

## • Fats and Oils

THERMO-ANALYTICAL RESEARCH OF LARD AND CACAO BUTTER. B. Lorant, G. Rajky and M. Takacs (Inst. for Food Control and Chem. of Budapest, Director: O. Vajda). *Seifen-Ole Fette-Wachse* 98(5), 107-9 (1972). Composition of the fatty acid part of lard depends upon the diet of the pig. The different compositions can be detected through thermo-analysis. The test results were completed by gas-chromatographic analysis. The same procedures was applied to cacao butter and to cacao butter substitutes.

ADSORPTION AT THE OIL-WATER INTERFACE: BOTH ENERGY BARRIER AND DIFFUSION CONTROLLED KINETICS. A.G. Bois, J.F. Baret and R. Roux (Lab. of Physics of Liquids, Faculty of Sciences, Marseille, France and the Superior School of Engineers, Univ. Saint-Joseph, Beyrouth, Lebanon). *Kolloid-Z. u. Z. Polymere* 249, 1144-7 (1971). Both energy barrier and diffusion play a role in adsorption kinetics. Two different equations are obtained using a localized and non-localized model for the adsorbed layer. In order to test these models the adsorption of steroids at the oil-water interface was investigated. It has been found that none of the models give an accurate description of the adsorption kinetics from beginning of adsorption up to equilibrium.

AUTOMATED DETERMINATION OF MILK FAT IN MILK. L. Stookey, A. Conetta, and H. Zehnder (Technicon Industrial Systems, Tarrytown, N.Y. 10591). *J. Dairy Sci.* 55, 403-7 (1972). The Technicon Auto-Analyzer has been adapted to the determination of milk fat in milk. A sample is dissolved in acetic acid containing a surfactant, and milk fat is re-suspended as uniform colloidal globules by addition of water. Absorbance of the suspension is measured at 600 nm. Linear response from 1.5 to 7% milk fat is obtained. No interference from protein or lactose is encountered. The correlation coefficient is 0.96 between either the Babcock or Gerber method and the automated turbidimetric method.

FATTY ACID COMPONENTS OF INDIAN-GROWN SOYABEAN OILS. G.K. Viswanadha Rao, M.R. Subbarham and K.T. Achaya. *Indian J. Tech.* 9 No. 7, 265-7 (1971). Gas chromatographic analyses of oils from a large number of Indian-grown soyabean, as well as a few exotic samples, show an I.V. variation of from 106 to 133. A fairly typical oil sample of I.V. 122 will have the following component fatty acids (% by wt.): palmitic 14.5, stearic 5.5, oleic 24, linoleic 52 and linolenic 4. The total minor components do not exceed 1.0%. Equations relating I.V. with fatty acid composition have been developed. The equations show different patterns above and below I.V. 120. The low linolenic acid content of Indian oils should make for less off-flavour problems and easier saturation during commercial hydrogenation. (World Surface Coatings Abs. No. 356)

FATTY ACID COMPOSITION OF THE OIL FROM THE SEED OF *ERYTHRINA LITHOSPERMA*. S.P. Tandon, K.P. Tiwari and A.P.

Gupta. *Indian Oil Soap J.* 34 No. 7, 151-4 (1969). Fatty acid composition of the oil has been studied by joint application of the urea adduct formation method and paper chromatography. The percentages of the different fatty acids are: lignoceric 4.1, behenic 5.7, arachidic 4.16, stearic 5.81, palmitic 7.73, oleic 42.85, linoleic 27.03 and linolenic 2.34. (World Surface Coatings Abs. No. 356)

RELIABILITY OF GAS CHROMATOGRAPHY FOR THE ANALYSIS OF FATTY ACIDS. F.H. De La Court, N.J.P. Van Cassel and A.M.J. Van Der Valk. 44 No. 7/8, 241-7 (1971). Results of a cooperative exercise by 10 Dutch laboratories on the analysis of methyl esters of mixed fatty acids and of natural oils after conversion of the acids to methyl esters are reported. There was a fairly wide spread of results in both cases and reasons for the discrepancies are examined. (World Surface Coatings Abs. No. 356)

SEPARATION OF ORGANIC ACIDS BY THIN LAYER CHROMATOGRAPHY ON GRADIENT LAYERS. O. Schettino and L. Ferrara. *Riv. Ital. Sostanze Grasse.* 47 No. 9, 450-5 (1970). Solvent systems of various polarities were used for examination of the TLC behavior of 10 fatty acids (C<sub>6</sub> to C<sub>22</sub>) on gradients of silica gel changing to silica gel plus AgNO<sub>3</sub>, kieselguhr to silica gel plus AgNO<sub>3</sub>, silica gel to kieselguhr, and silica gel to polyamide, and also for oxalic, succinic, glutaric, adipic, pimelic, suberic, azelaic and sebacic acids on silica gel to kieselguhr and silica gel to alumina gradients. Various spray reagents were used for location of the acids, and R<sub>F</sub> values are tabulated. A method for establishing conditions for maximum separation of any pair of acids is illustrated for the pairs octanoic-decanoic and oleic-ricinoleic. Portions of test solution were applied along the edge of the plate, which was developed at right angles to the gradient, i.e. in adsorbent layers of graduated percentage composition, from which the zone of maximum separation was obtained by plotting R<sub>F</sub> value against distance along the gradient. (World Surface Coatings Abs. No. 356)

PETROLEUM ETHER-SOLUBLE LIPOPROTEIN OF BARLEY FLOUR. R.C. Hoseney, Y. Pomeranz, J.D. Hubbard and K.F. Finney (Hard Winter Wheat Qual. Lab., Dept. of Grain Sci., and Ind., Kansas State Univ., Manhattan, Ks.). *Cereal Chem.* 48, 223-29 (1971). Water-saturated butanol precipitated a protein fraction from the petroleum ether-soluble oil of barley flour. The protein fraction (0.84% of the total free oil) contained 45.0% protein and 24% carbohydrate. The protein migrated as a doublet during starch-gel electrophoresis. The lipoprotein contained relatively high amounts of the amino acids lysine, arginine and cysteine. The protein isolated from barley flour oil appeared to have properties that were similar to those of the protein fractions isolated from wheat flour oil.

SEPARATION OF MAMMALIAN NEUTRAL LIPIDS BY CHROMATOGRAPHY ON GLASS-FIBER PAPER IMPREGNATED WITH SILICA GEL. Dorothy M.E. Poccock, Shelia Rafal and A. Vost (McGill Univ. Med. Clinic, The Montreal Gen. Hosp., Montreal, Canada). *J. Chromatog. Sci.* 10, 72-6 (1972). This paper describes

### The American Oil Chemists' Society Announces Four SHORT COURSES ON HUMAN HYPERLIPEMIAS

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Mornings devoted to theory, afternoons to practical demonstration

For more information see p. 142A of April JAOCS or contact: Dr. Daniel L. Azarnoff, The University of Kansas Medical Center, Clinical Pharmacology—Toxicology Center, Rainbow Boulevard at 39th Street, Kansas City, Kansas 66103 or Nicholas Pelick, Supelco, Inc., Supelco Park, Bellefonte, Pennsylvania 16823.

uniform and complete separation of mammalian neutral lipids (cholesteryl esters, triglycerides, free fatty acids, diglycerides and polar lipids) by ascending chromatography on glass-fiber paper in a one-dimensional, single-development system (isooctane, benzene, acetic acid, acetone). A maximum of 35 min is required for development and visualization of chromatograms. Previously, comparable separation of neutral lipids required thin-layer chromatography with extra long plates and two successive development systems.

EFFECTS OF FLOUR LIPIDS ON COOKIE QUALITY. L.T. Kissell (ARS, USDA, Soft Wheat Qual. Lab., Ohio Agr. Res. and Dev. Ctr., Wooster, Ohio 44691), Y. Pomeranz and W.T. Yamazaki. *Cereal Chem.* 48, 655-62 (1971). Flours of 4 wheat varieties, defatted with petroleum ether, produced smaller cookies with reduced top-grain definition than parent whole flours. Return of unfractionated free lipids to defatted flours at normal concentration restored original spread and top-grain quality. Polar and nonpolar lipid fractions alone were only partially effective in improving defatted flour; both were required for full restoration of quality. Thin-layer chromatography of lipid extracts revealed no detectable varietal differences. Flour-lipid interchange by variety produced no cookie quality differences owing to free lipid source. Cookie characteristics at normal lipid concentration were determined by varietal properties of defatted flour residues. Both whole (parent) and defatted flours increased progressively in cookie spread and top-grain score when treated with free lipids at 1.5X, and 3X normal levels.

EXTRACTIVE COMPONENTS FROM THE SEED OF MYRISTICA CAGAYANENSIS MERR. Y.T. Lin, Y.H. Kuo and S.T. Kao (Dept. of Chem., National Taiwan Univ., Taipei, Taiwan, China). *J. Chin. Chem. Soc. (Taipei)* 18, 45-9 (1971). The *n*-hexane extracts of *Myristica cagayanensis* Merr. was partitioned between *n*-hexane and 85% ethanol. Triglycerides of myristic acid was the major constituent in the upper layer. Four crystalline compounds were isolated from the lower layer, one of which,  $C_{20}H_{38}O_2$ , was tentatively assigned, from the spectroscopic data and chemical behaviour, as 2-isopropyl-3-(3',4'-methylenedioxy-phenyl)-4,5-methylenedioxyindanone-1 or 2,3-dimethyl-4-(3',4'-methylenedioxyphenyl)-5,6-methylenedioxy-tetralone-1.

SEPARATION OF FREE ACIDS  $C_2-C_6$  IN DILUTE AQUEOUS SOLUTION COLUMN TECHNOLOGY. D.M. Ottenstein and D.A. Bartley (Supelco, Inc., Supelco Park, Bellefonte, Pa. 16823). *J. Chromat. Sci.* 9, 673-81 (1971). Free acids,  $C_2-C_6$ , are strongly adsorbed by the diatomite support, metal column tubing, metal on the inlet side of the chromatographic column as well as glass wool used as column plugs. Silanized supports and silanized glass wool are also unsatisfactory for use with free acids. Acid additives to the stationary phase are important for deactivation of both the support and metal column tubing. Phosphoric acid appears to be the most effective acid additive. Glass column tubing does not adsorb acids. Teflon is an inert support for acids, but cannot be used to prepare the highly efficient columns normally required. Low polarity stationary phases are effective in separation of the iso-butyric/propionic acid pair. These include the SP-1200 stationary phase and the Chromosorb 101 porous polymer.

EFFECT OF PLANTING DATE AND SOUTHERN CORN LEAF BLIGHT ON THE FATTY ACID COMPOSITION OF CORN OIL. M.D. Jellum (Univ. of Ga. College of Agr. Exp. Stations, Georgia Station, Experiment, Ga. 30212). *Cereal Chem.* 48, 663-9 (1971). Eight commercial corn hybrids were planted on each of 3 different dates in 1969 and 1970. Southern corn leaf blight did not occur in 1969, but a severe disease epidemic occurred in 1970 and greatly reduced yields of susceptible hybrids in the second and third planting dates. Fatty acid composition of oil was determined for each hybrid from each planting date and year. Hybrids were significantly different for all fatty acids in both years. Planting dates had a small influence on only palmitic and stearic acids in 1969, but all fatty acids (except linolenic) were significantly different among planting dates in 1970. One hybrid resistant to infection by leaf blight and one hybrid with intermediate resistance showed identical trends in oil composition among planting dates, as did hybrids susceptible to leaf blight. Therefore, it was concluded that Southern corn leaf blight did not influence oil composition.

STABILITY OF INTERMEDIATE MOISTURE FOODS. 1. LIPID OXIDATION. T.P. Labuza, L. McNally, D. Gallagher, J. Hawkes and F. Hurtado (Dept. of Nutr. and Food Sci., M.I.T., Cambridge,

Mass. 02139). *J. Food Sci.* 37, 154-9 (1972). Intermediate moisture foods (IMF) are subject to chemical and biochemical deterioration. Lipid oxidation rates become maximized in the IMF range but can be moderated by antioxidants. However, the method of preparation is also important in terms of which branch of the sorption hysteresis loop is followed. Rancidity develops much slower at similar solids content and water activity if the food is at the lower moisture content of the adsorption branch. This may be due to several factors including catalyst mobility, viscosity, dissolved solutes and swelling.

CHANGES IN THE LIPID SOLUBLE CARBONYLS OF BEEF MUSCLE DURING AGING. J.D. Sink and P.W. Smith (Div. of Food Sci. and Ind., The Penn. State Univ., University Park, Pa. 16802). *J. Food Sci.* 37, 181-2 (1972). Muscle samples were excised from the rib of 3 USDA Choice crossbred Hereford steer carcasses after exsanguination (0-days), and after 3, 8, and 14 days of aging at 3C. The carbonyl analyses were conducted on hexane extracts. Results indicated that after 3 days aging, the total carbonyl content was twice that present at slaughter whereas the amount of monocarbonyls had increased three times. However, after 14 days, the total carbonyls present represented a threefold increase over the amount initially present and the monocarbonyls showed a fourfold increase. Generally, the monocarbonyls accounted for 35-40% of the total carbonyls present. The methyl ketones constituted the largest group of monocarbonyls, ranging from 75-87%.

A PROCEDURE FOR ISOLATION AND QUANTITATIVE DETERMINATION OF VOLATILE FATTY ACIDS FROM MEAT PRODUCTS. II. Halvarson (Swedish Meat Res. Ctr., S-244 00 Kävlinge, Sweden). *J. Food Sci.* 37, 136-139 (1972). A methodology was developed for determination of the composition of volatile fatty acids in meat products. By applying this technique the fatty acid components from  $C_1$  up to  $C_6$  can be reproducibly isolated and analyzed in concentrations down to about 0.05 milligram acid/gram meat product. The accuracy of the whole procedure for a particular acid was estimated to be within  $\pm 10\%$  relative error for concentrations greater than 1.0 milligram fatty acid/gram meat product.

2. OPTIMIZATION OF FILM FORMATION. *Ibid.*, 40-44. Optimization studies of heat-induced protein-lipid surface film formation were conducted with natural soy milks at various concentrations, pH's and temperatures. The optimal conditions for film processing were: (1) a thoroughly emulsified dispersion of protein and lipid with a soluble solids content of 4-6%; (2) a pH range from 6.5-9.0; and (3) a temperature of 90-100C. Also model system studies were made with a 3.0% concentration of soy protein isolate with varied secondary components. The optimal concentrations of major components were 2-3% water-dispersible protein (based on optimal soy-milk concentration), 0.5-3.0% neutral lipids and about 0.1% phospholipids. The relative importance of major components and optimal conditions for film production were assessed by measurement of film yield, rate of film formation and protein incorporation efficiency. Total soybean protein recovery in films increased from 47% under the traditional method to 65% under optimal conditions.

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A SIMPLE SEPARATION OF NEUTRAL LIPID CLASSES WITH TWO DIMENSIONAL THIN-LAYER CHROMATOGRAPHY. D.C. Palmer, J.A. Kintzios and N.M. Papadopoulos (Div. of Biochem., Walter Reed Army Inst. of Res., Walter Reed Army Med. Ctr., Washington, D.C.). *J. Chromatog. Sci.* 10, 107-9 (1972). A two-dimensional thin-layer chromatographic system for the separation of classes of neutral lipids is described. Silica Gel G precoat (with binder) are used as the adsorbent with development in lined, initially dry, chambers with no prior equilibration of the system. The main lipid classes separated are: cholesteryl esters, triglycerides, fatty acid methyl esters, fatty acids, 1,3-diglycerides, 1,2-diglycerides, cholesterol and monoglycerides. Limited separation of unsaturated triglycerides is also demonstrated.

SIMULTANEOUS RECOVERY OF PROTEIN AND OIL FROM RAW PEANUTS IN AN AQUEOUS SYSTEM. K.C. Rhee, C.M. Cater and K.F. Mattil (Food Protein R&D Center, Texas Eng. Exp. Sta., Texas A&M Univ., College Station, Tx. 77843). *J. Food Sci.* 37, 90-93 (1972). The feasibility of using an aqueous system for the simultaneous recovery of peanut oil and food grade protein concentrates and isolates directly from raw peanuts was investigated. The effects of such pertinent processing parameters as degree of grinding, solids-to-solvent ratio, extraction time and temperature, pH of extraction and protein precipitation and various salts at different concentrations on the recovery of oil and protein concentrates and isolates were determined. Under optimized conditions, approximately 96% of the oil and 94% of the proteins present in the peanuts were recovered when protein concentrates were prepared by employing an initial isoelectric centrifugation procedure whereas approximately 92% of the oil and proteins were recovered under the conditions of protein isolate preparation by an initial alkaline extraction method.

## New Books

Lou Going, Book Review Editor

PROCEEDINGS SOS/70 THIRD INTERNATIONAL CONGRESS FOOD SCIENCE AND TECHNOLOGY (Washington, D.C., August 1970), Edited by G.F. Stewart and Calvert L. Willey (Institute of Food Technologists, 1971, 940 p., \$15.00).

The welcoming remarks indicate ". . . perhaps the most critical need the world faces in the next few years. . . is the problem of feeding a world population which is growing without prospect of early effective restraint and which even now is not fed satisfactorily in either quantity or quality. That is why we have chosen the theme of "Science of Survival" for this meeting."

This is a hard cover collection of 140 papers varying in length from 2-18 pages. The papers are, generally, well-referenced. No discussion is appended.

The general topics listed in the Table of Contents are: (1) Plenary Sessions; (2) Education for Food Science and Technology; (3) Information and Documentation; (4) Food Acceptance in a Changing World; (5) Nutritional Considerations in the Application of Food Technology; (6) New Sources of Proteins; (7) Food Fat and Human Health; (8) Biological Evaluation of the Nutritive Value of Foods; (9) Sensory Properties of Foods (Flavor); (10) Food Engineering; (11) Food Preservation and Protection; (12) Physical and Chemical Properties of Foods; (13) Food Safety; (14) Food Laws and Regulations; (15) Water Supply and Water Disposal.

So varied are the topics that political, social and economic as well as technical aspects of "Science of Survival" are presented.

This book would be of general interest to food scientists and technologists and to those concerned with food problems of developing countries.

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SOY PROTEIN-LIPID FILMS. 1. STUDIES ON THE FILM FORMATION PHENOMENON. L.C. Wu and R.P. Bates (Food Sci. Dept., Univ. of Florida, Gainesville, Fla. 32601). *J. Food Sci.* 37, 36-39 (1972). The phenomenon of soy protein-lipid film formation has been studied with soy milk and model systems of soy protein isolate (SPI), phospholipids, vegetable oil and sucrose, in attempts to define the effect of these components on heat induced protein-lipid surface film formation. Water-dispersible protein had the primary role in film formation. Of the secondary components phospholipids were more capable of combining with SPI than were neutral lipids. Carbohydrate was least capable of incorporation and was not essential. However, all the secondary components tended to help the film formation on the surface of heated (85C) aqueous dispersion of SPI, and film yield did not decrease as long as the concentration of protein was maintained within a critical range (1.5-3.0%) and secondary components were at about 0.9%. The film formation phenomenon is hypothesized as based on protein denaturation, endothermic polymerization of protein and lipid-protein interaction.

METHYL BROMIDE RESIDUES IN OILS. E. Listopadeva et al. *Prumysl Potravin* 23(2), 40-3 (1972). The authors studied experimentally the possibility of treating oil seeds with methyl bromide and methods for its subsequent elimination. The study was carried out on sea cabbage, poppyseed, sunflower, rapeseed and peanut, both decorticated and non-decorticated. The residues could not be eliminated by heating or by aeration. However, the amount remaining in the oils extracted from the treated seeds was negligible. (Rev. Franc. Corps Gras)

DEPENDENCE OF THE QUALITY OF BUTTER ON THE CONTENT OF UNSATURATED FATTY ACIDS. P.N. Andreev et al. *Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol.* 1971(6), 74-7. Prolonged storage of unsalted butter at -18C results in oxidation, especially of highly unsaturated fatty acids. Under these conditions, oleic acid is hardly touched. The most important changes are those which the non-conjugated unsaturated fatty acids undergo, conjugated acids being only slightly affected. The quality of butter in prolonged storage is directly correlated with the decrease in the amount of non-conjugated highly unsaturated fatty acids and the acidity of the butter serum. Storage stability depends on the initial content of these fatty acids as well as their ratios to one another. (Rev. Franc. Corps Gras)

EFFECT OF DIFFERENT FACTORS ON THE EXTRACTION OF CORN OIL. N.M. Minasjan et al. *Mashlozhir. Prom.* 38(1), 8-10 (1972). The form of the particles, their size and the moisture content of the presseake have significant effects on the extraction of the oil. The effect on the extraction process exerted by the moisture content of the corn germ obtained by the dry process is greater than that exerted by the moisture content of the presseake resulting from germs obtained by the wet process. It is convenient to extract the germs at 5-8% moisture and the presseake at 10% moisture. In the treatment of corn presseake, flake form is preferable to meal. (Rev. Franc. Corps Gras)

EFFECT OF THE COMPOSITION AND THE PROPERTIES OF THE LIPID COMPONENT ON WHEAT STARCH. L.I. Puckova et al. *Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol.* 1971(6), 26-8. The addition to wheat starch of sunflower oil and of a mixture of sunflower oil with 5-10% of hydrogenated cottonseed oil alters the temperature of maximal gelatinization, the time when the maximum is reached and the viscosity of the aqueous lipid-starch suspension. The essential variations in these properties occur during temperature changes from 30 to 90C. Addition of the hydrogenated oil improves the quality of starch bread. (Rev. Franc. Corps Gras)

THERMAL CONDUCTIVITY OF SUNFLOWER SEEDS. I.G. Korateev et al. *Izv. Vysshikh Uchebn. Zavedenii, Pishchevaya Tekhnol.* 1971(6), 23-5. The increase in the moisture content of sunflower seeds from 6 to 17.8% is accompanied by a linear increase in their apparent density, specific weight and specific heat. Increase in the moisture content of the seeds to 11% leads to an increase of the cooling time, of the coefficient of thermal diffusivity, and to a decrease in the thermal resistance. Further increases in moisture content do not affect the quantities mentioned, except the coefficient of thermal diffusivity which is lowered. (Rev. Franc. Corps Gras)

A PROPOSED IMPROVEMENT IN THE AOM TEST WITH PARTICULAR REFERENCE TO BEEF TALLOW. J.P. Rialland (Laiteries F.

(Continued on page 246A)

## • Abstracts . . .

(Continued from page 244A)

Bridel, 35-Retiers). *Rev. Franc. Corps Gras* 19, 37-42 (1972). Changes in various chemical indices during the AOM test on tallow were studied. These indices were the peroxide value, color, TBA value and ultraviolet absorption, on both the volatile and nonvolatile fractions. The same indices were followed in tallows to which copper soaps had been added. It was concluded that the oxidation processes were the same in each case. The copper decreased the induction period by 90%, and the test took 4 hours instead of the usual 40. It is proposed that copper be used as standard procedure to speed up the test.

ANALYSIS OF THE STEROL COMPOSITION OF COCOA BUTTER. H. Chaveron (C.T.U., Paris). *Rev. Franc. Corps Gras* 19, 21-36 (1972). The results from a 12 laboratory collaborative testing program on cocoa butter and on cocoa butter mixed with 20% mutton tallow are presented. The program included determination of the amount of unsaponifiables and total sterols. The sterols were fractionated by GLC. Results were analyzed statistically. Analysis of sterols by GLC can be used for controlling the purity of cocoa butter.

GAS CHROMATOGRAPHY IN THE FATS AND OILS INDUSTRY IN THE UNITED STATES. STATE OF KNOWLEDGE IN 1971. L.D. Metcalfe (Armour Ind. Chem. Co., McCook, Ill.). *Rev. Franc. Corps*

*Gras* 19, 7-12 (1972). Areas covered in this review are the following: instrumentation, GLC of methyl esters, preparation of fatty acid esters, GLC of free fatty acids, GLC of glycerides, GLC of fatty acid derivatives, and determination of other compounds such as chick edema factor, chlorinated phenols and antioxidants in fats and oils.

COTTONSEED PHOSPHOLIPIDS. I. COLUMN CHROMATOGRAPHIC FRACTIONATION OF COTTONSEED OIL AND COTTONSEED PHOSPHOLIPIDS. A.S. El-Noekrashy and Y. El-Shatory (Fats Lab., Nat. Res. Center, Dokki, Cairo, U.A.R.). *Rev. Franc. Corps Gras* 19, 13-19 (1972). Cottonseed oil was fractionated on a silicic acid column with subsequent thin-layer chromatographic identification of the isolated lipids. The compounds found were: sterol esters, 0.3%; triglycerides, 92.2%; free fatty acids, 3.8%; sterols, 0.9%; cerebrosides, 0.5%; cephalins, 1.1%; lecithin, 0.8%; and phytylglycerol, 0.4%. Fatty acid patterns revealed that the total saturated fatty acids content of the cephalin and lecithin fractions was considerably higher than of the triglycerides. Column and thin-layer chromatography of the mixed phospholipids isolated from crude hydraulic pressed, screw pressed, prepress-solvent and solvent extracted oils, revealed no significant differences in the relative amounts of the phospholipid fractions isolated from the 4 oil samples. The total cephalins and lecithin constituted more than 70% of the mixed phospholipids. Palmitic and stearic acids were present in higher amounts in the phospholipids than in the crude oils, while linoleic acid was present in lower amounts.

NICKEL- OR COPPER-ON-SILICA HYDROGENATION CATALYSTS. G. Gobrun and M. Motillon. *U.S.* 3,652,458. The catalysts are prepared by reaction between a water soluble salt of the metal and an alkaline reagent such as NaOH in water. A highly pure silica is used as carrier. The insoluble metallic compound from the reaction is washed, dried, and then reduced with hydrogen at an elevated temperature.

PARTIAL FATTY ESTERS OF GLYCEROL AND POLYGLYCEROL STABILIZED WITH ORGANIC PHOSPHITES. O.S. Kauder (Argus Chem. Corp.). *U.S.* 3,654,178. The partial esters contain at least 40% monoester and have an iodine value of less than 15. The organic phosphite stabilizer makes the composition resistant to deterioration at temperatures in excess of 200C. The compositions are used as surfactants and dispersing agents.

PROCESS FOR THE SEPARATION OF MIXTURES OF FATTY ACIDS AND ROSIN ACIDS. A. Koebner. *U.S.* 3,654,255. A mixture of esterified fatty acids and rosin acids is neutralized by reaction with an alkali metal or ammonium base in aqueous solution and in the presence of at least one mole (per mole of rosin acid) of an alkali metal or ammonium aryl or alkylaryl sulfonate. The mixture is allowed to stand until it separates into two layers. The upper layer consists of the fatty acid esters and the lower one contains the salts of the rosin acids. The two layers may then be mechanically separated and their constituents recovered. The process is particularly applicable for removing unsaponifiables from crude tall oil.

METHODS OF CONVERTING COCOA BUTTER TO FREE ACIDS. C.S. Castner (Schuyler Dev. Corp.). *U.S.* 3,654,327. The method consists of melting the cocoa butter, reacting it with caustic at high temperature to complete hydrolysis, and then acidifying to pH 6.6-6.8. The reaction product is then washed and recovered.

CONTINUOUS RENDERING PROCESS. D.P. Madsen and J.H. Pikel (Chemtron Corp.). *U.S.* 3,655,702. There is provided an improved method and apparatus for the continuous rendering of fatty material. The raw material is first passed through a rendering evaporator for separating fat and cracklings. A vacuum is maintained in the evaporator to aid in the removal of moisture. Airlocks are provided at the entrance and exit of the evaporator to prevent the entry of air as the material passes through.

## • Convention Site . . .

(Continued from page 234A)

Located in the Gatineau Hills is Kingsmere, the summer estate of the Rt. Hon. W.L. MacKenzie King, a late Prime Minister of Canada. One of the highlights of the ladies' program will be a visit to the teahouse on the estate and entertainment by a Canadian folksinger.

For those who may be driving to the convention, Ottawa is just 476 miles from Cleveland, 498 from Detroit, 505 from Boston and 795 from Chicago. An exciting program has been arranged for those who accompany their spouses to the AOCS Fall Meeting. Ladies' program chairman Mrs. Bernd Weinberg notes that Ottawa is usually having its Indian Summer at the end of September. The weather should be mild and pleasant during the day and cool in the evenings. However even in Ottawa the weather can be unpredictable, so it would be best to bring a raincoat and some clothing suitable for temperatures in the low 50's.

## • Ladies Program . . .

(Continued from page 235A)

on the Mall, to the Bytown Museum or the Parliament Buildings could be arranged if desired.

Evening Banquet followed by dancing.

### WEDNESDAY—September 27

Morning Continental breakfast at the Burgundy Room. Local tours to National Art Centre, National Gallery, Archives, etc.

Afternoon Free time.

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## • Fatty Acid Derivatives

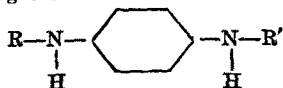
**CATALYTIC EPOXIDATION IN SITU OF SOME OIL TYPES.** M.M. Hassan El-Mallah et al. (Nat. Res. Center, Dokki-Kairo/UAR). *Seifen-Ole Fette-Wachse* 98(4), 75-78 (1972). Epoxidation in situ has been carried out on cotton seed oil, soya bean oil and linseed oil. Catalysts were ammonium sulfate and stannous chloride. The most effective catalysts with best reaction times have been investigated.

**PREPARATION OF PHOSPHATIDES.** H. Pardun (Lever Bros.). *U.S. 3,652,397*. Modified phosphatides of improved emulsifying power and suitable for use as anti-spattering agents in margarine are obtained by the partial hydrolysis of a vegetable phosphatide with an enzyme preparation containing lipase and phospholipase A until 2-15% of lysophosphatides are formed. Free fatty acids are then removed by solvent extraction.

**POLYMERIC FATTY ACID POLYAMIDE RESIN INK BINDER.** D.W. Glaser and P.D. Whyzmuzis (General Mills, Inc.). *U.S. 3,652,469*. The resins are obtained by reacting an acid mixture comprising a polymeric fatty acid and a low aliphatic monocarboxylic acid with an amine mixture comprising an alkaline diamine and a polyhexamethylene polyamine, such as bis(hexamethylene) triamine. The resins are useful in flexographic ink where they perform as a binder. Alcohol solutions of the resins are generally used.

**EPOXIDATION OF SOYBEAN OIL.** L.H. Dierdorf, Jr. and J.H. Kosciolk (FMC Corp.). *U.S. 3,655,698*. A method is disclosed for increasing the oxygen content of oxidizable organic materials by contacting the materials with a vaporous effluent containing 5% by weight of peracetic acid coming directly from a generator. The method is useful in epoxidizing ethylenically unsaturated organic compounds and in bleaching liquids, textiles, and wood pulp.

**STABILIZATION OF UNVULCANIZED OIL-EXTENDED INTERCONNECTED LINEAR-RUBBERY-POLYMERS.** A.E. Oberster and E.E. Schroeder (The Firestone Tire and Rubber Co.). *U.S. 3,657,170*. Stabilization is achieved by means of a synergistic mixture of (a) a substantial amount of a fatty acid having 12-22 carbon atoms per molecule and (b) a substantial amount of a compound having the formula



in which R is a phenyl, tolyl, straight chain alkyl, branched chain alkyl, cycloalkyl, or hydroxyalkyl group containing 3-8 carbon atoms and R' is a straight or branched chain alkyl, cycloalkyl, or hydroxyalkyl group containing 3-8 carbon atoms.

## • Biochemistry and Nutrition

**EFFECT OF EXERCISE ON DEVELOPMENT OF ATHEROSCLEROSIS IN SWINE.** R.P. Link, W.M. Pedersoli and A.H. Safanie (Dept. of Physiol. and Pharmacol., College of Vet. Med., Univ. of Ill., and Ill. Agr. Exp. Station, Urbana, Ill.). *Atherosclerosis* 15, 107-22 (1972). Two groups of female and 2 groups of male miniature pigs (11 per group) were used to study the effect of exercise on the development of atherosclerosis. The pigs were maintained on a diet low in cholesterol and fat until 16 months of age at which time this study was initiated. One pig was randomly selected from each group and necropsied immediately before the study was initiated. The cardiovascular systems were examined for atherosclerosis. None was found. One group of each sex was trained and conditioned for sustained exercise on a treadmill. When the animals were reasonably well conditioned after 3 weeks of exercise, all groups were fed an atherogenic diet. The trial was of 22 months duration. Feeding the atherogenic ration increased the blood lipids in all groups. However, the differences in the serum cholesterol, triglycerides, total lipids and plasma fibrinogen between the groups of each sex were not significant. Differences between males and females were significant. There were significant differences in the extent of atherosclerosis between the exercised and the non-exercised pigs. Weight of the hearts in relation to body weight was slightly greater in the exercised than in the non-exercised pigs but the differences were not significant. This may have been due partly to the greater amount of fat on hearts from non-exercised pigs. Coronary arteries were also slightly larger in the non-exercised pigs. The exercised pigs consumed more of the diet,

gained less weight, had less atherosclerosis and less total body fat than the non-exercised pigs.

**CHOLESTEROL VEHICLE IN EXPERIMENTAL ATHEROSCLEROSIS.** D. Kritchewsky, H.K. Kim and Shirley A. Tepper (Wistar Inst. for Anatomy and Biology, Philadelphia, Pa. 19104). *Atherosclerosis* 15, 101-5 (1972). Rabbits were fed diets containing 2% cholesterol and 6% of either rapeseed oil (RSO) or corn oil (CO). In three experiments there were no differences in atherogenicity of the two oils. Serum cholesterol and liver triglyceride levels were similar in the two groups, whereas serum triglycerides and liver cholesterols were somewhat lower in rabbits fed cholesterol and RSO. From gas chromatographic analysis of the triglycerides and cholesteryl esters of aortas and livers, there is indirect evidence for the conversion of erucic to oleic acid. At the level and time period of feeding (6%, 2 months) RSO did not exert a deleterious effect on the rabbits.

**THE COMPOSITION OF CHOLESTEROL ESTERS IN FATTY STREAKS AND ATHEROSCLEROTIC PLAQUES OF THE HUMAN AORTA.** Brigitte Kunnert and H. Krug (Dept. of Pathol., Karl Marx Univ., Leipzig, G.D.R.). *Atherosclerosis* 13, 93-101 (1971). The histochemical analysis of fatty streaks and atherosclerotic lesions showed the following six cholesterol ester fractions: saturated fatty acids, acids with one, two, three, four and more than four double bonds. According to the two largest fractions we distinguished between chromatograms of the oleic acid type and of the linoleic acid type. Most of the fatty streaks belonged to the oleic acid type, while most of the atherosclerotic plaques belonged to the linoleic acid type. But we also found lipidoses of the linoleic type and atherosclerotic plaques of the oleic acid type as well as chromatograms with equal fractions of oleic and linoleic acid ester fractions. Our parallel histological and histochemical investigations suggest that the cellular activity plays an important role in the genesis of the cholesterol ester composition. We believe that the plasma cholesterol esters (linoleic acid type) that entered the arterial wall were converted intracellularly to esters with more double bonds in their fatty acid moiety. By decompensation of this mechanism (overloading by lipids or cell injury caused by a noxa) we may see an accumulation of oleic acid cholesterol esters, a further transition to more unsaturated acids being impossible physiologically. The differences in the cholesterol ester composition of arteriosclerotic lesions are the results of extracellular infiltration of plasma cholesterol esters, intracellular transformation and secondary extracellular deposition by necrosis of lipid-laden (foam) cells.

## Northern California Section opens technical meetings to wives and guests

The AOCS Northern California Section met on Friday, May 19, at H's Lordship Restaurant in Berkeley. Twenty-three wives and guests attended, and, as a result of a decision made at a recent Fresno meeting, rather than conducting a meeting of their own, they joined Section members in listening to the technical program presented by Alan McGregor, Quality Control Manager of Safeway Stores, Inc. McGregor was aided by Margaret and Bill Woods in setting up equipment for his presentation. He reported that quality control starts with correct processing design and ends with professional evaluation of the results on a continuing basis, and he emphasized that simple testing after the fact does not comprise true control, which must go far deeper than statistical testing.

Section member Loyd Smith, professor in the Department of Food Science, University of California at Davis, invited members to Davis for the next meeting on October 27, 1972.

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