

# ABSTRACTS

R.A. REINERS, Editor. ABSTRACTORS: N.E. Bednarczyk, J.E. Covey, J.G. Endres, Yoshio Hiyano, J. Iavicoli, S. Kawamura, D.A. Leo, F.A. Kummerow, E.G. Perkins, and R.W. Walker

## • Fats and Oils

THIN-LAYER CHROMATOGRAPHY OF CERAMIDES. K.A. Karlsson and I. Pascher (Dept. of Med. Biochem., Univ. of Göteborg, Fack, 400 33 Göteborg 33, Sweden). *J. Lipid Res.* 12, 466-472 (1971). Ceramides with mono-, di-, and trihydroxy long-chain bases, and normal (saturated and unsaturated), branched-chain, and 2-hydroxy fatty acids have been analyzed by thin-layer chromatography. In most cases the compounds were also run as acetates. Borate, arsenite, and silver ions were used as complexing agents, and the effects of number, position and stereochemistry of hydroxy groups, and of unsaturation, were studied. The results are discussed in view of analysis of natural ceramide species.

RESOLUTION OF INTACT PHOSPHATIDYLINOSITOLS BY ARGENTATION THIN-LAYER CHROMATOGRAPHY. B.J. Holub and A. Kuksis (Dept. of Biochem., and Banting and Best Dept. of Med. Res., Univ. of Toronto, Toronto 101, Canada). *J. Lipid Res.* 12, 510-12 (1971). An argentation thin-layer chromatographic method is described for the separation of intact phosphatidylinositols on the basis of the degree of unsaturation of their component fatty acids. The system is applicable for metabolic studies using radioactive precursors of phosphatidylinositol.

SPRAY DETECTION OF PHOSPHOLIPIDS ON THIN-LAYER CHROMATOGRAMS. Satindra K. Goswami and C.F. Frey (Dept. of Gen. Surgery, Univ. Mich. Med. Cen., Ann Arbor, Mich. 48104). *J. Lipid Res.* 12, 509-10 (1971). A new spray reagent containing copper, ammonium molybdate and sulphuric acid for the detection of phospholipids on thin-layer chromatograms is described. The specificity and sensitivity of the spray reagent is also shown.

CHROMATOGRAPHY OF UNUSUAL LIPIDS ON THIN LAYERS OF MAGNESIUM OXIDE. H.P. Kaufmann, H.K. Mangold and K.D. Mukherjee (Bundesanstalt für Fettforschung, Münster i. Westf., Germany). *J. Lipid Res.* 12, 506-9 (1971). The chromatographic behavior of some minor components of natural lipids was studied using layers of magnesium oxide and of commercial adsorbents containing magnesium oxide. The lipids investigated included wax esters, cholesterol esters, diester waxes, and esters, ethers and ether-esters of ethanediol and glycerol. Pronounced differences were found in the patterns of separation of certain lipids on magnesium oxide as compared to silica gel and Florisil. The procedures described afford means for the detection and isolation of unusual lipids in natural materials.

NATURAL WAXES. XVII: COMPOSITION OF SPERM OIL. M. Streibl, J. Jirousova and K. Stransky (Inst. for Organic Chem. and Biochem., Czech. Acad. Sci., Prague, Czech.). *Fette Seifen Anstrichm.* 73, 301-5 (1971). Two samples of sperm oil were separated by preparative gas chromatography into five fractions corresponding to the major peaks. Exact composition of the component acid and alcohol could be determined by microinteresterification of the above fractions. Cetyl ester of lauric acid is the main component (>80%) in the group of isomeric C<sub>28</sub>-esters; the major component of C<sub>30</sub>-esters and C<sub>32</sub>-esters are cetyl myristate (~80%) and cetyl palmitate (~75%) respectively. Stearyl palmitate (55%) dominates in the group of C<sub>34</sub>-esters and stearyl stearate (~60%) is the major component in the group of C<sub>36</sub>-esters. Experiments were also carried out to determine compositions of isomeric esters in the five gas chromatographic fractions from their mass spectra.

INFLUENCE OF ENVIRONMENT ON FAT COMPOSITION OF SOYBEAN. W. Schuster (Inst. For Plant Dev. and Growth, Justus Liebig-Universität of Giessen, Ger.). *Fette Seifen Anstrichm.* 73, 305-14 (1971). Location and seasonal effects have a stronger influence on oil content and composition and on protein concentration in the soybean than do differences among varieties. Content of linoleic and linolenic acids and fat content were lower under dry, hot climatic conditions. Under cold, humid conditions of growth, the content of less desirable linolenic acid distinctly increased. However, growing conditions were interrelated with the varieties as well; thus under definite climatic conditions, individual varieties exhibited more favourable fatty acid composition.

PROGRESS IN THE ANALYSIS OF LIPIDS. X: GAS CHROMATOGRAPHY, PART 2. A. Kuksis (Banting and Best Dept. Med. Res., Univ. Toronto, Toronto, Canada). *Fette Seifen Anstrichm.* 73,

332-42 (1971). This review, written in English, covers research done in the area of the analysis of triglycerides using gas chromatography. The review covers the analysis of triglycerides, a description of operating conditions, apparatus and column packings. An extensive description of the identification of peaks using an internal standard is presented. Furthermore, descriptions of the identification and analysis of diglycerides and monoglycerides using gas-liquid chromatography are presented.

CODEx ALIMENTARIUS STANDARDS FOR FATS AND OILS. H. Wessels (Inst. for Fat Res., Munster/Westf., Ger.). *Fette Seifen Anstrichm.* 73, 293-300 (1971). A short introduction on the principles of Codex Alimentarius is given. The Codex is a joint development of the Food and Agricultural Organization (FAO) and World Health Organization (WHO) with the participation of 75 member states. Recommended standards for fats and oils are presented. The standards will be forwarded to the various governments for acceptance or rejection. The most significant regulations are discussed. While the article is in German, important recommended standards are presented in an appendix in their English version.

STORAGE STABILITY OF CSM: ALTERNATE FORMULATIONS FOR CORN-SOY-MILK. G.N. Bookwalter, H.A. Moser, W.F. Kwolek, V.F. Pfeifer and E.L. Griffin Jr. (USDA, ARS, No. Reg. Res. Lab., Peoria, Ill. 61604). *J. Food Sci.* 36, 732-36 (1971). Corn-soy-milk (CSM), a high-protein food supplement for children, contains pregelatinized corn meal, soy flour, nonfat dry milk, vitamins and minerals. To increase the choice of possible ingredients, several formulations were studied. Flavor and chemical tests after storage at 77, 100 and 120 F were made on experimental samples containing corn meals and soy flours of different compositions, dry whey, increased levels of nonfat dry milk, sucrose and dextrose hydrate. Stability was adequate for all formulations tested except those containing dextrose hydrate or unprocessed whole corn meal. At storage temperatures of 100 F or above, substantial losses in available lysine occurred in the samples containing dextrose hydrate.

STORAGE STABILITY OF CSM: INCREASING FAT TO 6% IN CORN-SOY-MILK BLENDS. G.N. Bookwalter, H.A. Moser, L.T. Black and E.L. Griffin Jr. *Ibid.*, 737-41. CSM is a high-protein food supplement for infants and pre-school children; it consists of partially gelatinized corn meal, toasted soy flour and nonfat dry milk and is fortified with vitamins and minerals. The original CSM formulation contained only 2% fat. Storage stability characteristics were determined for CSM blends containing as much as 6% fat. The fat sources tested were processed corn germ, full-fat soy flour, refined soybean oil, expeller crude corn oil and a combination of high-fat corn meal with full-fat soy flour. Flavor and chemical tests were made on blends stored at 77, 100 and 120 F and compared with those on CSM containing 2% fat. Stability was similar or improved in the formulations containing higher fat levels. One sample of crude corn oil was satisfactory while another caused off-flavors in the experimental blends.

AN EMULSION METHOD FOR RAPID DETERMINATION OF FAT IN RAW MEATS. J.R. Moreau and M.T. Lavoie (Food Sci. Dept., Université Laval, Ste-Foy, Quebec 10, Canada). *J. Food Sci.* 36, 760-63 (1971). A new assay for fat determination in raw meats was developed. It involves preparing an emulsion from the meat to be analyzed. A portion is then purposely broken down to separate the fat portion which is subsequently measured in graduated Babcock battles. The method takes about 10 minutes and results correlate with those obtained with Salwin's modified Babcock method taking about 20-25 minutes and with the official ether extraction method taking about 24 hours. The new method permits analyzing large samples of almost any desirable and practical size and applies directly to meat emulsions prepared in manufacturing sausage products for quality control purposes.

LIPIDS OF CURED CENTENNIAL SWEET POTATOES. W.M. Walter Jr. (Dept. of Food Sci., North Carolina State Univ., Raleigh, N.C. 27607), A.P. Hansen and A.E. Purcell. *J. Food Sci.* 36, 795-97 (1971). The lipids of cured Centennial sweet potatoes were identified and quantitated using a combination of column and thin-layer chromatography. It was found that 2.7% of the dry weight was made up of lipids which were

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shown to consist of 42.1% neutral lipids, 30.8% glycolipids and 27.1% phospholipids. Triglycerides and steryl esters were the major lipids of the neutral fraction. Among the phospholipids, phosphatidyl ethanolamine, phosphatidyl choline and phosphatidyl inositol were the most abundant. Galactolipids and steryl glucosides were also present. Fatty acid analysis of the three major lipid groups showed that stearic, palmitic, oleic, linoleic and linolenic acids were the most abundant.

**GAS CHROMATOGRAPHIC DETERMINATION OF MONO- AND DI-BASIC ACIDS.** E.P. Crowell, S.M. Aronovic and B.B. Burnett (Union Camp Corp., P.O. Box 412, Princeton, N.J. 08540). *J. Chromat. Sci.* 9, 296-300 (1971). Ozonolysis of unsaturated fatty acid products from natural sources, such as tall oil, yields a complex mixture of mono- and di-basic acids. The GC procedure presented for the analysis of these materials is capable of measuring the concentrations of C<sub>1</sub> to C<sub>16</sub> monobasic and C<sub>2</sub> to C<sub>14</sub> dibasic acids. Methylation at room temperature using anhydrous methanol-HCl was found to be an effective and convenient derivatization technique. Zinc oxide neutralization of the mineral acid allowed direct chromatography of the methanol solutions. All principal components were sufficiently resolved to allow good quantitative measurement except for the esters of decanoic and succinic acids. To maintain reproducibility, it was necessary to add water to the helium carrier gas.

**ANALYSIS OF MIXTURES OF FATTY ACIDS, PRIMARY AMIDES AND THE CORRESPONDING N-ACYL AMIDES.** T. Nakagawa, J.H. Vermeer and J.R. Dean (Res. Dept., Chemcell Limited, P.O. Box 99, Edmonton, Alberta, Canada). *J. Chromat. Sci.* 9, 293-5 (1971). A GC procedure for the separation and analysis of water, acetic acid, propionic acid, butyric acid, acetamide, propionamide, butyramide and the corresponding N-acyl amides is described. Chromosorb 101 is used as the column packing. GC/MS spectrometer coupling and NMR were used to verify the procedure. The mass spectra of the N-acyl amides are presented.

**ANTIOXIDANT POTENTIAL OF TEMPEH AS COMPARED TO TOCOPHEROL.** L.V. Packett, L.H. Chen and J.Y. Liu (Dept. of Nutr. and Food Sci., Univ. Ky., Lexington, Ky. 40506). *J. Food Sci.* 36, 798-99 (1971). The ability of tempeh to preserve tocopherol-stripped corn oil was studied. Tempeh (25 or 50%) was mixed into corn oil and incubated at 37C for a maximum of 6 weeks. Peroxide values were determined periodically. Results showed that tempeh can effectively prevent lipid oxidation; 50% tempeh in corn oil showed higher antioxidant potential than 25% tempeh, 0.01% alpha-tocopherol or 0.03% alpha-tocopherol. This study substantiates the antioxidant potential of tempeh and suggests its use with other foodstuffs to help preserve the lipids contained therein.

**DETERMINATION OF MOISTURE AND OIL CONCENTRATION IN FEEDSTUFFS BY FOUR DIFFERENT METHODS.** Lynn Crook and W.P. Williams, Jr. (Dept. of Food Science and Biochem., College of Agr. and Biol. Sciences, Clemson Univ., Clemson, S.C. 29631). *J. Ass. Off. Anal. Chem.* 54, 756-9 (1971). The moisture content of feedstuffs was determined by 4 methods: drying (1) over sulfuric acid to constant weight and (2) *in vacuo* 5 hours at 95C, and direct extraction with (3) ethyl or (4) petroleum ether, assuming that the difference between weight loss of the moist sample upon extraction and the oil recovered represented the moisture content. Statistical analysis indicated that 1 > 2 > 4 > 3. The oil content of feedstuffs was determined by petroleum or ethyl ether extractions of moist samples and of samples dried by 1 and 2. No significant difference existed between the corresponding petroleum and ethyl ether extractions. However, the amount of oil extracted from samples dried by 2 was significantly less than that extracted from moist samples or samples dried by 1.

**INFLUENCE OF AGE ON TOTAL LIPIDS AND PHOSPHOLIPIDS OF TURKEY MUSCLE.** R.M. Wangen, W.W. Marion and D.K. Hotchkiss (Depts. of Poultry Sci. and Statistics, Iowa State Univ., Ames, Iowa 50010). *J. Food Sci.* 36, 560-62 (1971). Ten turkeys (Williams' strain) were randomly selected at 4-week intervals from 4 to 28 weeks to study muscle lipid composition. Lipids were extracted from thigh and breast samples with cold chloroform-methanol (2:1). Proteins of the extract were used to determine total lipid, individual phospholipids and total phospholipids. The lipid content of thigh muscles increased with advancing maturity, whereas breast

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## Northeast Section Honors Hans Kaunitz With Achievement Award



Don Fritz, above left, presents the 1971 Achievement Award of the Northeast Section of AOCs to Dr. Hans Kaunitz, Professor of Pathology at Columbia University in New York. Pictured below are some of the members who gathered at the Section's September 14th Award Night. Directly below, from left to right, are Arthur Wrigley, H. Kaunitz, Ruth Ellen Johnson, Mrs. H. Kaunitz and Mrs. A. Wrigley. Pictured at bottom of page are Roland Steinkoenig, Ursula Bleyer, Mrs. H. Kaunitz, H. Kaunitz and Glen Jacobson.



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muscle lipid remained constant throughout the test period. Total phospholipid levels showed no significant variation with age, but comprised a decreasing percentage of total lipid as bird age advanced.

METHOD OF TREATING RESIDUES OF RENDERED HIGH FAT MEAT MATERIAL. M.D. Appleman, Jack J. Schroeder *et al.* U.S. 3,539,357. High temperature rendered tissue is treated with acid under controlled conditions to produce a limited breakdown of the proteins so that the tissue remains soft and pliable which upon addition of alkali to a neutral pH will resolidify rather than remain liquid.

SHORTENING CONTAINER DEVICE. R.N. Wood (Inland Container Corp.). U.S. 3,539,360. A container particularly well adapted to receive bulk quantities of shortening and the like having a plastic bag in the form of a tube having a single sealed seam closing its lower end. The tube is received inside a carton of corrugated fibreboard and a portion of the perimeter of the bag is secured by adhesive means to the upper margin of a carton sidewall to assure that it will remain in position during filling and that the bag will remain closed when the carton is set up or erected prior to filling of the bag. After filling, the bag is detached from the carton sidewall so that the end user can dump the bag and product from the carton as a single unit.

## • Biochemistry and Nutrition

MYOCARDIAL LIPASES AND CATECHOLAMINES IN BURN SHOCK. R. Okamoto, V.V. Glaviano and M. Pindok (Loyola Univ. Stritch Sch. of Med., Chicago, Ill. 60612). *Proc. Soc. Exp. Biol. Med.* 137, 347-53 (1971). In anesthetized dogs subjected to 4 hr of shock from infrared burns, lipolytic activity of cardiac muscle was found significantly below the activity determined in normal heart muscle. Myocardial homogenates from control and burned dogs responded to the addition of epinephrine with an increase in rate of lipolysis after incubation for 10 min. Incubation of the media for 1 hr showed a further increase in lipolysis, although no difference was noted in activity between epinephrine-treated and untreated homogenates from either the control or burn group of dogs. The addition of inhibitors or activators to the lipolytic mixture prepared from normal hearts suggested that cardiac lipolytic activity results from both an epinephrine-sensitive lipase and a lipoprotein lipase. The epinephrine-sensitive lipase could not be classified as a monoglyceride lipase, since epinephrine as well as ATP and cyclic AMP failed to increase the rate of lipolysis in cardiac muscle homogenates containing monopalmitin substituted for Ediol as a substrate. Myocardial norepinephrine and epinephrine levels in burned dogs were not different from those found in control dogs. The absence of a change in these cardiac catecholamines leaves the possibility that other humoral or toxic substances may be responsible for altering myocardial lipolysis in burn shock.

TRITON-INDUCED HYPERLIPEMIA IN GOATS UNDER VARIOUS PHYSIOLOGICAL CONDITIONS. L.H. Schultz and W. J. Esdale (Univ. of Wis., Madison, Wis. 53706). *J. Dairy Sci.* 54, 1173-79 (1971). Goats were given intravenous injections (0.2 or 0.4 g per kilogram of body weight) of detergent Triton WR 1339 to measure triglyceride entry into the blood under fed, fasted, lactating and fasted conditions. Blood triglycerides increased up to 160-fold 72 hours after injection. Total cholesterol and phospholipids also increased 5 to 9-fold while free fatty acids, acetone, ketone bodies and blood glucose were not affected by Triton injection. Fed or fasted nonlactating goats had a triglyceride entry of from 0.14 to 0.22 mg per minute per kilogram body weight. Triton was not effective in blocking triglyceride exit from the blood in fed lactating animals even though triglyceride in the plasma increased 12 to 15-fold. Milk production and milk fat composition were not changed even at the highest circulating lipid concentration. Triton had no apparent effect on the health of the goats as they ate and behaved normally.

VOLATILE FATTY ACIDS IN CONCENTRATE RATIONS FOR LACTATING DAIRY COWS. G.M. Jones (Dept. of Animal Sci., Macdonald College of McGill Univ., Ste. Anne de Bellevue, Quebec, Canada). *J. Dairy Sci.* 54, 1142-49 (1971). Varying proportions of acetic and propionic acid (70:30, 50:50, 30:70) were included in concentrate rations at 0, 3, 6 and 9%. Rations were made isonitrogenous by varying amounts of dry shelled

corn and corn gluten feed. Each ration was fed to five cows at 1 kg per 3.5 kg milk for 84 days. Forages, including hay and green chop or haylage, were offered ad libitum. Each concentrate ration also was fed to three wethers for 21 days. Voluntary intake and digestibility were determined. There were no significant differences between rations for milk production, but persistency of milk yield was greater ( $P < 0.05$ ) for the 6%-70:30 ration than that of the 3%-70:30, 3%-50:50 or 9%-30:70 rations. The 9%-70:30, 3%- and 9%-30:70 rations resulted in higher ( $P < 0.05$ ) milk fat percentages than the 9%-50:50 ration. Average daily gains were affected by ration ( $P < 0.05$ ) with the 50:50 rations approximating the basal ration. Sheep digested more cellulose of high volatile fatty acid rations than of basal ration ( $P < 0.05$ ). Differences in digestibility of dry matter, energy and protein were not significant ( $P < 0.05$ ). Dry matter and digestible energy intakes were depressed with the 90%-50:50, ration.

PROTEIN TURNOVER AND 4'-PHOSPHOPANTHETHEINE EXCHANGE IN RAT LIVER FATTY ACID SYNTHETASE. J. Tweto, Marcia Liberati and A.R. Larrabee (Dept. of Chem., Univ. of Oregon, Eugene, Oregon 97403). *J. Biol. Chem.* 246, 2468-71 (1971). The rate of turnover of rat liver fatty acid synthetase has been measured in animals tested under steady state conditions. The value obtained for the half-life varied from 71 to 108 hours. The exchange rate of the covalently bound prosthetic group, 4'-phosphopantotheine, with unbound pantothenate compounds was found to be more than an order of magnitude greater than the half-life of the enzyme complex. A model is proposed in which the prosthetic group, or some small portion of the enzyme complex containing the prosthetic group, is periodically removed from and replaced on the larger fatty acid synthetase moiety, such action taking place many times before an individual complex is catabolized. Moreover, this exchange is not part of the catalytic function of an enzyme complex, but may be a means of control of over all fatty acid synthetase activity.

VITAMIN D METABOLISM: THE ROLE OF KIDNEY TISSUE. R. Gray, I. Boyle and H.F. DeLuca (Depts. of Biochem. and Med., Univ. of Wis., Madison, Wis. 53706). *Science* 172, 1232-34 (1971). The appearance of a polar metabolite of 25-hydroxycholecalciferol has been studied in the intestinal mucosae of nephrectomized rats and rats which have been made uremic by ureter ligation. Nephrectomy prevents the appearance of this metabolite in the intestine. Equivalent amounts of the metabolite were found in uremic rats and in sham-operated controls, showing that the production of this metabolite is independent of the uremic state of the animals. In addition, it was shown that the metabolite produced *in vitro* by kidney homogenates is identical to that found *in vivo* in the intestine.

THE PURIFICATION AND PROPERTIES OF MICROSOMAL PALMITOYL-COENZYME A SYNTHETASE. J. Bar-Tana, G. Rose and B. Shapiro (Dept. of Biochem., Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel). *Biochem. J.* 122, 353-62 (1971). The isolation and purification of palmitoyl-CoA synthetase from rat liver microsomes is described. Several methods suitable for enzyme assay are described. The general properties and kinetic parameters of the purified enzyme were determined and are discussed in relation to microsomal fatty acid activation.

THE ACTIVATION OF FATTY ACIDS IN CASTOR BEAN ENDOSPERM. T.G. Cooper (Dept. of Biol., Mass. Inst. of Tech., Cambridge, Mass. 02139). *J. Biol. Chem.* 246, 3451-55 (1971). The demonstration that the reactions of  $\beta$  oxidation and the glyoxylate cycle occur in the glyoxysome, a cellular organelle isolated from castor bean endosperm, has raised the question of the intracellular location of the enzymatic activation of free fatty acids in this tissue. Glyoxysomes, isolated on sucrose gradients, have been shown to contain a thiokinase which, in the presence of CoA, MgCl<sub>2</sub>, and ATP (GTP is ineffective), activates free fatty acids to their cognate fatty acyl-CoA derivatives. The thiokinase is specific for fatty acids of chain length greater than C-10. An acetate thiokinase was also found in glyoxysomes. It is specific for ATP and is more tightly bound to the organelles than the long chain thiokinase. Although the long chain thiokinase is easily solubilized, the data show that the intact glyoxysomes can convert free fatty acids to their CoA derivatives and oxidize them to acetyl-CoA.

LIPOXYGENASE CONTENT AND ANTIOXIDANT ACTIVITY OF SOME FRUITS AND VEGETABLES. A. Pinsky, S. Grossman and M. Trop (Dept. of Life Sciences, Sect. of Biochem., Bar-Ilan Univ.,

Ramat-Gan, Israel). *J. Food Sci.* 36, 571-72 (1971). The linoleic acid oxidizing capacity of 37 fruits and vegetables in common use was determined by measuring oxygen consumption on a linoleic acid substrate with the aid of an oxygen monitor. Egg plant, artichoke, potato, legume seeds, cauliflower and avocado contained marked activity. The fruits and vegetables tested could be divided into three groups: (1) where the linoleic acid oxidizing activity was not influenced by a nonionic detergent; (2) where the detergent inhibited enzyme activity; and (3) where the detergent solubilized or stimulated the enzyme involved. Several tissues contained considerable antioxidant activity as determined by their effect on soybean lipoxygenase.

FAT SUPPLEMENT FOR FEED RATION. G.D. Elenbogen (Vitamins, Inc.). *U.S. 3,600,187*. A fat supplement for animals consists of an emulsion of 30-70% edible fat, 10-30% alkylene glycol, 1-5% emulsifier and 8-30% water is described. A mixture of the glycol and water is formed. A portion of the emulsifier is added to the mixture, and the remainder is added to the fat. The water-glycol mixture and the fat are mixed, heated at 100-140F and then homogenized.

PHYSIOLOGY OF LIPID METABOLISM. Ph. Darcet (Faculty of Medicine, Paris). *Rev. Franc. Corps Gras* 18, 279-84 (1971). The digestion, absorption, transport, storage, utilization and metabolic control of lipids are described.

DIET AND ATHEROSCLEROSIS. F.G. Cobian (Univ. of Minnesota). *Rev. Franc. Corps Gras* 18, 269-77 (1971). The effects of dietary fats on blood cholesterol are reviewed as well as the relationship of blood cholesterol to cardiovascular diseases.

BORON AND MANGANESE EFFECTS ON PROTEIN, OIL AND FATTY ACID COMPOSITION OF OIL IN SOYBEANS. F.C. Boswell and R.E. Worthington (Depts. of Agron. and Food Sci., Univ. of Ga., College of Agr. Ex. Stations, Ga. Station, Experiment, Ga. 30212). *J. Agr. Food Chem.* 19, 765-68 (1971). Studies were conducted on three soil types to determine whether foliar applied manganese and boron are beneficial or detrimental with respect to protein, oil and fatty acid composition of soybean seed. Mn and B treatments did not greatly affect per cent total oil content as determined by nmr. Although slight protein increases were noted when B and Mn treatments were applied, values from the treated plots were not significant when compared to the check plots. Further, Mn and B had no effect on the various fatty acid components.

ACYL PHOSPHATIDYLGlycerol. R.W. Olsen and C.E. Ballou (Dept. of Biochem., Univ. of Cal. 94720). *J. Biol. Chem.* 246, 3305-13 (1971). A new phospholipid, isolated from extracts of *Salmonella typhimurium*, has been identified as 3-sn-phosphatidyl-1'-[3'-acyl]-sn-glycerol, or acyl phosphatidyl-glycerol (acyl-PG). The compound, whose analysis gave the ratios 3:2:1 for ester-glycerol-phosphorus, comprises 2% of the phospholipid of this organism, along with phosphatidylethanolamine (83%), phosphatidylglycerol (11%) and cardiolipin (4%). The designated configurations are inferred from enzymatic analyses showing that the two glycerols of the molecule are of opposite configuration with respect to their attachments to the central phosphate, as in phosphatidyl-glycerol. The fatty acids of acyl-Pg resemble in composition those of the total lipids of the organism. However, the fatty acids of the monoesterified glycerol moiety are much more saturated than those of the diacylglycerol part of the same compound or those of the total lipid. These results are consistent with the observation that fatty acids on the  $\alpha$ -position of glycerol are generally more saturated than those on the  $\beta$ -position in phospholipids, and provide direct support for the conclusion that the substance is not an artifact of chemical transacylation. In vivo incorporation of acetate-<sup>14</sup>C by *S. typhimurium* failed to reveal any rapid labeling or "chase" of label in any of the fatty acids of acyl-PG. When the bacteria entered the stationary phase of growth, the mole percentage of this lipid declined to zero, while that of phosphatidylethanolamine increased, apparently because of a time differential in the cessation of biosynthesis of the two compounds.

INFLUENCE OF DIETARY VITAMIN A LEVEL ON CHICKEN LIVER GLYCOGEN. C.F. Nockels and R.W. Phillips (Dept. of Avian Science, Colorado St. Univ., Fort Collins, Col. 80521). *Poultry Sci.* 50, 766-68 (1971). Liver glycogen levels were significantly higher than controls in chicks fed mildly vitamin A deficient rations. Blood glucose levels were not affected. Mildly hypovitaminotic A chicks were able to mobilize liver glycogen. The increase in liver glycogen in chicks fed vitamin

A-deficient rations may be a direct influence of the vitamin causing decreased glycogenolysis and/or an increased glycogenesis. Conversely, in hypervitaminosis A the increase in liver glycogen may be corticoid induced gluconeogenesis via producing increased levels of glucose-6-phosphate which stimulated glycogen synthetase activity.

LIPOLYTIC RESPONSE AND ADENYL CYCLASE ACTIVITY OF RAT ADIPOCYTES AS RELATED TO CELL SIZE. A.D. Hartman, A.I. Cohen, C.J. Richane and T. Hsu (Dept. of Biochem., Pharm. Div., Pennwalt Corp., Rochester, N.Y. 14603). *J. Lipid Res.* 12, 498-505 (1971). The number of fat cells contained in the rat epididymal fat pad was found to increase rapidly as the rats grew to a weight of about 300g. Additional increases in cell number above this weight were minimal. By contrast, cell size, as measured by the amount of triglyceride per cell, increased linearly until the rats reached about 600g. Glycerol release per 10<sup>6</sup> cells in response to norepinephrine *in vitro* was observed to be independent of cell size. Basal release expressed in this manner showed a slight but significant positive correlation with increasing cell size. When the rate of lipolysis was based either on the amount of triglyceride in the incubation medium, as is the usual custom, or on the cell surface area, lipolysis was inversely related to cell size. In addition to these observations on lipolysis, it was also demonstrated that norepinephrine-activated adenylyl cyclase activity expressed per 10<sup>6</sup> cells was unaffected by cell size. This leads to the suggestion that the number of adrenergic receptors in the fat cell is fixed and is independent of the size of the cell; as the cell enlarges, these receptors are merely distributed over a greater surface area.

STRUCTURAL ANALYSIS OF PHOSPHATIDYLCHOLINE OF PLANT TISSUE. K.A. Devor and J.B. Mudd (Dept. of Biochem., and Statewide Air Pollution Res. Center, Univ. of Calif., Riverside, Calif. 92502). *J. Lipid Res.* 12, 396-402 (1971). Pure preparations of phosphatidylcholine were isolated from spinach leaf chloroplasts, spinach leaf microsomes and cauliflower inflorescence. The isolated phosphatidylcholine was treated with snake venom phospholipase A, and the fatty acid distribution and composition of the fatty acid methyl esters prepared from the lysophosphatidylcholine and the freed fatty acid were determined by gas-liquid chromatography. The results showed that saturated fatty acids were preferentially esterified at position 1 and unsaturated fatty acids at position 2. The phosphatidylcholine from cauliflower was also treated with phospholipase C. The resulting diglycerides were fractionated on AgNO<sub>3</sub>-impregnated thin-layer plates. The diglyceride fractions were transesterified and the fatty acid composition of each was determined by gas-liquid chromatography. Of the three predominant species, one contained only linolenic acid (22% of the total), the second linolenic and oleic acid (19%), and the third linolenic and palmitic acids (37%). These molecular species could not be accounted for by random distribution of the fatty acids.

THE BIOLOGY OF METHYL KETONES. F.W. Forney and A.J. Markovetz (Dept. of Microbiol., Univ. of Iowa, Iowa City, Iowa 52240). *J. Lipid Res.* 12, 383-95 (1971). Examples of the biological occurrence of methyl ketones are reviewed. The lack of significant accumulations of these compounds in the biosphere indicates that a recycling of these organic molecules is occurring. Evidence for biodegradation of acetone by mammals and longer methyl ketones by microorganisms via terminal methyl-group oxidation is discussed. A new mechanism for the subterminal oxidation of methyl ketones by microorganisms is proposed whereby the first intermediate produced is an acetate ester which subsequently is cleaved to acetate and a primary alcohol two carbons shorter than the original ketone substrate. Methyl ketones can be produced by mammals and fungi by decarboxylation of  $\beta$ -keto acids. Some bacteria are able to form methyl ketones via the oxidation of aliphatic hydrocarbons at the methylene carbon  $\alpha$  to the methyl group. Speculations on the biosynthesis of methyl ketones by insects and plants and a discussion of the possible biological roles of methyl ketones in diverse biological systems are presented.

BIOSYNTHESIS OF PHOSPHATIDYLCHOLINE BY ENZYME PREPARATIONS FROM SPINACH LEAVES. K.A. Devor and J.B. Mudd (Dept. of Biochem., and Statewide Air Pollution Res. Center, Univ. of Calif., Riverside, Calif. 92502). *J. Lipid Res.* 12, 403-11 (1971). The enzymic incorporation of choline-1,2-<sup>14</sup>C from CDP-choline-1,2-<sup>14</sup>C into phosphatidylcholine by spinach leaf preparations was characterized. The enzyme catalyzing the incorporation, choline phosphotransferase, had a pH optimum of about 8.0 and required either Mn<sup>2+</sup> or Mg<sup>2+</sup> as

cofactor. The saturation concentration of  $Mn^{2+}$  was 0.3 mM and that for  $Mg^{2+}$  was 13 mM. The  $K_m$  for CDP-choline was 10  $\mu$ M. The choline phosphotransferase was inhibited by sulfhydryl reagents. The enzyme was inactivated at 30°C, but this inactivation could be prevented by dithiothreitol and  $Mn^{2+}$ . Preincubation of the enzyme with  $Mn^{2+}$  prevented inhibition by sulfhydryl reagents. The incorporation of diglyceride- $U-^{14}C$  into phosphatidylcholine was also studied. The enzyme did not show any diglyceride specificity when exogenous diglyceride was added, indicating that fatty acid distribution in phosphatidylcholine of spinach is not controlled by choline phosphotransferase.

CONTROL OF FATTY ACID DISTRIBUTION IN PHOSPHATIDYLCHOLINE OF SPINACH LEAVES. K.A. Devor and J.B. Mudd (Dept. of Biochem., Univ. of Calif., Riverside, Calif. 92502). *J. Lipid Res.* 12, 412-19 (1971). The acylation of lysophosphatidylcholine by enzyme preparations from spinach leaves was studied. The acylation reaction was followed by the incorporation of  $^{14}C$ -labeled fatty acids from the respective coenzyme A derivatives into phosphatidylcholine. The subcellular fraction with the highest specific activity was the microsomal fraction. Contaminating thioesterase activity which was encountered was inhibited by treatment with sodium dodecyl sulfate. The acyltransferase activity was only mildly inhibited by sulfhydryl reagents. Labeled fatty acid was primarily incorporated into phosphatidylcholine. When saturated and unsaturated fatty acyl CoA derivatives were used, the saturated derivatives were incorporated primarily into the 1-position of the glycerol moiety, and the unsaturated fatty acids went primarily to the 2-position. This pattern of incorporation agrees with the fatty acid distribution in vivo.

QUANTITATION OF SERUM LIPOPROTEINS BY ELECTROPHORESIS ON AGAROSE GEL: STANDARDIZATION IN LIPOPROTEIN CONCENTRATION UNITS (MG/100 ML) BY COMPARISON WITH ANALYTICAL ULTRACENTRIFUGATION. S.B. Hulley, S.G. Cook, W.S. Wilson, M.Z. Nichaman, F.T. Hatch and F.T. Lindgren (Metabolic Unit, U.S. Public Health Service Hosp., San Francisco, Cal. 94118). *J. Lipid Res.* 12, 420-33 (1971). Lipoprotein electrophoresis on agarose gel has been modified to allow estimation of the absolute quantity of each fraction. The reproducibility of the method is illustrated by 12 determinations in a single day on serum from one normal subject: mean total dye uptake was  $302 \pm 9$  (SD) "corrected dye units," and the percentages of  $\beta$ -, pre- $\beta$ -, and  $\alpha$ -lipoprotein were  $56.1 \pm 0.9$ ,  $29.1 \pm 0.4$  and  $14.8 \pm 0.7$ , respectively. Reproducibility over a period of 8 months was also demonstrated. Serum lipoproteins of 5 normal and 15 hyperlipidemic individuals determined by this technique were compared with values obtained by analytical ultracentrifugation. The correlation coefficients were: 0.993 for pre- $\beta$ -LP vs. VLDL, 0.978 for  $\beta$ -LP vs. LDL and 0.867 for  $\alpha$ -LP vs. HDL. Lipoprotein values obtained by paper electrophoresis were also correlated with those of the analytical ultracentrifuge, but to a lesser degree ( $r = 0.956$ ,  $0.691$ , and  $0.786$ , respectively). Values for LDL and VLDL which were measured by refractometry after preparative ultracentrifugation were very similar to those obtained from the analytical ultracentrifuge. Serum triglyceride concentration was highly correlated ( $r = 0.972$ ) with the agarose values for pre- $\beta$ -LP; serum cholesterol concentration was correlated ( $r = 0.673$ ) with  $\beta$ -LP. It is proposed that the standard curves of the comparisons with the analytical ultracentrifugal values be used to convert the corrected dye units of electrophoresis on agarose gel to mg/100 ml of specific lipoprotein.

HUMAN URINARY SULFATIDES IN PATIENTS WITH SULFATIDOSIS (METACHROMATIC LEUKODYSTROPHY). M. Philippart, L. Sarlieve, Colette Meurant and L. Mechler (Mental Retardation Res. Center, Neuropsychiatric Inst., Los Angeles, Cal. 90024). *J. Lipid Res.* 12, 434-41 (1971). The excretion of sulfatides in human urine was studied. Urinary glycolipids were extracted and fractionated on diethylaminoethyl cellulose and silicic acid columns, and by thin-layer chromatography. Fatty acids and long-chain bases were analyzed by gas-liquid chromatography of the corresponding esters and aldehydes. Glycosyl ceramide concentration was determined by gas-liquid chromatography of the trimethylsilyl ethers of the methyl glycosides. Normal females were found to excrete larger amounts of dihexosyl ceramides than males. Sulfatides were detected in all urine specimens. In sulfatidosis, a hereditary sulfatide storage disorder known as metachromatic leukodystrophy, a large increase in sulfatide was readily apparent on a thin-layer chromatogram of the crude lipid extract. On comparing samples from normal individuals and patients with sulfatidosis, urinary sulfatide composition was remarkably

similar to that previously reported in the kidney, including differences in fatty acid pattern. The determination of urinary sulfatides was a valuable confirmation of the deficiency in arylsulfatase A activity characteristic of sulfatidosis.

SEPARATION AND IDENTIFICATION OF MENAQUINONES FROM MICROORGANISMS. P.J. Duphy, P.G. Phillips and A.F. Brodie (Dept. of Biochem. and Microbiol., Univ. S. Calif. School of Med., Los Angeles, Calif. 90033). *J. Lipid Res.* 12, 442-49 (1971). Simple thin-layer chromatographic procedures are outlined for the separation, isolation and characterization of a complex of lipophilic naphthoquinones. Procedures are also described for the quantitative recovery of naphthoquinones from thin-layer plates. The general usefulness of the described methods is demonstrated by their application in the analysis of menaquinones from several microorganisms. The methods allow distinction between menaquinones varying in side-chain length, degree of saturation and geometry, as well as in the presence or absence of ring methyl groups.

A NEW CHROMATOGRAPHIC SYSTEM FOR VITAMIN  $D_3$  AND ITS METABOLITES: RESOLUTION OF A NEW VITAMIN  $D_3$  METABOLITE. M.F. Holick and H.F. DeLuca (Dept. of Biochem., Univ. of Wis., Madison, Wis. 53706). *J. Lipid Res.* 12, 460-65 (1971). A simple yet powerful new chromatographic procedure for vitamin  $D_3$  and its metabolites is described. Liquid-gel partition chromatography on Sephadex LH-20 using a solvent of various percentages of  $CHCl_3$  in Skellysolve B (petroleum ether, bp 67-69°C) permits excellent resolution of vitamin  $D_3$ , 25-hydroxyvitamin  $D_3$ , and their more polar metabolites. Of special importance is the resolution of the metabolites of vitamin  $D_3$  more polar than 25-hydroxycholecalciferol. Because of this resolution, a new metabolite of vitamin  $D_3$  has been demonstrated in the plasma of rats and in the intestines of chicks given 100 IU of vitamin  $D_3$ - $1,2$ - $^3H$ .

SERUM LIPOPROTEIN ACCUMULATION IN THE LIVERS OF OROTIC ACID-FED RATS. L.A. Pottenger and G.S. Getz (Dept. of Pathol. and Biochem., Univ. of Chicago, Chicago, Ill. 60637). *J. Lipid Res.* 12, 450-59 (1971). This study provides confirmation of previous observations that showed that rats fed a diet containing 1% orotic acid for 7 days develop a fatty liver and that there is an inhibition of the secretion of low density lipoproteins without altering general liver protein synthesis. Accumulated fat droplets (liposomes) are entrapped within rough endoplasmic reticulum vesicles. In this study, these vesicles have been shown to accumulate the apolipoproteins of low and very low density lipoproteins. Inhibition of lipoprotein secretion was demonstrated by perfusion of livers from orotic acid-fed rats with a serum-free medium. Liposomes were isolated from these rats. Partially delipidated liposomes, but not similarly treated microsomes or cell sap, were found to form a precipitation line when reacted against anti-low density lipoprotein antiserum. Detergent solubilization of the liposome followed by density gradient centrifugation resulted in a peak at d 1.025 g/ml containing both lipid and protein. Acrylamide electrophoresis in 8 M urea after total delipidation demonstrated liposomal bands which co-electrophoresed with three of four very low density lipoprotein bands; there was no band corresponding to the very low density lipoprotein band which travels farthest in acrylamide electrophoregrams. However, acrylamide electrophoresis of the apoproteins of serum high density lipoprotein from orotic acid-fed animals revealed the presence of the latter band. The results indicate that liver liposomes from orotic acid-fed rats apparently contain the low density apoprotein and probably several other very low density lipoprotein peptides.

SYNTHESES OF PLASMA TRIGLYCERIDES IN ENDOGENOUS HYPERTRIGLYCERIDEMIA. R.P. Eaton (Dept. of Med., Univ. of New Mexico School of Med., Albuquerque, N.M. 87106). *J. Lipid Res.* 12, 491-97 (1971). Radioisotopic kinetic studies of triglyceride fatty acid synthesis from serum free fatty acids have been performed in 20 studies of normal and lipemic subjects. The lipemic subjects were characterized as having carbohydrate-responsive endogenous lipemia, and were classified as having either Type III or Type IV prebetalipoproteinemia. In the untreated state, triglyceride production was reduced relative to concentration of triglyceride when compared with the normal control population. In response to carbohydrate restriction an absolute reduction in triglyceride synthesis from free fatty acids was demonstrated. These data indicate that over-production cannot be importantly implicated as the etiology of this form of endogenous lipemia. The patients thus represent a pathophysiological entity which

is distinct from the normal physiological lipemia induced by carbohydrate feeding in which overproduction is reported to be the initiating event.

EFFECT OF DIETARY TOMATINE ON CHOLESTEROL METABOLISM IN THE RAT. M.N. Cayen (Dept. of Biochem., Ayerst Res. Lab., Montreal, Quebec, Canada). *J. Lipid Res.* 12, 482-90 (1971). Tomatine is a virtually nonabsorbable saponin which has been used as an antifungal agent and analytically as a cholesterol precipitant. It was used in this study to determine whether or not it can form a complex with cholesterol *in vivo* in the rat intestine and what effects such complex formation would have on cholesterol metabolism. Rats that were fed tomatine as 1% of the diet had a decreased uptake of dietary cholesterol by the liver, an increased rate of hepatic and intestinal cholesterol synthesis as well as a partial offsetting of the dietary cholesterol-induced decrease in hepatic cholesterologenesis and an apparent increase in sterol excretion without an effect on bile acid excretion. *In vitro*, tomatine did not sequester cholic acid as did cholestyramine. The results show that tomatine has an effect on cholesterol absorption and on other aspects of lipid metabolism in the rat similar to that of cholestyramine, with the notable exception that tomatine increased sterol excretion while cholestyramine increased bile acid excretion. It was suggested that tomatine forms a nonabsorbable complex with cholesterol in the rat intestine.

STUDIES OF BRAIN MYELIN IN THE "QUAKING MOUSE." H. Singh, N. Spritz and B. Geyer (Dept. of Med., New York Univ. School of Med., and Lipid Met. Lab., Veterans Admin. Hosp., N.Y. 10010). *J. Lipid Res.* 12, 473-81 (1971). Myelin was isolated from the brains of "quaking" and littermate control animals and its composition was determined. The brains of quaking animals contained approximately one-fourth as much myelin as the control animals. There were qualitative as well as quantitative differences between the myelin from the two groups. By continuous cesium chloride gradient flotation it was shown that the myelin from the quaking animals consisted solely of a band corresponding to the heavier and smaller of the two bands found in normal controls. Cholesterol and glycolipids were lower and phospholipids (mainly phosphatidylethanolamine) and protein were higher in quaking animals than in controls. Also, phosphatidylethanolamine was decreased, and several consistent differences in the fatty acids (both unsubstituted and hydroxy) and aldehydes of the component lipids were found. In general there were smaller amounts of monounsaturated fatty acids in quaking animals. Myelin in the quaking mouse has certain compositional similarities with juvenile myelin.

ISOLATION AND CHARACTERIZATION OF A PHOSPHATIDYLETHANOLAMINE-DEFICIENT MUTANT OF *BACILLUS SUBTILIS*. J.L. Beebe (Dept. Microbiol., Cornell Univ. Med. College, New York, N.Y. 10021). *J. Bacteriol.* 107, 704-11 (1971). A mutant of *Bacillus subtilis* ATCC6051 deficient in phosphatidylethanolamine was isolated by nitrosoguanidine mutagenesis and penicillin concentration of auxotrophs employing phosphatidylethanolamine as supplement. The mutant was compared to the parent strain with regard to lipid composition, growth, osmotic fragility and staining character and differed substantially in each category. In addition to scant amounts of phosphatidylethanolamine, the mutant contained phosphatidylglycerol, cardiolipin, lysyl phosphatidylglycerol and diglucoacyldiglyceride though in amounts differing from those found in the parent strain.

PHOSPHOLIPID METABOLISM IN THE ABSENCE OF NET PHOSPHOLIPID SYNTHESIS IN A GLYCEROL-REQUIRING MUTANT OF *BACILLUS SUBTILIS*. T.L. Lillich and D.C. White (Biochem. Dept., Univ. Kentucky Med. Center, Lexington, Ky. 40506). *J. Bacteriol.* 107, 790-97 (1971). A glycerol-requiring auxotroph of *Bacillus subtilis* showed no net synthesis of phospholipid when deprived of glycerol. Although there was no net synthesis of phospholipid, it was found that (i) fatty acids and <sup>32</sup>P were slowly incorporated into phospholipid, (ii) in pulse-chase experiments, both <sup>32</sup>P and <sup>14</sup>C in the glycerol portion of the phospholipids were lost from phosphatidylglycerol and lysyl phosphatidylglycerol and accumulated in cardiolipin and (iii) the proportions of the phospholipids in the membrane changed with a loss of PG and an accumulation of cardiolipin. The addition of glycerol to the glycerol-deprived cells resulted in a rapid incorporation of glycerol and restoration to predeprived levels of the cardiolipin and PG.

AN ENZYMATIC PROCESS FOR A PROTEIN-CONTAINING BEVERAGE BASED ON SOYBEAN PROTEIN AND LEMON JUICE. H. Sugimoto, J.P. Van Buren and W.B. Robinson (N.Y. State Agr. Exp.

Sta., Cornell Univ., Geneva, N.Y. 14456). *J. Food Sci.* 36, 729-31 (1971). An acidic enzymatic process for preparation of a bland soybean protein hydrolysate is described. Cooked suspension (5.0%) of isolated soybean protein is mixed with small amounts of an acid-protease preparation from *Trametes sanguinea*, adjusted to pH 3.3-3.5 with concentrated lemon juice and incubated at 50C for 8-10 hours. After stopping the proteolysis by heat treatment, the clear supernatant is separated from any insoluble residue by centrifugation. A solubilized nitrogen recovery of 88-90% is obtained. After being diluted about twice and sweetened with sugar, the hydrolysate constitutes a completely clear, slightly yellowish lemonade-like flavored beverage. The data on chemical analysis, gel-filtration and rheological behavior of the hydrolysate are described and discussed.

INFLUENCE OF SEX AND POSTMORTEN AGING ON INTRAMUSCULAR AND SUBCUTANEOUS BOVINE LIPIDS. R.L. Hood and E. Allen (Dept. of Animal Sci., Univ. of Minnesota, St. Paul, Minn. 55101). *J. Food Sci.* 36, 786-790 (1971). Wholesale beef ribs from bulls, steers and heifers were used to study the changes in subcutaneous (SQ) and longissimus dorsi intramuscular (IM) lipids at 2, 7, 14 and 21 days postmortem (PM). Cholesterol levels, phospholipid levels and IM phospholipid fatty acid composition did not change with PM aging. The progressively increasing free fatty acid (FFA) levels observed with time PM were paralleled by fatty acid composition changes. Differences were observed in the quantity and composition of the fatty acids from the lipid classes for the three sex groups. Rib steaks from heifers had significantly higher sensory panel scores for aroma and lower IM and SQ levels of FFA when compared to bulls. A significant correlation of -0.49 was obtained between aroma score and IM levels of FFA.

PHOSPHOLIPID CONCENTRATION ESTIMATED FROM TOTAL MUSCLE LIPID. A.M. Campbell and L.T. Harrill (Agr. Exp. Sta. and College of Home Ec., Univ. of Tenn., Knoxville, Tenn. 37916). *J. Food Sci.* 36, 837 (1971). The inverse relationship between total muscle lipid concentration and phospholipid concentration of the total lipid was linear when a log-log plot was made of the data from 67 diverse samples. The regression equation presented should have some predictive value.

DENATURATION OF SOYBEAN PROTEINS BY ISOELECTRIC PRECIPITATION. A.M. Nash, W.F. Kwolek and W.J. Wolf (N. Reg. Res. Lab., Peoria, Ill. 61604). *Cereal Chem.* 48, 360-8 (1971). Water extracts of soybean meal were acidified with HCl; neutralized; equilibrated with a buffer of pH 7.6 and analyzed in an ultracentrifuge. Loss of solubility in the buffer, as compared to a nonacidified control, served as a criterion of denaturation. Factors causing denaturation were time of acid treatment and extremes of acidity. Two-hour acidification of water extracts to pH 4.5 decreased solubility and total ultracentrifuge area of the globulin fraction about 12%. Alkylation of sulfhydryl groups did not prevent these losses. When they were removed before neutralizing, protein solubility was reduced and all ultracentrifugal fractions decreased in area. Even though no loss of protein solubility occurred on pH 4.5 treatment of water extracts that were dialyzed to remove phytates, total ultracentrifuge areas decreased.

(Continued on page 463A)

• *Obituaries*

Word has been received of the deaths of the following AOCS members: Roy R. Baker, Jr., ('50) Research Chemist at Swift and Co., Oak Brook, Ill.; A.E. Rheineck, Professor, Polymers and Coatings Department, College of Chemistry and Physics, North Dakota State University, Fargo, N. Dak.; and Wilfred D. Simpson, ('58) Manager at Woodson-Tenent Labs, Wilson, Ark.

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# More Surveillance Urged on Adverse Reactions to Drugs

A National Center for Drug Surveillance should be established to detect and determine "at the earliest possible moment" adverse drug reactions not discovered by studies in laboratory animals or by early clinical investigations. Such a Center would increase the safety of drugs and facilitate the early availability of new important drugs, states the *Report of the International Conference on Adverse Reactions Reporting Systems*, issued by the Drug Research Board of the National Research Council.

While beneficial effects of drugs have been increasingly documented, present mechanisms for detecting and identifying adverse reactions are "haphazard and in-

adequate," the report states. More investigations are needed on topics such as specific reaction to drugs and chemicals; interactions between different drugs, between drugs and foods, and drugs and alcohol; and long term effects of drugs such as oral contraceptives, antidiabetics, anticoagulants and cholesterol lowering agents.

The recommendations and proposal for the National Center for Drug Surveillance were made at an International Conference on Adverse Reactions Reporting Systems, held October 22 and 23 last year. Participants included more than 300 scientists and administrators from universities, government agencies, the pharmaceutical industry and health care systems. Their major recommendations and conclusions are summarized in the report. A limited number of copies is available from the Drug Research Board, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

## • Abstracts . . .

(Continued from page 461A)

GELATION PHENOMENA OF SOYBEAN GLOBULINS. III. PROTEIN-LIPID INTERACTIONS. N. Catsimpoilas and E.W. Meyer (Lab. of Protein Chem., Central Soya Res. Ctr., Chicago, Ill. 60639). *Cereal Chem.* 48, 159-67 (1971). The major factors, other than temperature, pH and concentration, affecting the gelation of soybean globulins in the presence of lipids were determined to be (a) the length of the aliphatic chain of the glyceride, (b) the degree of unsaturation of the glyceride, and (c) the number of unesterified hydroxyl groups in the glycerol component. The apparent viscosities of the progel and gel were increased either by decreasing the fatty acid chain length of the glyceride or decreasing the esterification of the hydroxyl groups of glycerol. Saturated fats produced higher gel viscosity than unsaturated ones. Phospholipids and cholesterol also enhance gelation of soybean globulins.

## • Drying Oils and Paints

CHROMATOGRAPHIC DETERMINATION OF THE MOLECULAR WEIGHT DISTRIBUTION CURVE OF ALKYD RESINS. G. Bellens. *Double Liaison* 17, No. 183, 617-29 (1970). A fractionating method using column chromatography on glass beads was applied to 7 linseed/glycerol alkyds of 68% oil length differing in polyacid component (phthalic isomers, etc.), the eluent being a mixture of xylene and isopropyl alcohol. The viscosity average mol. wt. of each fraction was determined and results were plotted. Inferences are drawn according to the nature of each resin. (World Surface Coatings Abs. No. 346)

MECHANICAL PROPERTIES OF MODIFIED ALKYD RESINS. P.H. Gedam, R. Vittal Rao, M.A. Sivasamban and J.S. Aggarwal. *Paint Manuf.* 41, No. 1, 36-8 (1971). Properties such as tensile strength, toughness, bursting strength and modulus of rigidity of alkyd resins modified with refined sardine oil and upgraded sardine oil have been studied. They have been compared with those of linseed, soyabean, safflower and dehydrated castor oil alkyd films. Among medium oil length alkyds, upgraded sardine oil alkyd was the toughest. All medium oil length alkyds had far better mechanical properties than long oil alkyds. (World Surface Coatings Abs. No. 348)

## • Detergents

HOW TO SELECT EMULSIFIERS. J.B. Mickle (Dept. of Animal Sci. and Ind., Oklahoma State Univ., Stillwater, Ok.). *Food Eng.* 43, 7, 68-71 (1971). The key to emulsifier performance is its water-fat solubility ratio. The latest research correlates this factor with emulsion stability in dairy products and shortenings.

THE DETERMINATION OF PHOSPHATE IN DETERGENTS BY COOL-FLAME EMISSION SPECTROSCOPY. W.N. Elliott and R.A. Mostyn (Quality Assurance Directorate (Materials), Royal Arsenal, London, S.E. 18). *Analyst* 96, 452-56 (1971). The total phosphate content of detergent materials is determined by measurement of the emission of the HPO molecular species at wavelength 528 nm in a cool hydrogen-nitrogen diffusion flame. Preliminary treatment with cation-exchange resin is necessary to remove interference by metals. Analytical results on detergent samples containing up to 20% phosphates (expressed as P<sub>2</sub>O<sub>5</sub>) indicates a precision of the order of 2 to 4% for the method.

## • Economics of Sunflowers . . .

(Continued from page 449A)

with grain sorghum not produced under the feed grain program.

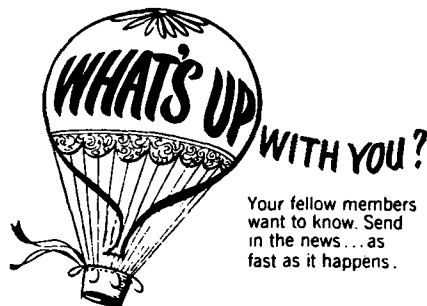
Although this area is shown in Table VIII, at the present time sunflowers cannot be produced in the Rolling Plains of Texas due to the carrot beetle. Failure to control this insect will prohibit introduction of sunflowers to this area.

In the Red River Valley sunflower yields required to compete with flax, barley and soybeans are lower than those required to compete with established crops in the Cotton Belt. At 4 cents/lb. sunflower yields of 900 lb. would compete with flax and a yield of around 1100 lb. would compete with soybeans and barley. Substantially higher yields would be required to compete with wheat grown under the domestic allotment program.

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