for the production of lecithin, several oilseeds—yellow mustard, black mustard, black sesame, white sesame, groundnut, cottonseed and soyabean—have been analysed for their lecithin content. Mustard seeds compare well with soyabean in this respect. Practically all the lecithin present in mustard seeds has been found to be left in the mustard cake (currently used as a catale feed) obtained during oil expelling. A simple and convenient laboratory-scale method involving two-step percolation of mustard cake with hexane and hexane-alcohol azeotrope for the recovery of lecithin is described.

STUDIES ON COMPOSITION, STORAGE AND ACCEPTABILITY OF SUNFLOWER OIL. C. Parvathi and P. Geervani (College of Home Science, A.P. Agric. Univ., Hyderabad 4, India) *J. Food Sci. Technol.* **13**, 192–5 (1976). The chemical composition of sunflower oil produced in Hyderabad was different from sunflower oil of Canada in respect of essential fatty acids. Heating resulted in a decrease in linoleic and increase in oleic acid fraction. Studies on storage behaviour indicated that sunflower oil became rancid earlier than groundnut oil. Both prolonged heating and storage accelerated rancidity in oils, the effect being more pronounced in sunflower oil. Consumers' acceptability revealed that most consumers felt that flavour quality of sunflower oil was similar to other vegetable oils.

POLLUTION IN OIL AND OIL-BASED INDUSTRIES AND REMEDIAL MEASURES. D.A. Ramayya, G. Azeemoddin and S.D. Thirumala Rao (Oil Technol. Res. Inst., Anantapur, A.P., India) *Chem. Age (India)* **27**, 465–9 (1976). Measures to minimise various types of pollution at different stages of processing of oilseeds and oils are discussed.

HIGH TEMPERATURE FUSION OF CASTOR OIL WITH CAUSTIC SODA: A CRITICAL STUDY. D.D. Nanavati (National Chem. Lab., Poona 8, India) *J. Sci. Ind. Res.* **35**, 163–8 (1976). Five published processes for the production of sebacic acid and 2-octanol from castor oil have been critically discussed. Of these, heating of castor oil soap particles containing stiochiometric excess of caustic soda arranged on a perforated grid in a reactor with superheated steam (200–415 C) for 4–6 hr appears to be more promising than the others.

REMOVAL OF SANGUINARINE FROM EDIBLE OILS CONTAMINATED WITH ARGEMONE OIL. I.S. Shenolikar (National Inst. Nutr., Hyderabad 7, India) *Indian J. Med.* **64**, 1128–32 (1976). Groundnut oil admixed with 2% argemone oil was treated with 0.5% phosphoric or 0.2% sulfuric or 1% hydrochloric acid (which is least effective) and live steam for 30 min. The degummed oil was refined with alkali and bleached in the usual manner. Sanguinarine content could thus be brought to a level of 0.4 μg/ml, which was found to be safe with experimental animals.

FAT SPLITTING. P.K. Basu (Hindustan Lever Res. Ctr., Bombay 93, India) *Chem. Age India* **27**, 871–6 (1976). Batch and continuous fat splitting processes are compared. Kinetics and mechanism of splitting are also discussed along with basic information for the design of continuous fat splitting columns. The residence time of fat in commercial fat splitting plants is usually about 2–3 times than that predicted by kinetics of the reaction. This was illustrated by splitting of hardened rice bran oil (initial free fatty acid content, 50%) in a continuous countercurrent plant at the Hindustan Lever Research Centre, Bombay. 25 references.

DETECTION OF KARANJ (PONGAM) OIL IN OTHER OILS BY THIN-LAYER CHROMATOGRAPHY. C. Sreenivasulu, K. Vijayalakshmi and S.N. Mahapatra (Regional Res. Lab., Bhubaneswar 4, India) *Oils & Oilseeds J.* **28**(3), 15–6 (1976). Oil (1 ml) was extracted with ethanol (or hexane in case of castor). The extract was concentrated, spotted on Silica gel G layer and developed with heptane-acetone (4:1). The plate was heated at 110 C for 3 min, cooled, sprayed with 20% solution of antimony trichloride in chloroform and heated for 5 min. Oil adulterated with 1% or more karanj oil gave an yellow spot (Rf 0.29) due to pongamol.

NUTRITION VALUE OF MORINGA. S.C. Verma, R. Banerji, G. Misra and S.K. Nigam (National Botanic Gardens, Lucknow, India) *Curr. Sci.* **45**, 769–70 (1976). *M. oleifera* and *M. concanensis* seeds yielded 27% and 33% fat, respectively. Defatted meals contained 50 and 72.6% protein, respectively. The characteristics of the fats, respectively, are as follows: n_D25 1.46, 1.46; acid no. 0.26, 0.25; and iodine no. 66.1, 67.07. The percentage fatty acid compositions as determined by GLC are as follows, respectively: 12:0, 12.5, 0.6; 16:0, 9.6, 9.1; 16:1, 1.6, 2.8; 18:0, 3.0, 2.4; and 18:1, 73.3, 83.8. Moisture and vitamin C contents were also determined in tender and soft as well as in mature and hard leaves and pods. *M. oleifera* leaves and pods are richer source of vitamin C than leaves of *M. concanensis*.

MISCELLA REFINING OF NEEM & MAHUA OILS. M.M. Ahuja, R.R. Gupta, K.N. Agrawal and A.C. Gupta (H.B. Technol. Inst., Kanpur 2, India) *Indian J. Technol.* **14**, 257–9 (1976). The oil was dissolved in petroleum ether (60–80 C), stirred for 15–20 min at 200 rpm first with NaOH solution and then with 95% ethanol to dissolve soap and washed 4 times with water, and finally with citric acid (0.1–0.2% on the wt. of oil) solution (0.3%) to remove soap traces. Solvent was removed. Refining loss and color and acid no. of refined oil were determined. Optimum conditions are: oil to solvent ratio 1:1; excess alkali 2%; alkali concentration 3–13% for oils having acid no. below 50 and higher for more acidic oils; and oil to alcohol ratio 2:1. Refining losses are reduced by nearly half compared to conventional method. Similar results were obtained in the lab. and in pilot plant (10 litre capacity).

• Biochemistry & Nutrition

THE FORMATION OF CIS-3-NONENAL, TRANS-2-NONENAL AND HEXANAL FROM LINOLEIC ACID HYDROPEROXIDE ISOMERS BY A HYDROPEROXIDE CLEAVAGE ENZYME SYSTEM IN CUCUMBER (CUCUMIS SATIVUS) FRUITS. T. Galliard, D.R. Phillips and J. Reynolds (Agric. Res. Council, Food Res. Inst., Colney Lane, Norwich, NR4 7UA, U.K.) *Biochim. Biophys. Acta* **441**, 181–92 (1976). A particulate enzyme fraction and an acetone powder preparation from cucumber fruits cleaved 9- and 13-hydroperoxyoctadecadienoic acids to form volatile aldehydes and oxoacid fragments. From the 9-hydroperoxide, the major volatile fragments were *cis*-3-nonenal and *trans*-2-nonenal using particulate enzyme and acetone powder preparations, respectively. Hexanal was the only significant volatile fragment from the 13-hydroperoxide. The particulate enzyme system was equally effective on both 9- and 13-hydroperoxide isomers and was fully active under anaerobic conditions and at pH 6.4. An enzymic pathway for the biogenesis of hexanal, *cis*-3- and *trans*-2-nonenal (components of the characteristic flavour volatiles of cucumber) from linoleic acid is proposed. This involves the sequential activity of lipoxygenase, hydroperoxide cleavage and *cis*-3-: *trans*-2-enal isomerase enzymes.

STRUCTURE OF THE MANNOHEPTOSE-CONTAINING PENTAGLYCOSYLDIACYLGLYCEROL FROM ACHOLEPLASMA MODICUM. W.R. Mayberry, T.A. Langworthy and P.F. Smith (Dept. of Microbiol., School of Med., Univ. of South Dakota, Vermillion, S.D. 57069) *Biochim. Biophys. Acta* **441**, 115–22 (1976). The pentaglycosyldiacylglycerol from *Acholeplasma modicum* strain Squire (PG 49) has the structure: D-galactopyranosyl-(1 → 2)-D-galactopyranosyl-(1 → 3)-D-glycero-D-mannoheptopyranosyl-(1 → 3)-D-glucopyranosyl-(1 → 2)-D-glucopyranosyl-(1 → 1)-diacylglycerol.

LIPID HYDROPEROXIDE ACTIVATION OF *N*-HYDROXY-*N*-ACETYLAMINOFLUORENE VIA A FREE RADICAL ROUTE. R.A. Floyd, L.M. Soong, R.N. Walker, and Melissa Stuart (Oklahoma Med. Res. Foundation, Biomembrane Res. Lab., Oklahoma City, Okla. 73104) *Cancer Res.* **36**, 2761–7 (1976). The data presented here demonstrate that linoleic acid hydroperoxide in the presence of methemoglobin or hematin activated the carcinogen *N*-hydroxy-*N*-acetyl-2-aminofluorene via the nitroxyl free radical intermediate into 2-nitrosofluorene and *N*-acetoxy-*N*-acetyl-2-aminofluorene. Ascorbate inhibited the activation, in which case the free radical intermediate was replaced by the ascorbate free radical. On the basis of optical kinetics, we have established that the rate of linoleic acid hydroperoxide decrease paralleled the rate of *N*-hydroxy-*N*-acetyl-2-aminofluorene decrease and also the rate of 2-nitrosofluorene increase. The stoichiometry of the reaction was such that, for every 2 linoleic acid hydroperoxide molecules consumed, 2 *N*-hydroxy-*N*-acetyl-2-aminofluorene molecules were oxidized and 1 2-nitrosofluorene and 1 *N*-acetoxy-*N*-acetyl-2 aminofluorene molecule was formed.

IMAGES OF DIVALENT CATIONS IN UNSTAINED SYMMETRIC AND ASYMMETRIC LIPID BILAYERS. R.C. Waldbillig, J.D. Robertson and T.J. McIntosh (Dept. of Anat., Duke Univ. Sch. of Med., Durham, N.C. 27710) *Biochim. Biophys. Acta* **448**, 1–14 (1976). Divalent cations have been microscopically visualized in association with simple lipid bilayers. Symmetric and asymmetric oriented bilayers were constructed from fatty acid monolayers and were cut in thin transverse sections for examination by bright field electron microscopy in the absence of stains, fixatives or embedding materials. It has been found that bilayers formed of lipid molecules having alkaline earth head groups exhibit natural electron contrast. The intrinsic image has been linked to local variations in the bilayer absolute electron density profile determined by X-ray diffraction analysis of the same specimens. By combining the microscopic, chemical and X-ray evidence it has been estimated that local increments of about 1 g/cm^3 can produce detectable electron contrast in 500 Å transverse sections of bilayers.

INTERACTIONS BETWEEN ANAESTHETICS AND LIPID MIXTURES AMINES. A.G. Lee (Dept. of Physiol. and Biochem., Univ. of Southampton, Southampton SO9 3TU, U.K.) *Biochim. Biophys. Acta* **448**, 34–44 (1976). The effect of a number of amine anaesthetics related to procaine on the temperature of lipid phase transitions has been studied using chlorophyll *a* as a fluorescence probe. The amines cause a reduction in the temperature of the phase transition of dipalmitoyl phosphatidylcholine and dipalmitoyl phosphatidylethanolamine and of mixtures of these lipids. The binding of charged amines causes a build up of positive charge on the membranes, limiting the binding. Incorporation of negative charge into the lipid bilayers causes a considerable increase in the binding of the charged amines, and the effect is reversed by addition of Ca^{2+}. Anaesthesia is suggested to arise from an increase in the proportion of lipid in the liquid crystalline phase, resulting in a conformational change in the sodium channel. Effects of the tertiary amines on nerve conduction can be understood if the negatively charged lipid in the membrane is concentrated around the sodium channel: positively charged anaesthetics will have a greater effect when applied to the inside of a nerve because of the low Ca^{2+} concentration inside the nerve.

ELIMINATION OF CHOLESTEROL IN HYPERLIPOPROTEINAEMIA. B. Angelin, K. Einarsson, K. Hellstrom and M. Kallner (Dept. of Med., Karolinska Inst. at Serafimerlasarettet, Stockholm, Sweden) *Clin. Sci. Mole. Med.* **51**, 393–7 (1976). Cholesterol intake (about 0.25 mmol/day) and the faecal excretion of cholesterol, coprostanol and coprostanone were determined in normolipidaemic control subjects and hyperlipidaemic patients, whose bile acid kinetics had been previously studied. It is concluded that patients with type II hyperlipoproteinaemia eliminate cholesterol as bile acids and neutral faecal steroids normally. The type IV lipoprotein pattern is associated with increased bile acid synthesis and/or elevated faecal excretion of neutral steroids, so that the net steroid 'balance' is usually above the normal limit.

INDEPENDENCE OF THE EFFECTS OF CHOLESTEROL AND DEGREE OF SATURATION OF THE FAT IN THE DIET ON SERUM CHOLESTEROL IN MAN. J.T. Anderson, F. Grande and A. Keys (Univ. of Minnesota, Lab. of Physiol. Hygiene, Stadium Gate 27, Minneapolis, Minn. 55455) *Am. J. Clin. Nutr.* **29**, 1184–9 (1976). The effect on the fasting serum lipid levels of adding daily 291 mg of cholesterol to diets containing 3 mg of cholesterol and equal fat content, but different fatty acid composition, was tested on 12 young men. The saturated diet provided 97 g/day of a saturated oil made up of 2 parts of palm oil and 1 part of coconut oil. The polyunsaturated diet provided 97 g/day of safflower oil. The cholesterol was dissolved in 40 g of either oil incorporated into a spread. A similar spread, devoid of cholesterol, was fed during the cholesterol free periods. Duration of dietary periods was 14 days. Addition of cholesterol produced a mean elevation of serum cholesterol of 9 mg/dl (SE ± 2.1) in the presence of the saturated diet, and of 8 mg/dl (SE ± 1.6) in the presence of the polyunsaturated diet. Both cholesterol elevations were significant ($P < 0.01$) but not significantly different from each other. Substitution of the saturated diet for the polyunsaturated diet caused a significant elevation of serum cholesterol which was the same when the substitution was made in the presence or in the absence of added dietary cholesterol.

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HUMAN PLASMA LIPOPROTEINS AS ACCELERATORS OF PROTHROMBIN ACTIVATION. S.P. Bajaj, J.A.K. Harmony, M. Martinez-Carrion and F.J. Castellino (Dept. of Chem., Univ. of Notre Dame, Notre Dame, Ind. 46556) *J. Biol. Chem.* **251**, 5233–6 (1976). The activation rate of bovine prothrombin by Factor Xa and Ca^{2+} has long been known to be greatly enhanced by addition of phospholipid. Upon substitution of human plasma lipoproteins for phospholipid (cephalin) in this activation system, only very low density lipoprotein enhances prothrombin activation. Low density lipoprotein and high density lipoprotein have no stimulatory effect on prothrombin activation. On the other hand, the sonicated lipid extracts from very low, low, and high density lipoproteins all can substitute for phospholipid in potentiating prothrombin activation. The efficiency of each lipid extract, in this regard, depends upon its source of extraction, and is greatest for the lipid extract of very low density lipoprotein.

UTILIZATION OF ENERGY FOR MAINTENANCE AND FOR FAT AND LEAN GAINS BY MICE SELECTED FOR RAPID POSTWEANING GROWTH RATE. N.L. Canolty and L.J. Koong (Dept. of Nutr. and Dept. of Animal Sci., Univ. of Calif., Davis, Calif. 95616) *J. Nutr.* **106**, 1202–8 (1976). The metabolizable energy intake (MEI) required for maintenance and the efficiency of utilization of metabolizable energy available for gain (MEA) were determined for a line of mice (rapid growth) selected for 41 generations for rapid postweaning weight gain and for a contemporarily mated line (control) that had been randomly selected. Feed intake of individually housed rapid growth and control males was restricted above maintenance or was ad libitum from 21 to 42 days of age. Regressions of change in body energy per unit metabolic body size on MEI per unit metabolic body size showed that the maintenance requirement for each line of mice was 176 kcal per unit metabolic body size per day and that the rapid growth line was more efficient than the control line in utilizing MEA (50% vs. 23%) to promote an increase in body energy.

THE AFFINITY OF LOW DENSITY LIPOPROTEINS FOR AN ARTERIAL MACROMOLECULAR COMPLEX. A STUDY IN ISCHEMIC HEART DISEASE AND CONTROLS. G. Camejo, S. Waich, G. Quintero, M.L. Berrizbeitia and F. Lalaguna (Centro de Biofisica y Bioquimica [GC, FL], Lab. de Lipoproteinas, Instit. Venezolano de Investigaciones Cientificas [IVIC], Apartado 1827, Caracas 101, Venezuela) *Atherosclerosis* **24**, 341–54 (1976). Levels of serum cholesterol, triglycerides, lipoprotein pattern and the insolubilization of serum low density lipoproteins (LDL, betalipoprotein) by a factor present in arterial intima-media extracts was investigated in 55 patients with acute coronary heart disease and 50 health controls. In blood samples obtained 24 h after the episode, the serum betalipoproteins from male normotensive patients showed a high tendency to precipitate when incubated with the intima-media extracts, nearly twice the value measured in the control group. This affinity returned almost to control level after 21 days in the hospital. Hypertensive patients showed a serum cholesterol higher than the controls but almost no difference in LDL-arterial factor interaction. The composition of isolated LDL was studied in 7 patients and 8 controls and it was found that the total cholesterol/protein plus phospholipid ratio had a positive exponential correlation with the lipoprotein-arterial factor affinity.

POSITIONAL AND FATTY ACID SPECIFICITY OF MONOACYL- AND DIACYLGLYCEROL 3-PHOSPHATE FORMATION BY RABBIT HEART MICROSOMES. G.Z.-Behrens and K.J. Kako (Dept. of Physiol., Faculty of Med., Univ. of Ottawa, Ottawa, Ontario K1N 9A9, Canada) *Biochim. Biophys. Acta* **441**, 1–13 (1976). Fatty acid selectivity of acyl-CoA:glycerol-3-phosphate acyltransferase (EC 2.3.1.15) and acyl-CoA:monoacylglycerol-3-phosphate acyltransferase (EC 2.3.1.52) of the microsomal fraction prepared from rabbit heart was studied. The rate of acylation of 1-palmitoylglycerol 3-phosphate by rabbit heart microsomal fraction was increased proportionally to the increasing concentrations of 1-palmitoylglycerol 3-phosphate up to 50 nmol per ml; higher concentrations were inhibitory. Differences in the activities measured with palmitoyl-, oleoyl- and linoleoyl-CoA as acyl donors were negligible. When stearoyl-, arachidonoyl- and erucoyl-CoA acted as acyl donors, the rates of reaction were low. The acyl-CoA:1-palmitoylglycerol-3-phosphate acyltransferase activity increased proportionally to the increasing concentrations of acyl-CoA up to 10 nmol per ml; acyl donor specificity was similar to that found above. The acyltransferase showed some but not marked fatty acid selectivity in the presence of a mixture of two acyl-CoA esters (palmitic, oleic or stearic acids) as substrates.

COMPARATIVE STUDIES OF FATTY ACID SYNTHESIS IN ATHEROSCLEROTIC AND HYPOXIC HUMAN AORTA. I. Filipovic and M. Rutemöller (Instit. of Physiolog. Chem., Univ. of Münster, Münster, W. Germany) *Atherosclerosis* **24**, 457–69 (1976). The oxygen and glucose uptake, lactate formation, ATP/ADP and NADP/NAD ratios and incorporation of [^{14}C]acetate and [^{14}C]linolenic acid into lipids of early fatty streaks and more advanced complicated atherosclerotic lesions of human aorta were determined during aerobic and hypoxic incubation. Compared with grossly normal appearing sections of the aorta in intima and media preparations of early fatty streaks the oxygen uptake was increased while that in further developed atheroma was slightly diminished. More pronounced changes in these metabolic parameters were observed when the aortic tissue segments were incubated under hypoxic conditions. In aerobically incubated atherosclerotic lesions and in hypoxia the palmitic acid was synthesized mainly by chain elongation while in grossly normal areas of the aorta at least part of this acid was synthesized *de novo*.

ABNORMAL MEMBRANE PHOSPHOLIPID CONTENT IN SUBCELLULAR FRACTIONS FROM THE MORRIS 7777 HEPATOMA. K.Y. Hostetler, B.D. Zenner and H.P. Morris (Dept. of Med., Univ. of Calif., San Diego, The Veterans Admin. Hosp., San Diego, Calif. and Dept. of Biochem., Howard Univ., Washington, D.C.) *Biochim. Biophys. Acta* **441**, 231–8 (1976). Mitochondrial and microsomal fractions were prepared from normal rat liver and the Morris 7777 hepatoma and characterized by the use of the marker enzymes, succinate dehydrogenase and rotenone-insensitive NADPH-cytochrome *c* reductase. The phospholipid content per mg membrane protein of Morris 7777 hepatoma mitochondria was increased by 75% as compared with mitochondria from normal rat liver. Microsomes from this poorly-differentiated tumor were found to have a 45% decrease in the content of phospholipid. These abnormalities were independent of tumor size or age. The content of the various phospholipid classes per mg protein in the respective mitochondrial and microsomal fractions was determined. Large increases in nearly all the major phospholipid classes were found in tumor mitochondria; tumor microsomes were characterized by an increased content of sphingomyelin but the content of nearly all other phospholipids was significantly decreased.

ABNORMAL ACTIVATION OF STEROL SYNTHESIS IN LYMPHOCYTES OF ATHEROSCLEROTIC-SUSCEPTIBLE PIGEONS AND HETEROZYGOUS FAMILIAL HYPERCHOLESTEROLEMIC PATIENTS. V.K. Kalra and D.H. Blankenhorn (Dept. of Biochem. and Med., Univ. of Southern Calif., School of Med., Los Angeles, Calif. 90033) *Biochim. Biophys. Acta* **441**, 334–40 (1976). Delipidated human sera enhances the incorporation of [2-^{14}C]acetate, but not mevalonate, into digitonin-precipitable sterols of pigeon lymphocytes. Show Racer and White Carneau pigeons exhibit inherited differences in induction of sterol synthesis dissociated from inheritance of hypercholesterolemia. Moreover, lymphocytes of three familial hypercholesterolemic individuals, having serum cholesterol level in the normal range by drug therapy, exhibited a higher activation of sterol synthesis by delipidated sera when compared to cells of normal individuals. It is suggested that genetic abnormality in lymphocytes of familial hypercholesterolemic can be dissociated from hypercholesterolemia.

PHOSPHOLIPID-PROTEIN INTERACTIONS IN THE Ca^{2+}-ADENOSINE TRIPHOSPHATASE OF SARCOPLASMIC RETICULUM. A.F. Knowles, E. Eytan and E. Racker (Sec. of Biochem., Mole. and Cell Biol., Cornell Univ., Ithaca, N.Y. 14853) *J. Biol. Chem.* **251**, 5161–5 (1976). Ca^{2+}-adenosine triphosphatase from sarcoplasmic reticulum has been delipidated by gel filtration through a Sephadex G-200 column equilibrated with buffer containing cholate. The delipidated Ca^{2+}-adenosine triphosphatase had negligible adenosine triphosphatase activity, but up to 50% of the ATPase activity was restored when the delipidated enzyme was recombined with phospholipids. It was shown with the delipidated preparation that the phosphorylation of the enzyme by either ATP or P_i was entirely dependent on phospholipids. Among the purified phospholipids, phosphatidylcholine reactivated the adenosine triphosphatase activity better than phosphatidylethanolamine. Vesicles capable of translocating Ca^{2+} were reconstituted from delipidated Ca^{2+}-adenosine triphosphatase and phosphatidylethanolamine, but not with phosphatidylcholine alone. We conclude that the firmly bound phospholipids which are purified together with the adenosine triphosphatase protein are not essential for the pump since they can be substituted by phosphatidylethanolamine isolated from soybeans.

PHOSPHOLIPASES A_1 AND A_2 IN LAMELLAR INCLUSION BODIES OF THE ALVEOLAR EPITHELIUM OF RABBIT LUNG. M.F. Heath and W. Jacobson (Strangeways Res. Lab., Worts' Causeway, Cambridge CB1 4RN, U.K.) *Biochim. Biophys. Acta* **441**, 443–52 (1976). A lamellar body-enriched fraction was prepared from rabbit lung and characterized by electron microscopy, surface activity studies, phospholipid assay and marker enzymes. Both phospholipases A_1 and A_2 were found to be present in lamellar bodies. After these had been ruptured both enzymes were found to be principally in the soluble phase. The possible roles for phospholipases in lamellar body development and in the respiratory distress syndrome of the newborn are discussed.

LIPOPROTEIN LIPASE IN RAT LUNG. EFFECT OF DEXAMETHASONE. M. Hamosh, H. Yeager, Jr., Y. Shechter and P. Hamosh (Dept. of Physiol., and Biophys., Georgetown Univ. Sch. of Med., Washington, D.C. 20007) *Biochim. Biophys. Acta* **431**, 519–25 (1976). The effect of hormone administration on the activity of lipoprotein lipase in the lung was studied in the rat. The following hormones were administered: dexamethasone, L-thyroxine, estradiol-17β and progesterone. In addition, lung lipoprotein lipase activity was studied in diabetic and lactating rats. Lipoprotein lipase activity was measured in dried, defatted preparations of rat lung using double labeled ([^{14}C]palmitate, [^{3}H]glycerol) chylomicron triacylglycerol as substrate. Stimulation of enzyme activity by dexamethasone could lead to increased uptake of triacylglycerol-fatty acids by the lung and may thus be a contributing factor to corticosteroid-induced enhanced surfactant synthesis.

TREATMENT OF HYPERCHOLESTEROLEMIA WITH SECHOLEX. A LONG-TERM CLINICAL TRIAL AND COMPARISON WITH CHOLESTYRAMINE. E.A. Nikkilä, T.A. Miettinen and A. Lanner (Third Dept. of Med., Univ. of Helsinki, Finland) *Atherosclerosis* **24**, 407–19 (1976). The efficacy of an anion-exchange gel, Secholex, as a hypocholesterolemic agent was assessed in 46 patients in 4 different studies and the effects were compared with those of cholestyramine. All patients had severe Type II-a or II-b hyperlipoproteinemia. In short-term metabolic studies Secholex (15 g/day) and cholestyramine (16 g/day) decreased serum cholesterol levels and increased total fecal sterol output and serum methyl sterol concentration to a similar extent, but cholestyramine was more effective than Secholex in increasing fecal bile acid excretion. In crossover studies, the two drugs appeared to be equally effective in lowering serum cholesterol levels but the patients mostly preferred Secholex. It is concluded that Secholex is a relatively safe drug which effectively reduces serum cholesterol levels in two-thirds of patients with severe hypercholesterolemia.

TOTAL SERUM CHOLESTEROL AND URINARY DEHYDROEPIANDROSTERONE IN HUMANS. A. Lopez-S, C. Wingo and J.A. Hebert (Dept. of Med., Louisiana State Univ. School of Med. in New Orleans, New Orleans, La. 70112) *Atherosclerosis* **24**, 471–81 (1976). The relationship between urinary excretion of dehydroepiandrosterone (DHEA) and total serum cholesterol was evaluated in an epidemiological study of coronary risk factors. The results of this study show statistically significant negative correlation ($r = -0.238$; $P = 0.014$) between the urinary excretion of DHEA (mg/g creatinine) and total serum cholesterol. Total serum cholesterol ($r = 0.278$) and to a lesser extent, DHEA ($r = 0.021$) were found to be correlated with age. However, it was determined that the correlation between serum cholesterol and urinary DHEA was not attributable to the effect of age, since the partial correlation coefficient between serum cholesterol and urinary DHEA adjusted for age ($r = 0.240$) was found to be statistically significant ($P < 0.05$). Negative but non-significant correlations were also found between urinary excretion of DHEA and many of the accepted risk factors for coronary heart disease.

CHYLOMICRON METABOLISM IN RABBITS FED DIETS WITH OR WITHOUT ADDED CHOLESTEROL. T.G. Redgrave, K.B. Dunne, D.C.K. Roberts and C.E. West (Dept. of Physiol., Univ. of Melbourne, Parkville, Victoria 3052, Australia) *Atherosclerosis* **24**, 501–8 (1976). Intestinal lymph chylomicrons, isotopically labelled with radioactive triacylglycerol and cholesterol, were injected into normally fed and cholesterol-fed rabbits in order to establish the pattern of clearance of intestinal lipoproteins from the plasma. In normal rabbits the cholesterol moiety of chylomicrons was removed from the plasma less readily than triacylglycerol. In cholesterol-fed rabbits, the clearance of triacylglycerol was unaltered, but clearance of chylomicron cholesterol was further retarded. The majority of the injected lymph cholesterol was recovered in $d < 1.019$ g/ml lipoproteins. These observations support the notions that clearance of chylomicron remnants is impaired in the rabbit, and that hypercholesterolaemia in the cholesterol-fed rabbit is due to an accumulation of chylomicron remnants in the plasma.

MODIFICATION BY PROSTAGLANDINS E_1 AND E_2, INDOMETHACIN, AND ARACHIDONIC ACID OF THE VASOCONSTRICTOR RESPONSES OF THE ISOLATED PERFUSED RABBIT AND RAT MESENTERIC ARTERIES TO ADRENERGIC STIMULI. K.U. Malik, P. Ryan and J.C. McGiff (Dept. of Pharmacology, Center for the Health Sci., The Univ. of Tenn., Memphis, Tennessee) *Cir. Res.* **39**, 163–8 (1976). In isolated perfused rabbit mesenteric arteries, prostaglandin (PG) E_1 and E_2, 1–5 ng/ml, did not alter the basal perfusion pressure, but reduced the vasoconstrictor responses to sympathetic nerve stimulation; the responses to injected norepinephrine were reduced by PGE_1 and variably affected by PGE_2. In contrast, in rat mesenteric arteries PGE_1 and PGE_2, 1–5 ng/ml, potentiated the vasoconstrictor responses to nerve stimulation and to injected norepinephrine. Since these effects of arachidonic acid were abolished by the simultaneous infusion of indomethacin, they appear to be mediated through conversion of arachidonic acid to PG. We conclude that prostaglandins modulate adrenergic transmission in mesenteric arteries and this effect is species dependent.

FLUORESCENCE DEPOLARIZATION STUDIES OF PHASE TRANSITIONS AND FLUIDITY IN PHOSPHOLIPID BILAYERS. 2. TWO-COMPONENT PHOSPHATIDYLCHOLINE LIPOSOMES. B.R. Lentz, Y. Barenholz and T.E. Thompson (Dept. of Biochem., Univ. of Virginia School of Med., Charlottesville, Va. 22901) *Biochemistry* **15**, 4529–37 (1976). The fluorescence depolarization associated with the hydrophobic fluorescent probe 1,6-diphenyl-1,3,5-hexatriene is used to monitor changes in fluidity accompanying the gel-liquid crystalline phase transition in phosphatidylcholine dispersions. In this way, the parameters of the phase transition are determined for both large, multilamellar liposomes and small, single-lamellar vesicles composed of three mixtures of phosphatidylcholines: dimyristoyl-dipalmitoyl, dimyristoyl-distearoyl, and dioleyl-dipalmitoyl. Phase diagrams for these mixed-lipid vesicles are constructed by plotting the delimiting temperatures of the phase transition vs. the lipid composition of the vesicle. The phase diagrams are interpreted to suggest that the miscibilities of the lipids studied are markedly different in small, single-lamellar vesicles and large, multilamellar liposomes. These results are discussed in terms of the effects of high curvature on the structure of biological membranes.

FLUORESCENCE DEPOLARIZATION STUDIES OF PHASE TRANSITIONS AND FLUIDITY IN PHOSPHOLIPID BILAYERS. 1. SINGLE COMPONENT PHOSPHATIDYLCHOLINE LIPOSOMES. B.R. Lentz, Y. Barenholz and T.E. Thompson (Dept. of Biochem., Univ. of Virginia School of Med., Charlottesville, Va. 22901) *Biochemistry* **15**, 4521–8 (1976). The fluorescence depolarization associated with the hydrophobic fluorescent probe 1,6-diphenyl-1,3,5-hexatriene is used to monitor the changes in fluidity accompanying the gel-liquid crystalline phase transition in synthetic phosphatidylcholine dispersions. The parameters of the phase transition are determined for both large, multilamellar liposomes and small, single-lamellar vesicles. These parameters are compared with those obtained using other techniques. In addition, the data are interpreted in terms of two limiting molecular models, which in turn offer insight into the structural differences between multilamellar liposomes and small vesicles.

STUDIES OF THE LIPID BINDING CHARACTERISTICS OF THE APOLIPOPROTEINS FROM HUMAN HIGH DENSITY LIPOPROTEIN. II. CALORIMETRY OF THE BINDING OF APO AI AND APO AII WITH PHOSPHOLIPIDS. M. Rosseneu, F. Soetewey, G. Middelhoff, H. Peeters and W.V. Brown (Simon Stevin Inst., Jeruzalemstraat 34, Brugge, Belgium) *Biochim. Biophys. Acta* **441**, 68–80 (1976). The interactions of lysophosphatidylcholine and synthetic 1,2-dimyristoyl-*sn*-glycerophosphocholine (DMPC) liposomes with the isolated HDL-apolipoproteins, apo AI and apo AII, has been studied by microcalorimetry. Complex formation is a highly exothermal process characterized by a maximal enthalpy of about -200 kcal/mol of apoprotein when added to DMPC at 28°C in 0.05 M sodium carbonate/bicarbonate buffer, pH 9.6. The binding of a constant amount of DMPC to apoprotein mixtures containing various proportions of apo AI and apo AII, demonstrates the existence of a maximal association at a 1:1 molar ratio of the apolipoproteins.

LOW-DENSITY LIPOPROTEINS IN PATIENTS HOMOZYGOUS FOR FAMILIAL HYPERBETALIPOPROTEINAEMIA. G.L. Mills, C.E. Taylaur and M.J. Chapman (Courtauld Inst. of Biochem., Middlesex Hosp. Med. School, London, England) *Clin. Sci. Mole. Med.* **51**, 221–31 (1976). The low-density lipoproteins (LDL; density 1·007–1·063 g/ml) from two patients homozygous for familial hyperbetalipoproteinaemia have been submitted to chemical and physicochemical analysis. The presence of an anomalous lipoprotein with a low proportion of triglyceride and a raised proportion of cholesterol has been confirmed. In one patient, this lipoprotein accounted for about 85% of the LDL, but in the second, the amount varied from about 85% to a point at which it could not be detected among the coexisting normal lipoproteins. The protein moiety of this anomalous LDL has effectively the same amino acid composition as that derived from the LDL of healthy subjects. The proportions of carbohydrate, phospholipid and fatty acids could not be reliably distinguished from those of normal LDL. The molecular weight and diffusion constant of the abnormal lipoprotein, even in the purest preparation, were close to the values determined for normal LDL of similar flotation rate.

EFFECT OF DIETARY CHROMIUM ON GLUCOSE TOLERANCE AND SERUM CHOLESTEROL IN GUINEA PIGS. A.M. Preston, R.P. Dowdy, M.A. Preston and J.N. Freeman (Dept. of Agr. and Natural Resources, Nutr. Res. Lab., Lincoln Univ., Jefferson City, Mo. 65101) *J. Nutr.* **106**, 1391–7 (1976). The effects of feeding three levels of dietary chromium (Cr) to non-pregnant guinea pigs, guinea pigs during pregnancy and lactation and F-1 offspring guinea pigs on weight gain, glucose tolerance, glucose peak time value and serum cholesterol concentration has been investigated. Dietary levels of Cr were: Basal Diet (B) = 0.125 ppm; B supplemented with 0.5 ppm Cr (S_1 Diet) and B supplemented with 50 ppm Cr (S_2 Diet). All groups had similar weight gain patterns and daily feed intake levels. Parent generation guinea pigs fed the B diet consumed less than 10 μg Cr/kg body weight/day while F-1 guinea pigs consumed more than this amount. Mortality rates during pregnancy were greater in guinea pigs fed the B diet than in the Cr supplemented groups suggesting a possible protective effect by Cr. Glucose tolerance, glucose peak time values and serum cholesterol appeared to be more affected by pregnancy and generation of guinea pigs than by the level of dietary Cr. Results suggest that species differences may exist between Cr requirements of guinea pigs and rodents for avoiding glucose intolerance.

PHOSPHOLIPID ACYL GROUP STABILITY IN CULTURED FIBROBLASTS. DIFFERENCES BETWEEN HUMAN CELL LINES OF FETAL AND ADULT ORIGIN. M.D. Rosenthal and R.P. Geyer (Dept. of Nutr., Harvard Sch. of Public Health, 665 Huntington Ave., Boston, Mass. 02115) *Biochim. Biophys. Acta* **441**, 465–76 (1976). Human fibroblasts of both fetal and adult origin incorporated [1-^{14}C]acetate primarily into phospholipid acyl groups (70–80% of total radioactivity). When these labeled cells were replated in non-radioactive medium, there was continuous loss of ^{14}C from steroids, triacylglycerols and non-lipid material. In contrast, after some initial loss, cell lines of fetal origin completely retained ^{14}C in cellular phospholipids during continued cell division. Unlike cells of fetal origin, fibroblasts of adult origin continued to lose radioactivity from their phospholipid acyl groups during growth in unlabeled medium. Loss of radioactivity from [1-^{3}H]acetate incorporated into phospholipids of adult cells cannot be attributed to cell death since it was not accompanied by any loss of previously incorporated [*Me*-^{14}C]thymidine. If cellular phospholipids were labeled with [U-^{14}C]glycerol, both fetal and adult fibroblasts continued to lose radioisotope from the cells during growth in nonradioactive medium. Thus, there is turnover of the phospholipid molecules themselves in fetal human fibroblasts grown in vitro, but their acyl groups are retained within cellular phospholipids. In this respect, fibroblasts of fetal origin resemble established cell lines such as the L fibroblast. Fibroblasts of adult origin do not exhibit this complete conservation of their phospholipid acyl groups. ●

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