ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: N. E. Bednarcyk, J. E. Covey, J. G. Endres, J. Iavicoli, S. Kawamura, F. A. Kummerow, E. G. Perkins, and R. W. Walker

• Fats and Oils

CHOLESTEROL DETERMINATION WITH FERRIC ACETATE-URANIUM ACETATE AND SULFURIC ACID-FERROUS SULFATE REAGENTS. A. C. Parekh and D. H. Jung (Clin. Lab., Ind. Univ. Med. Cen., 1100 West Mich. St., Indianapolis, Ind. 46202). *Anal. Chem.* 42, 1423–27 (1970). A new method for cholesterol determination using ferric acetate-uranium acetate in acetic acid and sulfuric acid-ferrous sulfate reagents is proposed. These reagents while functioning as precipitants, serve to extract the cholesterol and also provide a color development with it, which is superior to the reactions reported in the literature. The new assay is not affected by lipemic, slightly hemolyzed, or icteric (up to 15 mg bilirubin/100 ml) sera. Repeated analyses of a pooled serum gave a result of 172 mg ± 1.82 standard deviation with ± 0.30 as the standard error of the mean. Per cent recoveries of cholesterol added to the sample were in the range of 98.5 to 100.7. The accuracy of the results obtained by the proposed assay is comparable to those obtained by using the reference method of Abell *et al.* The reproducibility of the proposed method is the best reported to date in the literature.

DETERMINATION OF UNSATURATION BY ANALITICAL HYDROGENATION AND NULL POINT PRESSUREMETRY. D. J. Curran and J. L. Driscoll (Dept. of Chem., Univ. of Mass., Amherst, Mass. 01002). *Anal. Chem.* 42, 1414–19 (1970). A multirange differential capacitive-type pressure transducer system has been used to follow pressure changes in a closed system during analytical hydrogenation of unsaturates and subsequent *in situ* regeneration of hydrogen gas by hydrolysis of sodium borohydride. A graphical treatment of the recorded data yields the volume of $NaBH_4$ needed to generate hydrogen equivalent to that consumed in the hydrogenation reaction. The method uses an experimentally determined correction to the data for the free space equivalent of the volume of solution and liquid added to the system. Precision and accuracy are a few parts per thousand for sample sizes corresponding to 0.1 millmole of unsaturation in favorable cases. As little as 1.2 micromoles of octene-1 have been determined with an accuracy of about 2% relative.

REVIEW OF ANALYTICAL METHODS FOR DETERMINING THE COLOR OF OILS. J. Lezajic. *Bilten Biljna Ulja I Masti* 7(1), 23–5 (1970). (Rev. Franc. Corps Gras)

THE PROBLEM OF WASTE WATER IN THE OIL PROCESSING INDUSTRY. Z. Klaric *et al. Bilten Biljna Ulja I Masta* 7(1), 27–32 (1970). (Rev. Franc. Corps Gras)

COMPARISON OF INDIGENOUS BLEACHING EARTH (BRV-KUTINA) WITH IMPORTED EARTHS. J. Lezajic *et al. Bilten Biljna Ulja I Masti* 7(1), 33–5 (1970). (Rev. Franc. Corps Gras)

DISTRIBUTION OF VARIETIES OF SUNFLOWER ACCORDING TO THE AGROECOLOGICAL CONDITIONS IN DIFFERENT PARTS OF YUGOSLAVIA. T. Vrebalov. *Bilten Biljna Ulja I Masti* 7(1), 1–10 (1970). (Rev. Franc. Corps Gras)

THE WAX CONTENT OF ALMOND OIL AND SUNFLOWER SEED OIL. B. Ostric-Matijasevic *et al. Bilten Biljna Ulja I Masti* 7(1), 11–15 (1970). (Rev. Franc. Corps Gras)

COMPARATIVE STUDY OF CATALYST QUALITY BY LABORATORY-SCALE HYDROGENATION. Z. Vrbaski *et al. Bilten Biljna Ulja I Masti* 7(1), 17–21 (1970). (Rev. Franc. Corps Gras)

COLD DETERMINATION OF THE SAPONIFICATION VALUE. J. Graille and M. Naudet (Lab. Nat. des Matieres Grasses, ITERG, Marseille). *Revue Franc. Corps Gras* 16, 475–77 (1970). Use of mixtures of alcoholic KOH and dimethylsulfoxide permits determining the saponification value at room temperature. The procedure worked out is as follows: Into a 100 ml flat bottom flask weigh exactly 1.5 g of oil. Add 10 ml of freshly distilled dimethylsulfoxide and 25 ml of 1 N KOH in 96% ethanol. Stopper the flask and mix violently for 20 min. Rinse the mouth and sides of the flask down with a minimum of neutralized 50% ethanol. Add 25 ml of 0.5 N aqueous HCl and mix carefully until the solution clears. The excess KOH is titrated with 0.5 N HCl in 50% ethanol to a phenolphthalein end point. A control is run in parallel with the sample. With solid fats, dissolve them in 10 ml of dioxane before adding the reagents. The values obtained by this method run consistently 2–5 units below those obtained by the standard procedure.

THE TOCOPHEROLS OF VEGETABLE OILS. F. Mordret (Ecole Superieure d'Application des Corps Gras, Paris). *Revue Franc. Corps Gras* 16, 467–74 (1970). The first part of this review is concerned with the form and distribution of tocopherols in various vegetable oils. The second part covers the analysis of tocopherols in vegetable oils and includes column, gas-liquid and thin-layer chromatographic procedures for fractionating the total tocopherols.

A SIMPLE TEST FOR THE DETECTION OF TARAMIRA OIL IN MUSTARD OIL. K. L. Chatterjee and J. S. Pruthi (Central Agmark Lab., Directorate of Marketing and Inspection, Nagpur-1, India). *Oil Oilseeds J.* 22(10), 10–11 (April, 1970). Taramira (*Eruca sativa*) oil closely resembles Indian mustard and rapeseed oils and can be used to adulterate them. A method for detecting this adulteration at levels of 2.5% or greater has been developed. About 5 g of oil is steam distilled, and the distillate (200 ml) is extracted with ethyl ether. The ether is evaporated to 2 ml and mixed with 2 ml of absolute ethanol. A drop of this solution is placed on filter paper and dried. Then a 2% solution of ammoniacal $AgNO_3$ is sprayed on it. A dark brown spot appearing immediately indicates the presence of taramira oil. It is important that the spot test be run within 24 hours of the distillation and evaporation steps.

EVALUATION OF THE FLAVOR AND INTERPRETATION OF THE TOTAL QUALITY RATING OF MARGARINE ACCORDING TO 100 POINT AND 5 POINT SCALES. J. Slowikowska. *Tluszcze Jadalne* 14(4), 190–4 (1970). The system of sensory evaluation of margarine developed at the Institute of Oil Industries of Warsaw is based on evaluation of the following qualitative characteristics: evenness of color, flavor, meltability in the mouth and spreadability. The importance of these characteristics is expressed by weighted coefficients calculated for them and representing: 0.68 for flavor, 0.12 for meltability in the mouth, 0.10 for spreadability, and 0.10 for evenness of color. According to the 5 point scale, a product whose flavor rating is 2.5–3.5 has a satisfactory flavor. A flavor is unsatisfactory between 1.5 and 2.5 points, good between 3.5 and 4.5 points, very good above 4.5, and very poor below 1.5 points. Comparison of the two systems shows the superiority of the one based on 5 points. (Rev. Franc. Corps Gras)

TRANSESTERIFIED BINARY MIXTURES AS BASE FATS FOR MARGARINE PRODUCTION. U. Fal *et al. Tluszcze Jadalne* 14(4), 207–17 (1970). Margarine base stocks which are 100% transesterified may contain 20–35% by weight of a tallow hydrogenated to a low iodine value and 80 to 65% of liquid soybean or sunflower seed oil. In order to improve the consistency, small quantities of palm oil or partially hydrogenated liquid oils should be combined with the transesterified base oils. (Rev. Franc. Corps Gras)

INVESTIGATION OF A RAPID METHOD FOR DETERMINING TRACES OF IRON AND COPPER IN VEGETABLE OILS. I. EXTRACTION OF METALS FROM REFINED OILS BY 5 N HYDROCHLORIC ACID. A. Jakubowski *et al. Tluszcze Jadalne* 14(4), 171–9 (1970). By using 5 or 10% acid based on the weight of oil, over 90% of the iron and copper initially present in the oil can be recovered. (Rev. Franc. Corps Gras)

SOLUBILITY OF FATTY ACIDS AND THEIR METHYL ESTERS IN FURFURAL AND COMMERCIAL GRADE SULPHOLANE. J. Wisniak, C. Eichholz and A. Fertilio. *Brit. Chem. Eng.* 15, No. 1, 76–7 (1970). Data useful in the design of liquid/liquid extraction systems handling fatty acids and methyl esters in the range C_6–C_{22} are given. (World Surface Coatings Abs. No. 338)

BEESWAX. ANALYSIS AND CHARACTERISTIC VALUES. G. Tilschack (Hamburg, W. Ger.). *Fette Seifen Anstrichmittel* 71, 369–79

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(1969). The chemical characteristics of beeswax (acid, saponification and ester values), as given in the older literature, vary rather widely within the samples of same origin as well as within those from various sources. In order to account for these variations, the procedures for the determination of acid and saponification values of beeswax were subjected to a thorough investigation. The chemical characteristics and paraffin content of beeswax samples from many different countries are tabulated.

COLLABORATIVE STUDY COMPARING GAS-LIQUID CHROMATOGRAPHIC AND CHEMICAL METHODS FOR QUANTITATIVELY DETERMINING VITAMIN E CONTENT OF PHARMACEUTICAL PRODUCTS. A. J. Sheppard, W. D. Hubbard and A. R. Prosser (Div. of Nutr., FDA, Wash., D.C. 20204). *J. Assoc. Offic. Anal. Chem.* 52(3), 442–51 (1969). A collaborative study was conducted to compare the USP XVII (Emmerie-Engel) method and three GLC methods for quantitatively determining α-tocopherol, α-tocopheryl acetate, and α-tocopheryl succinate in pharmaceutical products. Nine collaborating laboratories analyzed seven pharmaceuticals encompassing tablets, capsules and liquids. The mean coefficients of variation were: USP method, 28.6%; GLC method A, 10.2%; GLC method B, 10.8%, GLC method C, 18.0%. GLC method A was the method of choice of those evaluated.

• Fatty Acid Derivatives

OXO SYNTHESIS OF BIFUNCTIONAL DERIVATIVES. R. Lai (Lipid Chem. Lab., Faculte des Sciences, Marseille). *Revue Franc. Corps Gras* 16, 455–66 (1970). The author describes the procedure for this synthesis and discusses the effects of pressure, temperature, nature and composition of catalyst (generally cobalt carbonyl), and reaction time on results and yields. Some specific reactions of various fatty acid derivatives, namely oleic acid, methyl oleate, oleic alcohol, oleic nitrile and oleic amine are discussed. The formation of isomers along with the addition products is also covered.

REACTION OF RAPE OIL WITH SULPHUR. J. Zajic and O. Kopecka. National Science Foundation, Washington, D.C.: SFCSI-Agr (TT-68-50075), 1969, 10 pp: Transl. of *Prumysl Potravin* 1964, 15 No. 8, 395–6 (in Czech.): U.S. Govt. Res. & Dev. Repts. 1970, 70 No. 6, 65. The aim of the work was to explain some aspects of the reaction of rape oil with S. Reactions with 3 and 10% of S at a *temp. of* 150C. have been analyzed. In the initial stage of reaction S quickly binds to double bonds of the oil fatty acids yielding sulphide chains. With 3% S in the reaction mixture the oil was polymerized in the next stage of reaction. With 10% S the above mentioned bond became disulphide. Geometric and position isomerism of fatty acids were found by spectral analysis of the reaction products. (World Surface Coatings Abs. No. 339)

• Biochemistry and Nutrition

INHIBITION OF LIPOLYSIS BY NORMAL ALCOHOLS. F. H. Mattson, R. A. Volpenhein and L. Benjamin (Procter and Gamble Co., Miami Valley Lab., Cincinnati, Ohio 45239). *J. Biol. Chem.* 245, 5335–40 (1970). The hydrolysis of methyl oleate by pancreatic lipase (EC 3.1.1.3) is inhibited by added normal alcohols. The efficiency of inhibition increases with the chain length of the alcohol, attaining a maximum at 10 carbon atoms. A further increase in chain length causes no further increase in inhibitory action. The data have been successfully treated by assuming that the reaction occurs at an interface. The inhibitory action of the alcohols followed the pattern of a typical Langmuir adsorption isotherm. The calculated free energy of adsorption of each $-CH_2-$ group of the alcohol was 820 cal. Although the uninhibited reaction was enzyme-limited, the effect of alcohols could be overcome by the addition of more substrate, but not by the addition of more enzyme. It is concluded that the inhibiting effect of alcohol is due to its adsorption on the substrate, thus blocking the enzyme from the substrate. Some of the properties of ester hydrolysis, which result from the reaction taking place at an oil-water interface, are discussed.

LIPOPROTEIN LIPASE OF THE BOVINE MAMMARY GLAND. E. W. Askew, R. S. Emery and J. W. Thomas (Dairy Dept., Mich. State Univ., East Lansing, Mich. 48823). *J. Dairy Sci.* 53, 1415–23 (1970). Homogenates of lactating and nonlactating bovine mammary tissue were examined for lipoprotein lipase. (EC 3.1.1.3) activity to provide information on the mode of uptake of serum triglyceride fatty acid by the bovine mammary gland. The activity of lipoprotein lipase in lactating bovine mammary gland homogenates was dependent upon the concentrations of bovine serum albumin, serum, and pH of the incubation mixture. Ca^{++} did not stimulate bovine mammary tissue lipolytic activity. Heparin caused minor but variable degrees of stimulation (3 to 25%) of lipolytic activity. The majority (80%) of cellular lipolytic activity was associated with the particulate fraction. Lipoprotein lipase activity was similar in all quarters of the udder, unaffected by freezing, and greatly reduced in nonlactating tissue. Milk contained a lipase with properties similar to tissue lipoprotein lipase.

EFFECTS OF CANCER UPON HIGH-DENSITY AND OTHER LIPOPROTEINS. M. Barclay, V. P. Skipski, O. Terebus-Kekish, E. M. Greene, R. J. Kaufman and C. C. Stock (Sloan-Kettering Inst. for Cancer Res., Walker Lab., Rye, New York 10580). *Can. Res.* 30, 2420–30 (1970). Serum lipoprotein levels were measured in normal subjects and in patients with cancer. All normal adult subjects were classified according to the amounts of high-density lipoprotein-2 in their sera. It was observed that subjects with low values also had a pronounced positive history of cancer in close blood relatives. The only significant difference between the groups of normal women was a substantially lower amount of the high-density lipoprotein-2 with a density between 1.063 and 1.125 g/ml in those with positive family histories of cancer. Normal men with family histories of cancer also had decreased values for high-density lipoprotein-2 and, in addition, had elevated levels of the very-low-density lipoproteins with densities less than 1.006 g/ml.

PHOSPHOLIPID SYNTHESIS AND DEGRADATION DURING THE LIFE-CYCLE OF P815Y MAST CELLS SYNCHRONIZED WITH EXCESS OF THYMIDINE. J. J. M. Bergeron, A. M. H. Warmsley and C. A. Pasternak (Dept. of Biochem., Univ. of Oxford, Oxford OX1 3QU, U.K.). *Biochem. J.* 119, 489–92 (1970). P815Y cells synchronized with excess of thymidine *incorporate* choline, proline and uridine throughout the cell cycle; the rate increases two- to four-fold during the S phase, when thymidine incorporation increases more than 15-fold. Choline incorporated at any stage of the cell cycle turns over in a biphasic manner; stable and unstable components are each labelled maximally during the S phase. Total phospholipid also doubles predominantly during the S phase. It is concluded that, despite turn-over, choline incorporation is a useful measure of net phospholipid formation during the cell cycle.

THE 5-YEAR EXPERIENCE OF MODIFIED FAT DIETS ON YOUNGER MEN WITH CORONARY HEART DISEASE. M. L. Bierenbaum, A. I. Fleischman, D. P. Green, R. I. Raichelson, T. Hayton, Portia B. Watson and Anne B. Caldwell. *Circulation* 42, 943–52 (1970). This is a study of 100 men, 30 to 50 years old, with documented coronary artery disease and past myocardial infarction who were placed under dietary management with a 28% fat diet. One hundred men whose diets were not managed were matched with regard to age at entry to the study, age at infarction, number of infarctions, blood pressure level, degree of angina and serum cholesterol level among other factors. Over a period of 5 years the diet-managed group experienced and maintained a significant reduction in serum cholesterol level which the nondiet-managed group did not. Under the diet and experimental conditions employed, with saturated fat content below 9% of calories, and cholesterol intake below 400 mg per day, the degree of unsaturation of the fats in the experimental diets did not appear to influence serum cholesterol value or mortality. The serum triglyceride level was significantly lower in the diet-managed group than in the nondiet-managed group; this was presumably related to weight reduction. In the group under dietary management, fatal and nonfatal myocardial reinfarction rates were lower but were statistically significantly so only for the fatal infarction rates in men under age 45. Serum phospholipids above 220 mg/100 ml were associated with a significantly lower rate of recurrent infarction.

INHIBITION OF CHOLESTEROL DEPOSITION IN LIVERS OF MICE FED PHYTOSTEROLS IN SHORT-TERM EXPERIMENTS. M. Katz, I. Bartov, P. Budowski and A. Bondi (Dept. of Animal Nutr. and Agr. Biochem., Faculty of Agr., Hebrew Univ., Rehovot, Israel). *J. Nutr.* 100, 1141–48 (1970). The purpose of the present investigation was to compare the cholesterol-interfering effectiveness of campesterol, β-sitosterol, stigmasterol and ergosterol. Soy sterols at a level of 1.0% of the diet prevented the accumulation of cholesterol in the livers of growing mice fed 0.5% cholesterol over a period of 12 days. In the absence of dietary cholesterol, soy sterols did not affect liver values consistently. Elevated plasma cholesterol values resulted from feeding cholesterol, soy sterols, or a mixture of both. When the test period was reduced to less than 5 days, soy sterols lost part of their effectiveness in preventing elevated liver cholesterol concentrations in cholesterol-fed mice. Comparison of the effects of several phytosterols in preventing the deposition of cholesterol in mice livers in a 5-day test period showed that β-sitosterol exhibited the greatest activity, followed by stigmasterol. Ergosterol and campesterol were relatively less effective.

EFFECTS OF A PHENOLIC ETHER, SU-13437, ON SERUM CHOLESTEROL, TRIGLYCERIDE, AND TRANSAMINASE LEVELS OF HUMAN SUBJECTS. C. H. Duncan and M. M. Best. *Circulation* 42, 859–65 (1970). The hypolipidemic activity of the phenolic ether, 2-methyl-2-(p-(1,2,3,4-tetrahydro-1-napthyl)-phenoxy)-propionic acid (Su-13437, Ciba) has been studied in 10 hypercholesterolemic patients. The patients were studied at 3-week intervals during 30 weeks of placebo administration and a 30-week period of treatment with Su-13437, 400 mg daily. Individual mean serum total cholesterol during administration of placebo ranged from 255 to 609 mg/100 ml and during treatment from 187 to 493, the mean reduction being 22%. Five of the subjects were also hypertriglyceridemic, with individual mean levels of triglycerides during placebo periods ranging from 159 to 1247 mg/100 ml. During treatment with Su-13437 mean triglyceride levels of these five patients ranged from 81 to 314 mg/100 ml, a mean reduction of 51%. The drug was well tolerated and its only effect on the hematologic and biochemical tests for possible toxicity was an increase in SGOT and SGPT levels in two patients, the levels being maximal between the sixth and ninth weeks of drug administration and returning later toward pretreatment values despite continuation of Su-13437.

APPLICATION OF THE TEMPERATURE-JUMP TECHNIQUE TO THE STUDY OF PHOSPHOLIPID DISPERSIONS. G. G. Hammes and D. E. Tallman (Dept. of Chem., Cornell Univ., Ithaca, N.Y. 14850). *J. Am. Chem. Soc.* 92, 6042–45 (1970). Temperature-jump experiments performed on suspensions of phosphatidylserine vesicles (liposomes) reveal a relaxation process having a phospholipid concentration dependent relaxation time. The addition of calcium ions or cholesterol to the suspensions has little or no effect on the relaxation time. Futhermore, liposomes which have been osmotically shrunk in sucrose give rise to relaxation times which are identical, within experimental error, with those obtained with osmotically swollen liposomes. The relaxation time exhibits a dependence upon the length of the sonication time of the liposome stock solutions, and the rate is considerably reduced upon addition of polylysine to the suspensions. Although a definite mechanism cannot be established, a simple mechanism consistent with all of the data is a conformational change within liposome aggregates, with the rate of the change being dependent on the size of the aggregate.

KETONE BODY AND FATTY ACID METABOLISM IN SHEEP TISSUES. Patricia P. Koundakjian and A. M. Snoswell (Dept. of Agr. Biochem., Waite Agr. Res. Inst., Univ. Adelaide, Glen Osmond,

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Call for Nominations for Eighth AOCS $2,500 Award in Lipid Chemistry

Sponsored by Applied Science Laboratories

In April 1964 the Governing Board of the American Oil Chemists' Society established an Award in Lipid Chemistry under the sponsorship of the Applied Science Laboratories Inc., State College, Pennsylvania. Previous awards were presented as follows: Erich Baer, August 1964; Ernest Klenk, October 1965; H.E. Carter, October 1966; Sune Bergstrom, October 1967; Daniel Swern, October 1968; H.J. Dutton, October 1969 and E.P. Kennedy, September 1970.

The award consists of $2,500 accompanied by an appropriate certificate. It is now planned that the eighth award will be presented at the AOCS Fall Meeting in Atlantic City, Oct. 2-6, 1971.

Canvassing Committee Appointees

Policies and procedures governing the selection of award winners have been set forth by the AOCS Governing Board. An Award Nomination Canvassing Committee has been appointed. Its membership is R.J. Sims, Chairman; W.P. Gibble, L.H. Widermann, D.L. Berner and T.J. Weiss. The function of this committee is to solicit nominations for the eighth award. Selection of the award winner will be made by the Award Committee whose membership will remain anonymous.

Rules

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

Letters of nomination together with supporting documents must be submitted in octuplicate to R.J. Sims, General Foods Corp., Technical Center, White Plains, N.Y., before the deadline date of April 15, 1971. The supporting documents shall consist of professional biographical data, including a summary of the nominee's research accomplishments, a list of his publications, the degrees he holds, together with the names of the granting institutions, and the positions held during his professional career. There is no requirement that either the nominator or the nominee be a member of the American Oil Chemists' Society.

Remember the DEADLINE, April 15, 1971

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S. Austral. 5064, Australia). *Biochem. J.* 119, 49–57 (1970). 3-Hydroxybutyrate dehydrogenase (EC 1.1.1.30) activities in sheep kidney cortex, rumen epithelium, skeletal muscle, brain, heart and liver were 177, 41, 38, 33, 27 and 17 mol/h per g of tissue, respectively, and in rat liver and kidney cortex the values were 1150 and 170, respectively. Laurate, myristate, palmitate and stearate were not oxidized by sheep liver mitochrondria, whereas the L-carnitine esters were oxidized at appreciable rates. The free acids were readily oxidized by rat liver mitochondria. During oxidation of palmitoy-L-carnitine by sheep liver mitochondria, acetoacetate production accounted for 63% of the oxygen uptake. The physiological implications of the low activity of 3-hydroxybutyrate dehydrogenase in sheep liver and the fact that it is found in the cytoplasm in sheep liver and kidney cortex are discussed.

THE OSLO DIET-HEART STUDY. P. Leren. *Circulation* 42, 935–42 (1970). The study deals with 412 men, aged 30 to 64 years, randomized 1 to 2 years after a first myocardial infarction. For the experimental group a diet low in saturated fats and cholesterol, and high in polyunsaturated fats was recommended. After 5 years, as reported previously, the incidence of fatal and nonfatal myocardial reinfarction was found to be significantly reduced. "Sudden death" was uninfluenced. Major coronary heart disease (CHD) relapses, including fatal and nonfatal events (MI), were significantly reduced ($P = 0.05$). After 11 years, death from all causes had occurred in 101 of the original dieters and 108 controls. A significantly reduced myocardial infarction mortality in the original diet group was found (32 versus 57, $P = 0.004$). The total number of coronary deaths (fatal myocardial infarction and sudden death) was 79 in the diet group and 94 in the control group ($P = 0.097$). The CHD mortality was correlated with age, serum cholesterol level, blood pressure, body weight, smoking habits and a combination of these risk factors.

DECREASED HYDROXYLATION OF STEROID HORMONES BY LIVER MICROSOMES FROM RATS BEARING WALKER CARCINOSARCOMA 256. R. Kato and Atsushi Takahashi (Dept. of Pharm., Nat. Inst. of Hyg. Sci., Setagaya-ku, Tokyo, Japan). *Cancer Res.* 30, 2346–52 (1970). The hydroxylating activities of liver microsomes for progesterone and testosterone were markedly decreased in male and female rats bearing Walker carcinosarcoma 256. The decreases in the hydroxylating activities were greater in the male rats than in the female rats. The content of cytochrome P-450 in liver microsomes was decreased in the tumor-bearing male and female rats. Moreover, the binding capacity of P-450 with progesterone and testosterone was decreased in the liver microsomes from tumor-bearing male rats, but not in those from female rats. The administration of 17-methyltestosterone to the tumor-bearing male rats did not prevent the decrease in the binding capacity of P-450 or in the hydroxylating activities for progesterone and testosterone. These results appear to correlate the decrease in the hydroxylating activities for steroid hormones in the male rats with the decrease in the content of P-450 and the binding capacity of P-450 with steroid hormones, while the decrease in the female rats is correlated with the decrease in the content of P-450. Since the binding capacity of P-450 for steroid hormones is regulated by androgen, these results suggest that the ability of androgen to cause and increase in the binding capacity of P-450 appears to be impaired in the tumor-bearing male rats.

STUDIES OF THE ELECTRON TRANSPORT CHAIN OF EXTREMELY HALOPHILIC BACTERIA. J. K. Lanyi and Joann Stevenson (Exobiol. Div., Amer. Res. Cen., Nat. Aeronautics and Space Admin., Moffett Field, Calif.). *J. Biol. Chem.* 245, 4074–80 (1970). Menadion reductase from a halophilic bacterium shows a requirement for high concentrations of salt for both activity and stability, reaching maximal value at 2 to 3 M NaCl. Lower concentrations of polyvalent cations, such as Mg^{+2} and spermine^{+4}, cause partial activity and some increase in stability. There is little difference in effectiveness among monovalent cations as chloride salts. Among anions, as sodium or potassium salts, the order of promoting enzyme activity and stability is Cl^-, $H_2PO_4^-$, ClO_4^-, SCN^-. The enzyme is inhibited by formamide and urea; alkyl substitution increases the effectiveness of these agents.

PREDICTION OF CORONARY HEART DISEASE BASED ON CLINICAL SUSPICION, AGE, TOTAL CHOLESTEROL AND TRIGLYCERIDE. I. H. Page, J. H. Berrettoni, Antanas Butkus and F. Mason Sones, Jr. *Circulation* 42, 625–39 (1970). Our results, based on the definition of coronary heart disease by cinearteriography, show that definite relationships exist among incidence of coronary heart disease (CHD), age, total cholesterol (TC) and total triglycerides, with less definite ones between free cholesterol, and phospholipids for a specific group of 450 male patients referred to the Cleveland Clinic because of suspected coronary heart disease. Age and TC were good discriminators in these patients suspected of CHD. An improved relationship and better discrimination was obtained by relating incidence simultaneously to age, TC, and TG. Coronary heart disease as defined by cinearteriography was most closely related to age, total serum cholesterol and total triglycerides in 450 patients referred to the Cleveland Clinic because the disease was suspected. Triglycerides were the least reliable predictor of the three. If all three were used, then using probabilities above 0.90 gave a 95% assurance of a correct prediction for this physician-selected group of patients. Less defininte relationships were found for phospholipids and free cholesterol.

TURNOVER OF MAMMALIAN PHOSPHOLIPIDS. C. A. Pasternak and J. J. M. Bergeron (Dept. of Biochem., Univ. of Oxford, Oxford OX1 3QU, U.K.). *Biochem. J.* 119, 473–80 (1970). Choline- and inositol-labelled phospholipids of exponentially growing or static neoplastic mast cells turn over by degradation and resynthesis of the entire molecule. Turnover follows a biphasic pattern, the unstable rapidly turning-over component accounting for 60–80% of labelled phospholipid. The residual stable component does not turn over any more than does protein or DNA. Subcellular fractions and surface membranes of choline-labelled P815Y cells contain the same proportion of stable and unstable components as do whole cells. The unstable component is largely phosphatidylcholine; the stable component is relatively richer in sphingomyelin. It is concluded that the phospholipids of neoplastic mast cells are of two classes, one of which is susceptible to continual enzymic degradation and resynthesis, and the other of which is metabolically stable.

TURNOVER OF MAMMALIAN PHOSPHOLIPIDS. C. A. Pasternak and Beverly Friedrichs. *Ibid.*, 481–88. Choline- and inositol-labelled phospholipids of human cultured lymphocytes turn over in a biphasic manner; phytohaemagglutinin activation stimulates turnover. Choline-labelled phospholipids of rat liver and kidney, but not of blood turn over in vivo as fast as those of duodenum, ileum or colon. Turnover is the intestinal tissues if greater in fed than in starved or vitamin A-deficient rats. In each case phosphatidylcholine turns over relatively faster than sphingomyelin or lysophosphatidylcholine. It is concluded that phospholipid turnover of the type described is a common feature of viable cells, and that metabolically favorable conditions increase, rather than decrease, turnover.

EPOXIDES AS OBLIGATORY INTERMEDIATES IN THE METABOLISM OF OLEFINS TO GLYCOLS. E. W. Maynert, R. L. Foreman and T. Watabe (Dept. of Pharm., College of Med., University of Ill., Chicago, Ill. 60680). *J. Biol. Chem.* 245, 5234–38 (1970). In the presence of rat liver microsomes and NADPH n-1-octene, n-4-octene and 3-ethyl-2-pentene were converted to the glycols with no trace of epoxides. Increased substitution of ethylenic hydrogen atoms by alkyl groups was found to retard the rate of biological oxidation but to enhance that of epoxidation by perbenzoic acid in chloroform. Microsomes without cofactors hydrolyzed the monosubstituted ethylene oxide more rapidly than the di- or trisubstituted derivatives. The relative rates were in the opposite order of those predicted for acid-catalyzed hydrolysis. The epoxides were found capable of inhibiting epoxide hydrolase. Incubation of microsomes and NADPH with 1 mM n-1-octene in the presence of 20 mM 4,5-epoxy-n-octane yielded both 1,2-epoxy-n-octane and n-octane-1,2-diol. However, in the presence of 20 mM 1,2-epoxy-n-octane, 1 mM n-4-octene yielded 4,5-epoxy-n-octane but no n-octane-4,5-diol. This effect in the presence of inhibitor indicates that the epoxide is an obligatory intermediate in the conversion of n-4-octene to the glycol.

INVESTIGATION OF THE COMPONENT REACTIONS OF OXIDATIVE STEROL DEMETHYLATION. W. L. Miller and J. L. Gaylor (Section of Biochem. and Mol. Biol. and the Grad. School Nutr., Cornell Univ., Ithaca, N.Y. 14850). *J. Biol. Chem.* 245, 5369–74 (1970). Microsomal enzymes of rat liver catalyze the oxidative demethylation of 4α-methyl-5α-cholest-7-en-3β-ol. Demethylation requires oxygen and both reduced and oxidized pyridine nucleotides. Aerobic incubation of 30-^{14}C-4α-methyl-5α-cholest-7-en-3β-ol with a microsomal preparation depleted of NAD^+ and containing an NADPH-generation system yields oxidative attack of substrate but no release of $^{14}CO_2$. Sterols were extracted from the microsomal protein with acetone. Only one oxygenated sterol accumulated in high yields. Thin-

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layer chromatography has been used to establish the homogeneity and purity of the isolated sterol. It has been identified as 3β-hydroxy-5α-cholest-7-ene-4α-carboxylic acid by mass spectrometry. The rates of carboxylic acid formation and decarboxylation (NAD^+-dependent) are sufficient to account for the over-all rate of demethylation.

METABOLISM OF DEHYDROISOANDROSTERONE AND OTHER STEROIDS BY SURVIVING SLICES OF THE POTATO TUBER AND ADDITIONAL PLANT TISSUES. J. J. Schneider (Dept. of Med., Jefferson Med. Col., Philadelphia, Pa. 19107). *J. Biol. Chem.* 245, 5505–10 (1970). The conversion of dehydroisoandrosterone to its β-D-glucopyranoside is readily effected by surviving slices of the potato tuber at pH 8. This reaction is largely limited to dehydroisoandrosterone and isoandrosterone and is slowly reversed at pH 4 as the result of weak β-glucosidase-like activity. Potatoes also contain an active β-glucuronidase which differs from known preparations in possessing the same substrate specificity as noted for the above glucoside-synthesizing system. In the course of surveying a number of plant tissues for their ability to glucosidate dehydroisoandrosterone, the reduction of this substrate to androstenediol and its oxidation to androstenedione by the green bean and pineapple, respectively, were noted. Steric requirements involved in the synthesis and hydrolysis of a number of steroidal β-D-glucopyranosides by potato slices and their hydrolysis by emulsion have been defined.

LIPID COMPOSITION OF TISSUES FROM ELECTROPHORUS ELECTRICUS. E. G. Trams and C. P. Hoiberg (Nat. Inst. Neur. Dis. and Stroke, Nat. Inst. of Health, Bethesda, Md. 20014). *Proc. Soc. Expt. Biol. Med.* 135, 193–96 (1970). The lipid composition of the electric organ of *Electrophorus electricus* was compared to that of its microsomal fraction and to that of muscle of the electric eel. Using column chromatography on silicic acid to separate the lipid extracts into nine lipid classes, it was found that the lipid composition of whole electric organ was identical to that of its microsomal fraction. Muscle tissue differed from electric tissue mainly in its high content of triglycerides and cholesterol; less than 10% of the latter was esterified. The amounts of glycolipids and sphingolipids found in either electric organ or in muscle were small. Some lipid fractions of electric organ and unfractionated lipid extracts formed bilayer membranes in the Rudin-Mueller system. Stability of the bilayers was optimal at 25–30C.

EFFECT OF CURCUMIN ON SERUM AND LIVER CHOLESTEROL LEVELS IN THE RAT. D. S. Rao, N. C. Sekhara, M. N. Satyanarayana and M. Srinivasan (Central Food Tech. Res. Inst., Mysore-2A, India). *J. Nutr.* 100, 1307–16 (1970). In rats fed cholesterol and curcumin, the coloring principle in turmeric, levels of serum and liver cholesterol fell to one-half of those in rats fed cholesterol and no curcumin. Deposition of cholesterol was found most in liver sections from rats fed cholesterol and least in specimens from animals concurrently fed curcumin. Curcumin increased fecal excretion of bile acids and cholesterol, both in normal and hypercholesterenic rats. This biliary drainage is a plausible explanation for the reduction of tissue cholesterol on curcumin feeding. Alpha- and β-lipoproteins in blood plasma showed meaningful response to addition of curcumin. The imbalance in these two lipoproteins brought about by cholesterol feeding was nearly corrected by simultaneous feeding of curcumin. The above beneficial effects of curcumin were about the same with 0.1% or 0.15% of curcumin in the diet, suggesting that the effective level of curcumin may be even lower than 0.1%. Curcumin maintained body and liver weights, correcting the ill effects in this respect caused by ingested cholesterol. The effect of curcumin in keeping down cholesterol in conditions which otherwise induced hypercholesteremia was not through alterations in cecal microflora which are known to dismute and utilize bile acids in the gut.

PHOSPHOLIPID METABOLISM IN PATIENTS WITH CEREBROVASCULAR DISEASE. H. P. Schwarz, L. C. McHenry, Jr., Lorraine Dreisbach and M. E. Jaffe (Dept. of Clin. Pathol. and Stroke Res. Cen., Phil. General Hosp., Philadelphia, Pa. 19104). *Proc. Soc. Expt. Biol. Med.* 135, 55–58 (1970). The GPG content of the plasma from the internal jugular vein of patients with cerebrovascular disease was significantly greater than the GPG value of the plasma from the internal carotid artery. There was some correlation between the A-V difference of GPG and lowered cerebral oxygen consumption ($r = 0.387$), but no more definite relation between these two parameters could be established.

• Drying Oils and Paints

BIFUNCTIONAL DERIVATIVES OF FATTY ACIDS OBTAINED BY DIMERIZATION. R. Guillaumin (ITERG Laboratory, Paris). *Rev. Franc. Corps Gras* 16, 441–54 (1970). The formation, properties and uses of dimeric fatty acids are reviewed. They may be produced by thermal dimerization, catalytic dimerization in the presence of Lewis acids such as $AlCl_3$ or BF_3 or with clay catalysts, or by free radical mechanisms. Each of these processes produces different isomers. The principal industrial process uses 5–6% activated earth and 2–3% water at 200–250C for 3–4 hours. About 50% polymers are formed, of which 80% are dimers and the rest larger polymers. The physical and chemical properties in relation to uses in paints and varnishes are discussed.

STUDIES IN FISH OIL ALKYDS. II. H. A. Bhatt and P. V. Tagdiwala (Dept. of Chemical Technol., Univ. of Bombay). *Paintindia* 20(7), 19–21 (1970). This investigation was carried out to study the effects of partial replacement of phthalic anhydride with maleic anhydride in fish oil alkyds of different oil lengths. Levels of replacement used were 10–20%. Air-dried films containing maleic anhydride showed faster drying and greater hardness but no improvement in water resistance, while baked films showed improved hardness, water resistance and flexibility. The maleic anhydride also made the odor of the fish oil alkyd less objectionable. At replacement levels above 20%, samples containing maleic anhydride showed increased tendencies to gel in the cans during storage.

ALKYD RESINS WITH KAMALA SEED OIL AND KAMLOLENIC ACID. J. P. Misra, S. P. Gulati, M. A. Sivasamban and J. S. Aggarwal (Regional Res. Lab., Hyderabad-9, India). *Paintindia* 20(3), 21–2, 32 (1970). The preparation of alkyd resins of 60% oil length from kamala seed oil, butylated kamala seed oil, mixed fatty acids of kamala seed oil and kamlolenic acid has been investigated in comparison with alkyds from tung oil. Various mixtures of linseed oil with these oils were successful in preventing gelation during the alkyd preparation. The resulting films had a scratch hardness

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of 400–500 g and satisfactory resistance to water, dilute sodium carbonate, and sulfuric acid solutions. Their resistance to 2% sodium hydroxide was poor.

RUBBER INCORPORATED LINSEED OIL VEHICLE. S. N. Behere and D. Dosi (Laxminarayan Inst. of Technol., Nagpur Univ., Nagpur, India). *Paintindia* 20(6), 23–7 (1970). This work was concerned with finding a method for incorporating just enough natural rubber into a drying oil medium to give the final dry film added rubbery properties but not cause gelation of the prepared medium. Products containing up to 15% prevulcanized rubber performed well.

ALUMINIZED CALCIUM SILICATE IN SURFACE COATINGS. H. V. Shah and D. J. Mehta (Central Salt and Marine Chemicals Res. Inst., Bhavnagar, India). *Paintindia* 20(3), 19–20 (1970). Properties and uses of aluminized calcium silicate pertinent to incorporation in surface coatings are given along with the preferred method of milling. This product compares favorably with imported ones and offers improved results at lower costs.

VINYL-MODIFIED DEHYDRATED CASTOR OIL. G. N. Tewari and J. S. Aggarwal. *Paint Manuf.* 40 No. 2, 23–6 (1970). Dehydrated castor oil (DCO) has been reacted with a number of vinyl monomers in various mole ratios using benzoyl peroxide, diazoaminobenzene and a mixture of *t.*-butyl hydroperoxide and di-*t.*-butyl peroxide as free radical initiators. The use of internally built-in peroxide groups in DCO has also been investigated for the same purpose. Clear products were obtained with the peroxide mixture and any of the monomers, *i.e.* methyl methacrylate, styrene, methyl acrylate and acrylonitrile in the proportion of 1 mole oil (considered as trilinolein) to 3–6 moles of vinyl monomer under appropriate reaction conditions. The film properties of the products were superior to those of DCO. Vinyl acetate was less reactive than the monomers listed above. (World Surface Coatings Abs. No. 338)

INFLUENCE OF MOLECULAR STRUCTURE OF EPOXY-CONTAINING BINDERS ON THE PROPERTIES OF PRIMERS APPLIED BY ELECTROPHORETIC DEPOSITION. B. Bröcker. Paper presented at the Xth FATIPEC Congress, Montreux 1970, 485–90 (in German). By partial esterification of epoxy resins with adducts of maleic acid anhydride and unsaturated fatty acids, suitable binders for electrophoretic deposition can be obtained. By additional use of fatty acids for the esterification the proportion of fatty acids in the binding agent can be increased. Binding agents with a low proportion of fatty acids deposit, during electrophoretic deposition, films with deficient thickness and rough surfaces and they do not offer sufficient protection against corrosion. By using binding agents with a higher proportion of fatty acids a greater film thickness is obtained, which shows better protection against corrosion. The throwing power of binding agents with higher proportions of fatty acids is poor, however, but can be improved by increasing the viscosity. High molecular epoxy resins are not suitable since they deposit films with deficient thickness. By etherification of epoxy resins with unsaturated fatty alcohols and polymerization with styrene and acrylic acid, binding agents are obtained which are stable against hydrolytic attack. (World Surface Coatings Abs. No. 339)

SOAPSTOCK FATTY ACIDS IN VARNISHES. A. L. Maskman *et al. Lakokras. Mat.* 1969, No. 6, 62–4. Soapstock fatty acids have been used in the production of varnishes analogous to varnish PFL-03 and the characteristics of the varnishes and the selected pigment pastes are compared. The new varnishes are just as good as the standard materials. (World Surface Coatings Abs. No. 339)

BLISTERING IN PAINT FILMS ON WOODEN STRUCTURES IN NORWAY. A. Underhaug. Paper presented at the Xth FATIPEC Congress, Montreux 1970, 83–94 (in English). When wood is oiled with linseed oil or primed with low pigment volume concentration linseed oil primers the paint work may later start to blister. This has been shown to be due to hydrolysis of the linseed oil. Hydrolyzed linseed oil swells the overlying paint film. It becomes liquid in warm weather, whereby adhesion to the substrate is reduced nearly to zero. Expanding air from within the wood can, under these conditions, blow up blisters. Several factors affecting the rate of hydrolysis have been examined. It seems that linseed oil under all practical exterior conditions will hydrolyze fairly rapidly. (World Surface Coatings Abs. No. 338)

• Detergents

THE RELATIONSHIP OF DENSITY, SURFACE TENSION AND VISCOSITY TO THE CHAIN-LENGTH OF ETHER-ESTERS OF ETHYLENE GLYCOL IN COMPARISON TO OTHER HOMOLOGOUS SERIES. R. Riemschneider and J. Sickfeld (Inst. Biochem., Free Univ. of Berlin, Berlin, Ger.). *Fette Seifen Anstrichmittel* 71, 478–88 (1969). A number of glycol ether-esters of the type R_1–O–CH_2CH_2–OCOR_2 were synthesized. For these compounds as well as for a few other non-branched homologous series, the following relationship showing the dependence of density, surface tension and viscosity from the chain-length was observed: $X_t = X_{t,z=\infty} + k_t/Z$, where X_t represents the physical property concerned at the temperature t, $X_{t,z=\infty}$ the limiting value of the aforesaid property at infinite chain-length and k_t a characteristic constant of the homologous series involved at the temperature t. The above relationship was found to be generally applicable with sufficient accuracy.

INFLUENCE OF EMULSIFIERS ON THE EMULSION SYSTEM OF CREAMS. E. Nurnberg (Pharmaceutical Res. Lab., Merck, Darmstadt, W. Ger.). *Fette Seifen Anstrichmittel* 71, 386–94 (1969). Besides the usual emulsion systems (o/w and w/o) an ambiphilic mixed system is described. The occurrence of an ambiphilic system was characterized. The properties of a few creams based on these emulsifiers are discussed. The determination of micro-penetration was carried out by which the consistency can be quantitatively expressed.

BENZENE RING BIODEGRADATION IN QUATERNARY ALKYLBENZENE SULFONATES. R. D. Swisher (Monsanto Co.). *Tenside* 6, 135–9 (1969). The four quaternary compounds 1-phenyl-a,a-dimethyldecane para sodium sulfonate (where a = 1,2,3,9) were fed to activated sludge in the SDA 24-hour semicontinuous test procedure. The internal quaternary derivatives (a = 1,2,3) all showed rapid and complete primary biodegradation, as determined by the disappearance of methylene blue activity (MBAS), and their benzene ring biodegradation ranged from 80 to 93%. Degradation of the terminal quaternary isomer (a = 9) could not be estimated accurately because of extensive adsorption or precipitation, in part as the magnesium salt, onto the sludge. This accounted for much of the 80–85% MBAS removal from the daily feed, as measured by analyses of the daily effluent; removal by biodegradation was estimated at zero to 40%. The benzene ring content of the effluent was about equivalent to the MBAS content, indicating that ring degradation occurred to about the same extent as primary degradation, if any. This work confirms that a quaternary carbon in the alkyl chain of ABS does not necessarily block ring degradation.