ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. G. Endres, J. Iavicoli, K. Kitsuta, F. A. Kummerow, C. C. Litchfield, Gladys Macy, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

The melting point of fatty materials. Ph. Meskens. *Lab. and Tech.* 6, 287–317 (1961). This paper is an excellent review of the phenomena of melting as applied to fatty materials. The author first considers the theory, then compares and comments upon the various methods used, proposes several modifications, and finally concludes that the melting point of a fat or fatty material can be useful but does not consider the melting point accurate enough to be included in the specification of a manufactured product.

Refining losses in pilot plant experiments. F. Ramos (Instituto de la Grassas y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 193–196 (1962). Refining losses for olive and soybean oils compared. Centrifugal refining gave slightly lower losses and made soapstock handling much easier. Refined oil quality was about the same with both methods.

Physical-chemical studies on ground olive pastes. XVI. Preliminary note on measurement of rheological properties of the pastes. C. W. Brabender, G. Hahn (Brabender Ohg., Duisburg am Rhein, Germany), J. M. Martinez, C. Gomez, and C. Janer. *Grasas y Aceites (Seville, Spain)* 13, 197–202 (1962). The force necessary to revolve a paddle in ground olive paste was found to be proportional to the radial velocity of the paddle. The addition of coconut fatty acid diethanol amides increased the consistency of the paste.

Methods of measuring the consistency of foods. C. Janer (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 216–221 (1962). A review on methods for measuring the consistency of butter, margarine, dough, starch, chocolate, cheese, honey, and juices.

Problems of the Italian olive oil industry. G. Coppa-Zuccari (Servizio di Documentazione Tecnica, Rome, Italy). *Grasas y Aceites (Seville, Spain)* 13, 253–256 (1962). A review.

The presence of squalene in olive tree leaves. A. Vazquez and M. L. Janer (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 242–243 (1962). Squalene was isolated from olive tree leaves by means of column chromatography and thin layer chromatography on silicic acid.

Tannins, gums and pectins in ripe olives. F. Mazuelos, J. M. Martinez, and A. Vazquez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 244–246 (1962). An attempt was made to relate the gum, tannin, and pectin content of ripe olives to the ease or difficulty of oil extraction. No correlation was found.

Action of pancreatic lipase on natural and synthetic glycerides. F. Mazuelos (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 239–241 1962). When olive fatty acids were esterified with glycerol, the triglycerides produced contained fewer saturated acids in the 1- and 3- positions than occur in natural olive oil. The adulteration of virgin olive oil with reesterified oil could be detected by measuring the iodine value of the fatty acids liberated from an oil by pancreatic lipase.

Spectrophotometric microdetermination of peroxides in fats. E. Vioque and A. Vioque (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 203–206 (1962). A spectrophotometric micromethod for dtermining the peroxide content of fats was developed. The peroxide was used to oxidize ferrous ion to ferric ion. Subsequent addition of N,N-dimethyl-*p*-phenylenediamine allowed spectrophotometric determination of the amount of ferric ion formed. Results agreed closely with the AOCS method for peroxide value. *Ibid.* 211 (1962). A similar qualitative spot test on filter paper can be used to identify as little as 1 milliequivalent of peroxide.

Colorimetric microdetermination of hydroxyl value. E. Vioque and M. P. Maza (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 207–210 (1962). A colorimetric micromethod for determining the hydroxyl value of non-volatile compounds containing primary and secondary hydroxyl groups is described. Hydroxyl groups were acetylated using acetic anhydride. The quantity of ester groups present before acetylation was determined colorimetrically using the hydroxamic acid reaction and subsequent complexing with ferric ion. From these results, the hydroxyl values could be calculated with a relatives error of 0–4%.

Minor components of olive oil and sulfur olive oil. I. Alcoholic compound isolated from the unsaponifiable fraction of sulfur olive oil. J. Martel and J. Gracian (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* 13, 212–215 (1962). A dihydroxysterol was isolated from the unsaponifiable fraction of sulfur olive oil using column chromatography on silicic acid. The substance was identified as homo-olestranol by means of melting point, elemental analysis, specific rotation, and a positive Liebermann-Burchard reaction.

Peroxide concentrates from autoxidized methyl eicosapentaenoate. Kazuo Fukuzumi, Suketaka Ito, and Shizuya Nakanishi (Nagoya Univ.). *Yukagaku* 12, 89–93 (1963). Purified methyl eicosapentaenoate was prepared by saponifying cuttlefish oil, esterifying the fatty acids with methanol, fractionating the esters through urea adducts, distilling the esters of highly unsaturated acids *in vacuo* and separating the esters by means of chromatography. It was autoxidized in the dark at 0–2C. Peroxide concentrates from autoxidized methyl eicosapentaenoate were obtained by the countercurrent extraction procedure, in which the autoxidized ester was simultaneously separated from the unoxidized ester. It has the highest peroxide value, 1.19×10^4 meq./kg, of all lipids ever obtained. The ultraviolet and the infrared spectra of the peroxide concentrates were determined. From the ultraviolet spectra, it was proved that the number of conjugated diene per molecule is about 0.5, that the conjugated triene is negligible, there are no conjugated tetraene and pentaene, and that a little unsaturated carbonyl groups exist. Dihydroperoxide exists from the results of infrared spectrum and peroxide value. The $-CH{=}CH-CH(OOH)-CH{=}CH-$ group probably exists in the peroxide concentrates, because of the α-methylene group absorption in the infrared spectra decreased more than that of expected influences due to conjugated dienes. *Cis-trans* conjugated diene and *trans-trans* conjugated diene exist, but considerable amount of double bonds remain as *cis*-nonconjugated forms.

Quantitative gas liquid chromatographic estimation of volatile fatty acids in aqueous media. R. G. Ackmen and R. D. Burgher (Fisheries Res. Board of Canada, Technological Res. Lab., Halifax, N. S., Canada). *Anal. Chem.* 35, 647–652 (1963). The quantitative analysis by gas liquid chromatography of volatile fatty acids in aqueous solutions has been rendered difficult by absorption and the appearance of ghost peaks on subsequent injection of samples. The addition of formic acid vapor to the carrier gas eliminates these problems and gives reproducible quantitative results in conjunction with a flame ionization detector. Excessive amounts of water under certain conditions may cause double peak formation, but the method is applicable to analyses with Silicone, polyester, and Tween substrates on Chromosorb W support.

A new color reaction of anthrone with malonaldehyde and other aliphatic aldehydes. T. W. Kwon and B. M. Watts (Dept. of Food and Nutrition, Fla. State Univ., Tallahassee, Fla.). *Anal. Chem.* **35**, 733–735 (1963). Anthrone reagent (0.2% anthrone in concentrated sulfuric acid) reacts with a series of short-chain aliphatic aldehydes producing orange to violet-red colors. Absorption curves of the reaction products are given in the visible region. The anthrone complexes of saturated aldehydes (acetaldehyde, butyraldehyde, and hexaldehyde) show their λ_{max} at 476 mμ, formaldehyde at 488 mμ, and propionaldehyde at 455 mμ, with molar absorptivities ranging from 3.0×10^2 to 4.5×10^3. The anthrone complexes of short chain α,β-unsaturated aldehydes, malonaldehyde, acrolein and crotonaldehyde) produce their λ_{max} at 510 mμ, with much higher absorption (ϵ = approximately 7.9×10^3). Possible reaction mechanisms are discussed.

Gas-liquid chromatography applied to the analysis of oils and fats. T. D. Heyes (Unilever Res. Lab., Port Sunlight). *Chem. Ind. (London)* **1963**, 660–5. The author reviews briefly (10 references) the use of gas-liquid chromatography. Included are tables giving compositions of lards from different locations in the pig and variations in the

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AND METHODS FOR PRODUCING THE SAME. F. B. Root (Sec'y. of Agr., U.S.A.). *U.S. 3,092,596.* The process for preparing a coating composition hardenable by a Diels-Alder polymerization reaction and having increased compatibility with tung oil consists of heating at a temperature of 100–150C a polyester reaction product of rosin, a glycol, and an unsaturated acid (fumaric or maleic), an antioxidant to prevent air oxidation and air drying of a coating produced from the composition, and from 12–75% of the polyester product of a material selected from the group consisting of tung oil, tung oil fatty acids, methyl tungate, air-blown methyl tungate, and allyl eleostearate. The heated mixture is then thinned.

• Detergents

COLOR STABILIZERS FOR DETERGENTS CONTAINING BACTERIOSTATS. Jane P. Mitoray and W. G. Bauer (Monsanto Chemical Co.). *U. S. 3,085,066.* An antiseptic detergent composition consists of an alkali metal fatty acid soap, a bacteriostat, and from 0.01 to 10% by weight on the combined weight of the soap and the compound, of a dicarboxylic acid of the formula HOOC—C_nH_{2n}—COOH where n has a value from 0 to 8.

SURFACE ACTIVITIES OF ORGANIC ACID SALTS OF N-n-ALKYLETHYLENEDIAMINES. Chiaki Kimura, Kageaki Kashiwaya, and Koichi Murai (Akita Univ., Akitashi, Japan). *Yukagaku* **12**, 105–7 (1963). N-*n*-Alkylethylenediamine have been prepared by the condenstation of ethylenediamine with C_{10-16} alkyl bromides. They were waxy, low-melting solids and combined with two equivalents of organic acids to form neutral salts which would be useful as cationic surfactants. Investigations were made on the surface activities of these salts with acetic, lactic, and propionic acid. N-*n*-Alkylethylenediamine salts containing C_{10} and C_{18} alkyl group did not show good surface activities. On the other hand, N-*n*-dodecyl or N-*n*-tetradecylethylenediamine salts were found to have excellent surface activities. In respect to surface tension and penetrating power, acetates and lactates were superior to the propionate, but inferior in foaming power.

CHEMICAL PROCESS OFFERED TO REDUCE ABS. Anon. *Chem. & Eng. News* **41** (15), 102 (1963). Treatment of effluent containing non-biodegradable alkylbenzene sulfonate (ABS) with H_2O_2 and ferrous iron destroyed 80–90% of the ABS within 30 minutes. Possible applications of such a process to sewage and laundry wastes are discussed.

RHEOLOGY OF AMMONIUM LAURYLSULFATE SOLUTIONS. R. Mateo. *Afinidad* **19**, 453–457 (1962). The viscosity of a 30% solution of ammonium laurylsulfate in water was measured at 20–70C using various applied shearing stresses. The solution exhibited the behavior of a Newtonian or pseudoplastic fluid.

SALTING-OUT CHROMATOGRAPHY SEPARATES ABS. Anon. *Chem. & Eng. News* **41**(11), 42 (1963). Salting-out chromatography was used to separate mixtures of toluenesulfonate, xylenesulfonate, and alkylarylsulfonates in aqueous solution. A column of Dowex 50-X2 cation exchange resin was employed with water and various $(NH_4)_2SO_4$ solutions as eluting liquids. Column eluents were monitored by ultraviolet absorption measurements at 222 mμ.

DETERGENTS AND SURFACTANTS: PROGRESS REPORT. L. Raphael. *Mfg. Chemist* **34**, No. 3, 116 (1963). This paper is a report of the use and manufacture of detergents and surfactants in the United States and Europe. Current economic trends in the use of detergents are discussed. A comprehensive survey of current knowledge in the areas of hydrotropes, chlorinated trisodium phosphate, synergism in detergents, micelle formation, detergent manufacture, and paints is given.

THE PHYSIO-CHEMICAL ACTION OF HOUSEHOLD DETERGENTS IN THE MECHANISM OF THE ELIMINATION OF DIRT. H. L. Rosano and J. B. Montagne (Dept. of Chem. City College of the City Univ., New York, New York). *Rev. Franc. Corps Gras.* **10**, 9–17 (1963). The authors have studied the composition of household detergents, the nature of household dirt and the composition of tap water. Detergency is defined as the substitution of a solid-oil interface by a solid-solution interface. In studying the stability of liquid drops and gas bubbles on liquid surfaces or of drops in liquids, detergents were found to have a limited action leaving a residual oily film on a solid surface. Fatty acids in household dirt and polyvalent ions induce flocculation. The surface active agent must form a monomolecular layer which mixes with the polyvalent soap. This mixing action breaks the network of fatty acids or polyvalent ions and in this way reduces the formation of precipitates. Carboxymethylcellulose, sodium polyphospate and sodium pyrophosphate oppose the action of the condensation of calcium. Sodium pyrophosphate and in particular sodium polyphosphate are complexing agents. In addition, it was found that sodium polyphosphate at a pH of 10.5 augments the monomolecular layer of calcium soap. Carboxymethylcellulose does not directly complex calcium but weakly penetrates into the network of the film of calcium soap. The study has shown that average household detergent is composed of 20% sodium benzene sulfate (detergent), 2% dodceyl monoethanalamine (foaming agent), 40% sodium tripolyphosphate (adjunct), 0.5% sodium carboxymethylcellulose (anti-redepository agent), 8% sodium silicate (corrosion inhibitor), 29% sodium sulfate (extender) and perfume, etc. The respective role of each component is examined.

POSSIBLE USES OF SUCROSE ESTERS AND SUCROGLYCERIDES. L. Nobile (Ledoga S.p.A., Milan). *Riv. Ital. Sostanze Grasse* **9**, 439–50 (1962). The present status of knowledge on sucrose esters and related compounds is extensively reviewed, with emphasis on manufacturing methods, toxicological properties and possible industrial applications.

USE OF SUCROSE ESTERS AND SUCROGLYCERIDES IN COSMETICS. R. Colson (Parfumerie, Cosmetique, Savons, Paris). *Riv. Ital. Sostanze Grasse* **9**, 472–5 (1962). Cosmetic applications for which sucrose esters are said to be superior to the anionic surfactants commonly used are discussed, among them shampoos, dentifrices, shaving creams, cleaning creams, synthetic toilet bars, lotions. Sample formulations are given for several of these applications.

COSMETIC FORMULAE FOR BEAUTY CREAMS CONTAINING SUCROSE ESTERS. P. Rovesti (Res. Inst. on Vegetable Produts, Milan). *Riv. Ital. Sostanze Grasse* **9**, 468–71 (1962). The conditions a cosmetic product must satisfy with respect to its action on human skin are defined and discussed. Fatty sucrose esters have been found to be well suited for use as emulsifiers in cosmetic formulations because of their physiological characteristics of mildness, nourishment to the skin, non-toxicity and emolliency. Several examples of cosmetic formulations containing these non-ionic surfactants as emulsifiers are given.

ANALYTICAL METHODS FOR SUCROSE ESTERS AND SUCROGLYCERIDES. M. Roussos (Société des Produits Chimiques, Bezons). *Riv. Ital. Sostanze Grasse* **9**, 451–63 (1962). A detailed description is given of all the major analytical methods, both chemical and physical, employed on sucrose esters and sucroglycerides such as: determination of monoesters and diesters, free acidity, methyl esters, combined acids, total sugar, fatty acid composition, organic and inorganic impurities.

SURFACE ACTIVITY OF SUCROSE ESTERS AND SUCROGLYCERIDES. H. Passedouet (Société des Produits Chimiques, Bezons). *Riv. Ital. Sostanze Grasse* **9**, 464–8 (1962). The surface properties (wetting, foaming, emulsifying power, detergency) of the non-ionic surfactants derived from esterification of sucrose with fatty acids are reviewed. The claim is made that, in comparison with polyethenoxy surfactants, sucrose derivatives possess many advantages, mainly in their nontoxicity, increasing solubility with increasing temperature, compatibility with quaternary germicidal compounds and ease of preparation in solid form.

EFFECT OF ORGANIC COMPOUNDS ON THE CLOUD POINT OF SOLUTIONS OF NON-IONIC SURFACTANTS. A. Fugazza (Lamberti S.p.A., Milan). *Riv. Ital. Sostanze Grasse* **11**, 567–73 (1962). Non-ionic surfactants derived from ethylene oxide are known to become turbid when heated to a temperature described as the cloud point. This is considered to be due to a transformation of the micellar structure into an emulsion. Addition of low molecular weight hydrocarbons to aqueous solutions of polyethenoxy surfactants is found to lower the cloud point by as much as 20–30C, while higher hydrocarbons (paraffin waxes) cause an increase in the cloud point. With fatty alcohols the opposite effect is found, with the higher alcohols (e.g., oleyl alcohol) depressing the cloud point by as much as 10–20C. No effect on the cloud point is found when the total concentration of surfactant plus hydrocarbon is varied up to 10%.

THE DETERMINATION OF ACTIVE OXYGEN IN WASHING POWDERS. M. Karvánek, J. Pokorný and G. Janíček (Inst. of Chem. Tech., Prague). *Papers of the Inst. of Chem. Tech. Prague* **4-I**, 299–310 (1960). A method is proposed for the determination of perborate and/or percarbonate when in the presence

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ceutical Co.). *U.S. 3,089,820.* In vitro prolongation of whole blood clotting time and inhibition of thromboplastin generation is obtained by administering to a mammal an anti-thromboplastic liver lipid which is non-toxic on oral and intravenous administration. The material is characterized by being a lipid derived from mammalian liver tissue, by being soluble in water and heptane and insoluble in ethanol, methanol, acetone, by prolonging whole blood clotting time, by prolonging recalcified plasma clotting time, by inhibiting thromboplastin generation, by counteracting the thromboplastic activity of platelets, and, upon intravenous injection into rabbits, prolonging whole blood clotting time. The lipid is obtained by non-polar solvent extraction of mammalian liver tissue followed by organic solvent precipitation of the active lipid.

PROCESS FOR THE PREPARATION OF LIPIDS. K. Folkers (Merck & Co.). *U.S. 3,089,821.* An improved process for the preparation of a lipid from *E. coli* bacterial cells containing lipopolysaccharides comprises: (1) suspending dried, defatted cells in water to form an aqueous bacterial cell suspension; (2) heating the cell suspension to the the boiling point for about 1 hour and then cooling; (3) separating the undissolved bacterial cell debris from the cooled aqueous solution; (4) adding acid to the aqueous solution in an amount sufficient to produce an aqueous acid solution between 1 to 2 *N* in acidity; (5) heating the aqueous acid solution to a temperature between 90 to 100C for between 15 to 60 minutes; (6) rapidly cooling the solution to about 25C; (7) extracting the resulting solution with a water-immiscible solvent to obtain a solvent extract of lipid; (8) evaporating the solvent extract to obtain active lipid.

METHOD OF EXTRACTING PROTEIN AND LIPID FROM RAW VEGETABLE MATERIALS. I. H. Chayen (C.C.D. Processes Ltd.). *U.S. 3,090,779.* The vegetable material is hammermilled in an aqueous liquid (liquid-to-solid ratio of at least 2:1) for a very short period of time ranging from about ⅔ second to 10 seconds at a top speed of at least 4,000 feet/minute. The high speed multiple rapidly repeated hydrodyanamic shock waves thus disrupt the natural cell structure and discharge the cell contents into the aqueous liquid while leaving the residual solid material predominantly larger than cell size. The aqueous liquid is alkalized to dissolve the proteins whereby in the presence of the lipids the two will combine to form a protein-lipid complex which remains dissolved. The aqueous liquid is then acidulated to the isoelectric point for the protein to precipitate the lipid-protein complex. The complex is partially dewatered by gravity separation and then completely dewatered by azeotropic distillation.

• Drying Oils and Paints

A STUDY OF THE FILM FORMING CHARACTERISTICS OF DIMORPHOTHECA OIL. A. E. Rheineck and H. Sobol (N. Dakota State Univ.). *Paint Tech.* 27 (5), 18–28 (1963). Raw dimorphotheca oil *(Dimorphotheca aurantiaca)* appeared to be highly inhibited on air drying. Wrinkled dried films formed after about 40 hours. Heat processed oil dried within several hours. Chemical changes during the drying cycle were followed by infra-red spectrograms. Two reactions take place in this process, namely, dehydration and polymerization. The predominating reactions and ultimate products formed are different at both temperatures. Dimorphotheca oil can be dehydrated by means similar to those used for dehydrating castor oil. These treated oils dry rapidly. Several 25 and 50 gallon varnishes were prepared from non-reactive phenolic resins and dimorphotheca oil. Corresponding varnishes based on tung oil were used as controls. The usual evaluation studies indicated that the dimorphotheca and tung oil varnishes were essentially equivalent.

OIL MODIFIED ALKYD RESINS MODIFIED WITH A THERMAL POLYMER OF DICYCLOPENTADIENE. I. J. Dissen (Velsicol Chemical Corp.). *U.S. 3,088,927.* A process for the production of oil-modified alkyd resins consists of reacting a polymer consisting substantially of polycyclopentadiene having a molecular weight of between 500 and 2,500 prepared by heating cyclopentadiene in the absence of other polymerizable material at a temperature of from 500–550F with an oil-modified alkyd resin prepared by reacting unsubstituted polyhydric alcohols containing up to 6 carbon atoms, unsubstituted polybasic acids containing up to 10 carbon atoms, and fatty acids containing from 14 to 22 carbon atoms at a temperature above 400F.

COMPATIBLE TUNG OIL-UNSATURATED ALKYD RESIN COMPOSITIONS

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component) and long chain (24h:0 as major component). The relative proportions of the two groups varied with the tissue. No 2-hydroxy acids could be found in liver and epididymal fat. The 2-hydroxy acids of brain are not liberated by mild alkali and therefore occur only in amide linkage. The amide-bound fatty acids of brain gangliosides and sphingomyelin account for none, or only a very small fraction, of the total brain hydroxy acids.

BIOSYNTHESIS OF FATTY ACIDS: IV. STUDIES WITH INHIBITORS. J. D. Robinson, R. O. Brady, and R. M. Bradley (Laboratory of Neurochemistry, Nat'l Inst. of Neurological Diseases and Blindness, Nat'l Inst. of Health, Bethesda, Md.). *J. Lipid Res.* 4, 144–150 (1963). Tetrolyl-CoA and propiolyl-CoA have been shown to be strong noncompetitive inhibitors of fatty acid synthesis. Acrylyl-CoA and isocrotonyl-CoA also inhibit, but much higher concentrations are required. It is suggested that this inhibition occurs through an interaction between the triple and double bonds of these compounds and enzyme sulfhydryl groups. Palmityl-CoA and free CoA have also been shown to inhibit fatty acid synthesis and to block the condensation of acetyl-CoA with malonyl-CoA, and the reduction of crotonyl-CoA to butyrate. The reduction of acetoacetyl-CoA to the β-hydroxy derivative was not inhibited by these materials, although the complete reduction to butyrate was prevented. The addition of flavin nucleotides also inhibited fatty acid synthesis catalyzed by brain enzyme preparations.

STEROLS OF SKIN IN THE NORMAL AND TRIPARANOL-TREATED RAT. L. Horlick and J. Avigan (Laboratory of Metabolism, Nat'l Heart Inst., Nat'l Inst. of Health, Bethesda 14, Md.). *J. Lipid Res.* 4, 160–165 (1963). Skin of normal rats and of rats treated with triparanol were incubated with acetate-2-H^3 for 2 hr, and the sterols were extracted and separated chromatographically. Treatment with triparanol resulted in grossly visible changes (scaliness, roughness, and atrophy of the skin) and in a marked alteration in the metabolism of skin sterols. There were considerable reductions in the concentrations of compounds with saturated side chains: desmosterol, lanosterol, and sterols tentatively identified as dehydromethostenol and Δ^7, 24-cholestadienol. Isotope data showed that after incubation for 2 hr, a large proportion of the counts were in squalene in skin from both normal and triparanol-treated rats. There was a reduction in the incorporation of radioactivity into the Δ^5-stenol fraction and an increase in the incorporation into lanosterol and Δ^7-sterols, in skin from triparanol-treated rats. Triparanol inhibits the enzyme responsible for reduction of the 24,25-double bond in the sterols of rat skin.

INFLUENCE OF SEX AND SEX HORMONES ON THE OXIDATION OF CHOLESTEROL-26-C^{14} BY RAT LIVER MITOCHONDRIA. D. Kritchevsky, S. A. Tepper, E. Staple, and M. W. Whitehouse (The Wistar Inst. and Dept. of Biochem., Univ. of Penn. School of Med., Philadelphia, and Dept. of Biochem., Univ. of Oxford, Oxford, England). *J. Lipid Res.* 4, 188–192 (1963). The oxidation of cholesterol-26-C^{14}, sodium propioate-1,2, or -3-C^{14}, and sodium octanoate-1-C^{14} by liver mitochondrial preparations from intact and gonadectomized rats of both sexes, and from intact and gonadectomized rats of both sexes treated with androgens and estrogens, has been studied. Androgen treatment of female rats slightly depressed cholesterol oxidation but ovariectomy had no effect. Cholesterol oxidation by preparations of normal male or female rat liver mitochondria was inhibited by sex hormones added *in vitro.*

EFFECT OF HORMONES ON LIPOLYSIS AND ESTERIFICATION OF FREE FATTY ACIDS DURING INCUBATION OF ADIPOSE TISSUE IN VITRO. M. Vaughan and D. Steinberg (Lab. of Metabolism, Nat'l Heart Inst., Bethesda 14, Md.). *J. Lipid Res.* 4, 193–199 (1963). Using a new approach based on simultaneous measurements of net changes in glycerol and free fatty acids, the rates of lipolysis and of fatty acid esterification were estimated in rat epididymal fat pads under various conditions *in vitro*. Glycerol release, taken as a measure of the rate of lipolysis, was stimulated by epinephrine, norepinephrine, glucagon, adrenocorticotropic hormone (ACTH), thyroid-stimulating hormone (TSH), and growth hormone (GH). When lipolysis was stimulated by epinephrine, glucagon, ACTH, or TSH, the calculated rate of esterification was also increased. GH, which produced a relatively small increase in the rate of lipolysis, produced no detectable increase in rate of esterification. The stimulatory effect of epinephrine, ACTH, and GH on lipolysis was inhibited by 10^{-2} *M* NaF but there was no detectable inhibition of the basal glycerol release from tissues incubated in the absence of hormones. Data are presented suggesting that small amounts of epinephrine (0.3 μg), ACTH (0.12 U), or glucagon (15 μg) are largely inactivated during 30 min of incubation with a fat pad under the conditions employed. The effects of GH and TSH, on the other hand, persisted without diminution for at least 60 min, consonant with the view that the effects of GH on lipolysis in adipose tissue are due to TSH contained in it rather than to ACTH.

PHYSIOLOGICAL PROPERTIES OF BLOWN OILS. Keeckebusch, K. Jahr, G. Czok, W. Griem, K. H. Bässler, C. H. Hammar and K. Lang (Physiol. Chem. Inst. Johannes Gutenbog, Univ., Mainz). *Fette Seifen Anstrichmittel* 64, 1154–1164 (1962). Thermal oxidation of oils at high temperatures (180C) produces a product in which toxicity is increased with an increase in the intensity of blowing until a certain maximum is reached after which the toxicity decreases. The absorption of the oil, protein efficiency and liver function were determined. Other physiological effects were measured and discussed in detail.

STABILIZATION OF CAROTENOID MATERIAL. R. A. Reiners and R. E. Morgan (Corn Products Co.). *U. S. 3,081,171.* A composition of matter stable to oxidative deterioration and liquid at normal temperatures consists of from 75 to 25%, by weight, of an oleaginous carotenoid material and from 25 to 75% of soybean lecithin.

METHOD OF PURIFYING PHOSPHATIDES. G. Elenbogen (Baxter Laboratories, Inc.). *U. S. 3,081,320.* A method is described for preparing a superior phosphatide emulsifying agent especially suited for use in parenteral preparations. A solution containing the alcohol soluble fraction of commercial lecithin is treated with a water soluble basic calcium compound to form an insoluble calcium salt with the phosphatidic acid fraction. The insoluble salt is removed and the solution is treated to isolate the superior phosphatide emulsifying agent.

OXYALKYLATED LECITHIN. S. S. Chang (A. E. Staley Mfg. Co.). *U. S. 3,085,100.* The process of forming a water-dispersible, oil-dispersible lecithin composition comprises chemically combining a lecithin having an A.I. of at least 40 with glycidol in the ratio of about 1 mole of glycidol per mole of phospholipin in the lecithin.

OIL-IN-WATER EMULSION FOR ORAL ADMINISTRATION, AND PROCESS FOR PREPARATION. M. Wruble, S. J. Rundman, and J. H. Koning (Upjohn Co.). *U. S. 3,085,939.* A palatable, stable, fluid oil-in-water emulsion for oral administration comprises: (a) an aqueous dispersion medium containing a protective colloid; (b) an internal phase containing by volume from 1 to 35% of an edible unsaturated oil; and (c) an additional internal phase containing by weight/volume of the emulsion from 1 to 17% of sitosterol. The protective colloid averts contact between the oil and the sitosterol to provide improved stability and palatability.

THERAPEUTIC COMPOSITION OF LITHOSPERMUM ERYTHRORHIZON IN JAPAN WAX AND SESAME OIL. K. Otsuki and J. Otsuki (Kyota, Japan). *U.S. 3,086,909.* A therapeutically useful ointment consists of a base constituted by a thermal blend of Japan wax and sesame oil and a minor proportion of a therapeutically active ingredient. The ointment base has an acid value of 5.4, a saponification value of 186.4, an iodine value of 85.2 and a melting range of 38–41C and contains 2.56% by weight of unsaponifiables.

PROCESS FOR PREPARING VITAMIN A ESTERS. M. Matsui, S. Saijo, K. Ohizumi, T. Nishida, and S. Okana (Sumitomo Chemical Co., Ltd.). *U.S. 3,086,981.* Vitamin A acid or its alkyl ester is contacted with lithium aluminum hydride in an inert medium. The resulting lithium aluminum complex compound of vitamin A is then decomposed with an acylating agent selected from the group consisting of fatty acid halide and anhydride.

METHOD OF INCREASING BLOOD CLOTTING TIME WITH A LIVER LIPID. J. P. Dailey and R. L. Colescott (Armour Pharma-

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been replaced by β-methylcholine or carnitine. The β-methylcholine was characterized by chromatography, carbon-hydrogen analyses, and melting points of derivatives. The results indicate that carnitine is decarboxylated by the larvae of this insect. The isolation and chromatography of β-methylcholine and its phosphatide are described.

FATTY ACID COMPOSITION OF LYMPH LIPIDS FROM RATS FED FRESH AND THERMALLY OXIDIZED FATS. V. R. Bhalerao, M. Inoue, and F. A. Kummerow (Univ. of Illinois, Urbana). *J. Dairy Sci.* **46**, 176–180 (1963). The absorption of fresh and thermally oxidized samples of milk fat, coconut oil, corn oil, and olive oil was studied in lymph-cannulated rats. One milliliter of the various fats was given to the animals by stomach tube and the lymph collected over a period of 24 hr. The fatty acid composition of the dietary fat and the lymph fat was determined by gas-liquid chromatography. The absorption of thermally oxidized fats via the lymph was found to be selective in both quantity and quality. Approximately 10% less thermally oxidized fat than fresh fat was absorbed. Furthermore, differences in absorption between oxidized and fresh fat were found to be greater for highly unsaturated fats, namely, corn oil and olive oil. There was practically no difference in the percentage of saturated fatty acids absorbed from heated as compared to that of the corresponding fresh fat. However, thermal oxidation lowered the absorption of unsaturated fatty acids via lymph.

VITAMIN A AND D ENRICHMENT OF NONFAT DRY MILK. J. C. Bauernfeind and L. E. Allen (Hoffmann-LaRoche Inc., Nutley, N. J.). *J. Dairy Sci.* **46**, 245–254 (1963). A production run of 60,000 lb of enriched nonfat dry milk was made by homogenizing a coconut fat carrier of vitamin A (synthetic) and D_2 in condensed milk before drying. Enriched nonfat dry milk was packaged in polyethylene bags, inserted in chipboard boxes, and later used as a beverage for various age groups, during periods up to 2 yr under field conditions. The data indicate that it is feasible and practical to enrich nonfat dry milk with vitamins A and D_2, using either the wet-stage process or the dry-stage process. The enriched nonfat dry milk, when consumed as a beverage in local diets of children, is readily acceptable and is not distinguished from the unenriched product.

DETERMINATION OF FREE AND ESTERFIED CHOLESTEROL BY A *MODIFIED DIGITONIN-ANTHRONE METHOD.* J. R. Goodman, L. P. Jarnagin, R. M. Meier, and I. A. Shonley (Veterans Admin. Hosp., San Francisco, Calif.). *Anal. Chem.* **35**, 760–763 (1963). The digitonin-anthrone indirect determination of cholesterol was revised to produce more reliable data and to provide separate final aliquots on all fractions that were suitable for C^{14} counting. Modification was made in the method as reported by Vahouny, et al. Minor changes were made in the procedure for free and total cholesterol. Ester cholesterol was determined as an original value, thus providing primary values of both free and ester cholesterol, the sum of which was equal to the total cholesterol value. This internal check in the method strengthens the reliability of the data. Final aliquots were obtained on all fractions for C^{14} counting in a liquid scintillation counter. Primary values on all fractions for both concentration and activity increased the reliability of specific activity calculations. The procedure gave data that was in close agreement with the Sperry-Webb method on a group of sera. It was further checked by determining recovery of added pure cholesterol.

FATTY ACID COMPOSITION OF BOVINE SEMEN. R. W. Dietz, B. W. Pickett, R. J. Komarek, and R. G. Jensen (Dept. of Animal Industries, Univ. of Connecticut, Storrs). *J. Dairy Sci.* **46**, 468–472 (1963). Total lipid concentration in 610 ml of bovine semen was found to be 4.10 mg per milliliter, which was equal to 3.75% of whole semen on a dry weight basis. The fatty acids, analyzed as methyl esters, were as follows: (where the first numbers represent the number of carbon atoms: degree of unsaturation, and the number in parentheses represents the relative percentage found) 12:0 (0.6), 14:0 (26.4), 15:0 (0.2), 16:0 (40.9), 16:1 (1.0), 17:0 (0.1), 18:0 (12.9), 18:1 (10.5), 18:2 (7.4).

LIPIDS OF ATHEROSCLEROTIC ARTERY. II. DIALYSIS OF LIPIDS OF ABDOMINAL AORTA AND LIPIDS IN LIPID-PROTEIN COMPLEXES EXISTING IN THE AORTA. Kazuo Fukuzumi and Yoshiaki Iwata (Nagoya Univ.). *Yukagaku* **12**, 93–7 (1963). Highly unsaturated acids in the phospholipids of arteries are concentrated. The higher the unsautration of fatty acids, the greater the rate of their oxidation. From this point of view, lipids of atherosclerotic abdominal aorta were dialyzed to separate the residue (phospholipids concentrates) and the dialysate, and the ultraviolet and infrared spectra, compositions and properties of these fatty acids were examined. It was confirmed that oxidized lipids were concentrated in the phospholipids contained in the lipids of atherosclerotic aorta, and that *trans-trans* conjugated diene hydroperoxide existed in the oxidized lipids. After extracting the lipids from the atherosclerotic aorta, further extraction was performed to obtain residue which was then hydrolysed with alkali, and the amount of fatty acids in the residue was estimated. It was shown that the atherosclerotic aorta contained lipid-protein complexes. From the infrared spectrum, it became clear that oxidized lipids containing *trans* isomers existed in the lipids of the lipid-protein complexes.

LIPIDS OF CANCEROUS TISSUE. II. LIPIDS OF BRONCHIAL CARCINOMA AND CANCEROUS PLEURAL FLUID. Kazuo Fukuzumi, Yoshiaki Iwata, and Kazuyo Kawashima (Nagoya Univ.). *Yukagaku* **12**, 165–8 (1963). The lipids were extracted from the tissue of bronchial carcinoma, and fatty acid methyl esters of the lipids were prepared. All the procedures were performed at room temperature and in nitrogen. The methyl esters of fatty acids of lipid from cancerous fluid were also obtained. The acid compositions were calculated from ultraviolet spectra. Infrared spectra indicated the presence of *trans-trans* or *cis-trans* conjugated diene hydroperoxide in the methyl esters of fatty acids obtained from the lipids of all samples.

THE RELATION OF DIETARY FATS TO THE DEVELOPMENT OF GALLSTONES IN ANIMALS. H. Dam (Copenhagen Polytech. Inst.). *Riv. Ital. Sostanze Grasse* **10**, 510 (1962). Young hamsters fed on a fat-free diet having an easily digestible sugar as the main source of carbohydrates develop cholesterol gallstones. Neither chicks nor whie mice, however, develop these gallstones when reared on the same diet. Analysis of the bladder bile of these animals gives higher ratios of bile acids to cholesterols and of phospholipids to cholesterol than in the case of the hamsters. A special diet can be composed which causes cholesterol stones to be dissolved in the bile and disappear. Also, adding small amounts of fat to the hamsters' sugar diet prevents cholesterol gallstones but, especially in the presence of cholesterol, favors formation of amorphous pigmented gallstones which are more resistant to curative treatment. The more unsaturated fats are effective in preventing formation of these amorphous gallstones.

MICRODETERMINATION, ISOLATION, AND GAS-LIQUID CHROMATOGRAPHY OF 2-HYDROXY FATTY ACIDS. Y. Kishimoto and N. S. Radin (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor). *J. Lipid Res.* **4**, 130–138 (1963). A new method is described for the specific isolation of 2-hydroxy fatty acids, particularly from brain lipids. The procedure involves saponification of the lipids with KOH-propylene glycol, preliminary purification with a small silica gel column, and precipitation as the copper chelate. The total content of 2-hydroxy acids may be determined by direct colorimetric determination of the copper in the precipitate, or the acids may be liberated and analyzed by gas-liquid chromatography. The acids are methylated with dimethoxypropane and acetylated with isopropenyl acetate prior to gas chromatographic analysis. The method is suitable for samples containing as little as 0.6 μ moles of hydroxy acid, but is readily scaled up for preparative isolations. An improved titrimetric procedure for copper is described.

OCCURRENCE OF 2-HYDROXY FATTY ACIDS IN ANIMAL TISSUES. Y. Kishimoto and N. S. Radin (Mental Health Res. Inst., Univ. of Michigan, Ann Arbor). *J. Lipid Res.* **4**, 139–143 (1963). The contents of 2-hydroxy fatty acids in rat spleen, kidney, lung, sciatic nerve, and skin, and in bovine plasma, were determined by a copper precipitation method, and the proportions of the various hydroxy acids were determined by gas-liquid chromatography. It was observed that there are two groups of hydroxy acids, short chain (16h:0 as major

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so located, relative to the vasculature, that heat is transferred to the thoracic structures and cervical spinal regions.

DIET AND CHOLESTEROLEMIA: VII. EFFECTS OF METHIONINE, ETHIONINE, AND *p*-FLUOROPHENYLALANINE. J. C. Seidel and A. E. Harper (Dept. of Biochem., Univ. of Wisconsin, Madison 6, Wisc.). *J. Lipid Res.* **4**, 75–80 (1963). The concentration of serum cholesterol in rats fed a diet containing cholesterol, cholic acid, and hydrogenated coconut oil was reduced when ethionine was included in the diet. This effect was not due to depressed intake of food or of cholesterol. The addition of equal amounts of ethionine and methionine to this diet maintained serum cholesterol at levels significantly below those of rats supplemented with ethionine alone. This addition of methionine also very largely prevented the depression of growth caused by ethionine. Administration of *p*-fluorophenylalanine lowered the concentration of cholesterol in the serum but β-2-thienylalanine had little effect.

NONPHOSPHATIDE FATTY ACYL ESTERS OF ALKENYL AND ALKYL ETHERS OF GLYCEROL. J. R. Gilbertson and M. L. Karnovsky (Dept. of Biol. Chem., Harvard Med. School, Boston 15, Mass.). *J. Biol. Chem.* **238**, 893–897 (1963). The presence of glycerol alkenyl ether diesters in the neutral lipid fraction of the lipids from the diverticulum of the starfish *(Asterias forbesi)* has been established by chromatographic concentration and analysis. That the previously known glycerol alkyl ethers actually exist in nature as glycerol alkyl ether diesters is also established. A number of mammalian tissue lipid extracts have been shown to contain glycerol ethers of both alkyl and alkenyl types, which together comprise 0.1 to 2.9% of the neutral lipid calculated as their fatty acid diesters. The alkenyl ethers were found to form from 29 to 82% of the total glycerol ethers in the neutral lipids of mammalian tissue. The presence of a glycerol alkenyl ether monoester, in addition to the alkenyl ether diester, has been demonstrated in the lipid extracted from the epididymal fat pad of the rat.

LIPIDS OF VIRUS INFECTED CELLS. II. LIPID ANALYSIS OF HELA CELLS INFECTED WITH VACCINIA VIRUS. C. R. Gaush and J. S. Youngner (Dept. of Microbiology, School of Med., Univ. of Pittsburgh, Pa.). *Proc. Soc. Exp. Biol. Med.* **112**, 1082–1085 (1963). The lipid composition of HeLa cells infected with vaccinia virus as well as non-infected cells is described. The results indicate that virus infection in a serum free medium does not alter the lipid composition of the cells. However, the incorporation of P^{32} into the phospholipids of virus infected HeLa cells was greater than that observed in non-infected cells, a finding that appears to be generally applicable to virus infected cells.

THE SYNTHESIS OF FATTY ACIDS BY RAT LIVER SLICES IN TRITRIATED WATER. D. W. Foster and B. Bloom (Nat'l Inst. of Arthritis and Metabolic Diseases, U. S. Public Health Service, Bethesda, Md.). *J. Biol. Chem.* **238**, 888–892 (1963). Long chain fatty acids from rat liver slices were isolated after incubation in a medium enriched with tritiated water. The saturated fatty acids were separated by lead salt precipitation and the incorporation of radioactivity into the individual acids determined. The major portion of radioactivity was found in palmitic and stearic acids. Sequential degradation of the saturated fatty acids was carried out and the intramolecular location of tritium determined. Contrary to expectation, more tritium was found in the odd-numbered carbon atoms than the even-numbered. It is suggested that an exchange reaction between reduced triphosphopyridine nucleotide and water occurs before or during fatty acid synthesis, and that the exchange is esssentially complete.

ACCUMULATION OF 24-DEHYDROCHOLESTEROL IN RATS TREATED WITH 22,25-DIAZACHOLESTANOL. D. Dvornik and M. Kraml (Dept. of Biochem., Ayerst Res. Lab., Montreal, Canada). *Proc. Soc. Exp. Biol. Med.* **112**, 1012–1014 (1963). Oral administration of 22,25-diazacholestanol dihydrochloride to rats caused striking lowering of cholesterol and significant accumulation of desmosterol in the serum, liver and adrenals. The findings are similar to those in humans and suggest a triparanol-like mechanism of action.

PRODUCTION OF HYPERCHOLESTEROLEMIA AND ATHEROSCLEROSIS BY A DIET RICH IN SHELLFISH. W. E. Conner, J. J. Rohwedder and J. C. Hoak (Dept. of Internal Med., State Univ. of Iowa College of Med., Iowa City). *J. Nutr.* **79**, 443–450 (1963). A diet supplemented with shrimp was fed to rabbits for 24 weeks. These animals promptly developed a sustained hypercholesterolemia, averaging 795 mg/100 ml at the conclusion of the study. At autopsy, all rabbits had evidence of aortic atherosclerosis. The process often involved large areas of the intimal surface. The analysis of aorta for cholesterol content provided a more quantitative expression of the presence of atherosclerosis. Aortic cholesterol in the shrimp-fed rabbits was as much as 60 times greater than that in control rabbits. Shrimp and other crustaceans contain large amounts of cholesterol. The results of this study re-emphasize that cholesterol-rich foods produce experimental atherosclerosis. Recent work has shown that dietary cholesterol has an important influence upon human serum lipid levels. Thus diets designed to prevent or treat atherosclerosis probably should be restricted in shrimp and other sea foods high in cholesterol content.

A PHOSPHOLIPID FRACTION FROM BEEF HEART MUSCLE WHICH ACTIVATES CYTOCHROME C OXIDASE. M. Cohen and W. W. Wainio (Bureau of Biological Res. and the Dept. of Physiology and Biochem., Rutgers, The State Univ., New Brunswick, N. J.). *J. Biol. Chem.* **238**, 879–882 (1963). A phospholipid fraction has been obtained from beef heart which is very effective in activating the partially purified preparation of cytochrome c oxidase. The addition of 0.047 mg of the active fraction phospholipid stimulated the reaction to half-maximal velocity ($V = 7.7$ sec^{-1} per mg of protein per ml). This amount of phospholipid corresponds approximately to a 1:1 molar ratio of phospholipid to cytochrome c. This active fraction is composed primarily of lysophosphatides, of which 65% are ethanolamine-containing, 21% serine-containing, and a minor inositol-containing component. The fatty acids are 54% stearic, 25% linoleic, 20% palmitic, and a trace of oleic.

ELECTROCARDIOGRAPHIC NOTCHING IN RATS DEFICIENT IN ESSENTIAL FATTY ACIDS. W. O. Caster and P. Ahn (Dept. of Physiological Chem., Univ. of Minn., St. Paul). *Science* **139**, 1213 (1963). A notch has been seen in the electrocardiograms of rats who were fed diets deficient in essential fatty acids. This notching occurs consistently at a point 37 percent through the QRS-complex. It can be prevented by the addition of small amounts of linoleate, linolenate, or arachidonate to the diet of these rats.

COMPLEXITY OF THE MIXTURE OF FATTY ACIDS FROM TUBERCLE BACILLUS. C_{16} AND C_{17} ACIDS FROM VIRULENT STRAINS. J. Cason and W. T. Miller (Chemical Lab., Univ. of Calif., Berkeley 4). *J. Biol. Chem.* **238**, 853–887 (1963). Certain fractions of the fatty acids from a virulent strain of tubercle bacillus have been examined in critical detail. The *n*–C_{16} fraction contains approximately 1% of an unsaturated acid that has been established by degradation as 10-hexadecenoic acid. This contrasts with the earlier finding of 9-octadecenoic acid, but is in agreement with the finding by Lennarz, Scheuerbrandt, and Bloch of 10-hexadecenoic acid in *Mycobacterium pheli*. The branched chain C_{17} fraction of acids contains approximately 20% of an unsaturated acid, established by degradation as 10-methyl-9-hexadecenoic acid. This is the first acid of this type found in the tubercle lipids. The saturated acids in the *br*-C_{17} fraction consist of approximately equal amounts of the 8- and 10-methylhexadecenoic acids; hence, it is shown that virulent strains of tubercle bacillus can produce monomethyl-substituted acids other than the 10-methyl derivatives.

LOCALIZATION OF THE BLOCK IN LIPOGENESIS RESULTING FROM FEEDING FAT. W. Bortz, S. Abraham, and I. L. Chaikoff (Dept. of Physiology, Univ. of Calif., Berkeley 4). *J. Biol. Chem.* **238**, 1266–1272 (1963). With the aid of cell-free preparations, a study was made of the factors (cofactors, enzymes, and substrates) involved in the diminished capacity of the liver of the fat-fed rat to incorporate acetate carbon into fatty acids. Depressed conversion of acetate carbon to fatty acids was observed as early as 2 hours after the enteral administration of 2 ml of corn oil to rats previously fed a fat-free, high-carbohydrate diet. As early as 4 hours after feeding, the decrease in fatty acid synthesis was pronounced. The depression in the incorporation of acetate carbon into fatty acids was more marked in experiments with liver slices than in those with the system composed of the supernatant fraction plus microsomes.

STUDIES ON A β-METHYLCHOLINE-CONTAINING PHOSPHOLIPID DERIVED FROM CARNITINE. L. L. Bieber, V. H. Cheldelin, and R. W. Newburgh (Science Res. Inst. and Dept. of Chem., Oregon State Univ., Corvallis, Oregon). *J. Biol. Chem.* **238**, 1262–1265 (1963). Larvae of the blowfly *Phormia regina* were shown to have a new phospholipid in which choline was replaced by β-methylcholine when the dietary choline had

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25% by the addition or withdrawal of the protein preparation, calcium caseinate for equicaloric amounts of maltose-dextrins. Only the diets low in protein (5% of calories) caused a significant change in plasma cholesterol and this was in the form of an increase.

Effect of food fats on concentration of ketone bodies and citric acid level in blood and tissues. D. M. Brahmankar and M. C. Nath (Dept. of Biochem., Nagpur Univ., Nagpur, India). *Proc. Soc. Exp. Biol. Med.* **112**, 670–672 (1963). Although the concentration of ketone bodies was found to be elevated in all fat fed animals, the saturated fat (butter fat, coconut oil and hydrogenated groundnut oil) adapted rats showed more accumulation of ketone bodies in plasma, liver, kidney and heart muscle than did those receiving unsaturated fats (groundnut oil and sesame oil). The citric acid level was also elevated in saturated fat fed rats whereas no such variation was observed in animals receiving unsaturated fat in the diet.

Studies with a natural source of xanthophylls for the pigmentation of egg yolks and skin of poultry. S. Brambila (School of Vet. Med., Nat'l Univ. of Mexico), J. A. Pino and C. Mendoza. *Poultry Sci.* **42**, 294–300 (1963). Experiments are described in which a material rich in xanthophyll prepared from the petals of the flower known as the Aztec marigold, *Tagetes erecta*, was incorporated in the diet of broilers and laying hens. It was found that good pigmentation of skin and egg yolks of poultry could be produced when the flower petal meal was used as the only pigment source at dietary levels of 0.25 per cent. The dietary content of xanthophyll using this level of flower meal corresponded to approximately 13.6 mg./lb. of feed.

Serum lipids and enzymes. Their levels after high-caloric, high-fat intake and vigorous exercise regimen in marine corps recruit personnel. G. L. Calvy, L. D. Cady, M. A. Mufson, J. Nierman and M. M. Gertler. *J. Am. Med. Assoc.* **183**, 1–4 (1963). The relationship between exercise and a high-calorie, high-saturated-fat diet was studied over a 22-week period in 101 Marine trainees with an average age of 20.5 yr. Their diet consisted of 4,500 calories (fat 2,025 calories or 225 gm, carbohydrates 2,025 calories or 506 gm, and proteins 450 calories or 112 gm). The program consisted of 16 hr of rigorous daily activity. There were no statistically significant changes in serum uric acid, lipid phosphorus, total cholesterol, lactic dehydrogenase, and malic dehydrogenase. Weight and blood pressure did not change. Serum content of triglycerides rose significantly, and isocitric dehydrogenase dropped significantly. It is suggested that a high-calorie and high-saturated-fat diet (milk, butter, and eggs) may not be atherosclerogenic if sufficient calories are utilized to offset this intake.

Cholesterol in higher plants. D. F. Johnson, R. D. Bennett and E. Heftmann (Nat'l Inst. of Arthritis and Metabolic Diseases, NIH, Bethesda, Md.). *Science* **140**, 198–199 (1963). The presence of cholesterol in *Solanum tuberosum* and *Dioscorea spiculiflora* plants was demonstrated by gas-liquid chromatography, thin-layer chromatography, isolation and mixed melting point, and purification to constant radioactivity after dilution with authentic cholesterol.

Effect of sympathetic blocking agent on plasma FFA and on the response evoked by catechol amines. A. Konttinen and M. Rajasalmi (Wilhuri Res. Inst., Helsinki, Finland). *Proc. Soc. Exp. Biol. Med.* **112**, 723–725 (1963). Plasma FFA concentration under the influence of a sympathetic blocking agent, guanethidine, and the effect of this blocking agent on the rise in FFA evoked by administration of epinephrine and norepinephrine in rabbits were studied. Plasma FFA declined under the influence of guanethidine. The rise of plasma FFA evoked by administered epinephrine was somewhat counteracted by the blocking agent. The effect of the agent on the rise evoked by norepinephrine was inconsistent.

The effect of a quaternary ammonium anion exchange resin on plasma and egg yolk cholesterol. C. H. McGinnis, Jr. and R. K. Ringer (Dept. of Poultry Science, Michigan State Univ., East Lansing, Mich.). *Poultry Sci.* **42**, 394–396 (1963). Oral administration of a quaternary ammonium anion exchange resin (cholestyramine) did not significantly affect egg yolk cholesterol levels of Single Comb White Leghorn hens during a period of 5 weeks. However, a high level of cholestyramine (1.5 per cent of the ration) decreased plasma cholesterol levels and egg yolk pigmentation. Body weight remained unchanged throughout the experiment.

Solubilization of fibrin s by phospholipids. A. R. Pappenhagen, J. H. Olwin and J. L. Koppel (Coagulation Res. Lab., Dept. of Surgery, Presbyterian-St. Luke's Hosp., affiliated with College of Med., Univ. of Illinois, Chicago). *Proc. Soc. Exp. Biol. Med.* **112**, 741–743 (1963). Solubilization of bovine fibrin s preparations by phosphatidyl inositol and phosphatidyl serine has been observed whereas phosphatidyl ethanolamine and lecithin did not have this ability. The solubilizing effect did not occur with preparations of bovine fibrin i. The extent of solubilization progressively diminished with increasing ionic concentration of the system, but was not significantly influenced by the type of buffer. The importance of using only fibrin i preparations in the fibrin plate assay for fibrinolytic or activator activities and the need for careful control of the ionic strength of the assay system are stressed.

Nutritive value of marine oils. I. Menhaden oil at varying oxidation levels, with and without antioxidants in rat diets. A. A. Rasheed, J. E. Oldfield, J. Kaufmes and R. O. Sinnhuber (Dept. of Animal Science and Food Sci. and Technol., Oregon State Univ., Corvallis, Oregon). *J. Nutr.* **79**, 323–332 (1963). Pure triglyceride separated from fresh menhaden oil proved the equivalent of lard in supporting growth of laboratory rats when added to a semisynthetic basal diet at a 10% level. When experimentally oxidized in glass containers to high peroxide levels (125 to 310), the triglyceride caused steatitis, enlarged livers and high levels of malonaldehyde in the blood and excreta of the animals. Clay-bleached menhaden oil was shown to undergo extensive oxidation changes over a brief period (24 hours). Such "fresh" oil caused toxic symptoms in rats when fed at a 15% dietary level. Symptoms included anorexia, steatitis, lowered hemoglobin levels and death, and they became more extensive or severe as the level of oxidation of the dietary fat increased.

Effect of deuterium oxide on lipid components of L-5178Y cells. G. H. Rothbalt, D. S. Martak and D. Kritchevsky (The Wistar Inst. of Anatomy and Biology, Philadelphia, Pa.). *Proc. Soc. Exp. Biol. Med.* **112**, 598–601 (1963). A comparison has been made of the relative lipid content of L-5178Y cells grown in conventional medium or in the same medium containing 30% D_2O. Cells grown in D_2O medium contain more total lipid. The major increases in the lipids of the D_2O grown cells are due to increases in the levels of triglycerides and sterol esters. There are very few differences in cellular levels of any of the other lipid fractions. Preliminary isotope experiments indicate that the increased lipid content in the D_2O grown cells is due to increased synthesis of lipid.

Lipids in chick urine: The influence of dietary rapeseed oil. J. L. Sell and J. A. McKirdy (Animal Science Dept., Univ. of Manitoba, Winnipeg, Canada). *Poultry Sci.* **42**, 380–383 (1963). Utilizing a technique for separate urine and feces collection, it has been demonstrated that urinary lipid excretion was not increased by feeding a ration containing 10% of rapeseed oil to growing chickens. The average lipid content of urine obtained from cockerels consuming the low-fat and rapeseed oil rations was 1.76 ± 0.16 and 1.74 ± 0.13% of the dry matter, respectively. Apparent digestibility and utilization coefficients for total lipids in the rapeseed oil ration were 84 ± 1.3 and 83 ± 1.3% respectively. The digestible energy and metabolizable energy values for rapeseed oil were 8.56 ± 0.09 and 8.50 ± 0.07 Cal./g., respectively.

A biological assay for metabolizable energy in poultry feed ingredients together with findings which demonstrate some of the problems associated with the evaluation of fats. I. R. Sibbald and S. J. Slinger (Dept. of Nutr. and Poultry Sci., Ontario Agr. College, Guelph, Ontario, Canada). *Poultry Sci.* **42**, 313–325 (1963). A detailed description of a biological assay which has proved to be satisfactory for measuring the metabolizable energy content of poultry feed ingredients is given. A number of problems concerning metabolizable energy assays and values are discussed. The results of two experiments are briefly described in order to support the contention that available metabolizable energy values for feed fats are subject to a number of errors and are therefore of doubtful practical value.

Brown fat: thermogenic effector of arousal in hibernators. R. E. Smith (Univ. of Calif. Med. Center, Los Angeles) and R. J. Hock. *Science* **140**, 199–200 (1963). Earlier indications that brown fat has a thermogenic role in rats exposed to cold suggested that certain comparable functions in hibernating marmots be investigated. From the results it appears that arousal of the animal by cold is induced by sympathetically activated thermogenesis in areas of brown fat

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• Fatty Acid Derivatives

ACID-OLEFIN ESTERIFICATION. THE ROLE OF THE OLEFIN. L. O. Raether, A. J. Lauck, and H. R. Gamrath (Research Dept., Organic Chemicals Div., Monsanto Chemical Co., St. Louis, Mo.). *I & EC Product Res. Div.* 2, 133–138 (1963). Olefins in the C_5 to C_{18} range react in direct esterification with acids to give good yields of commercially useful esters. All types of olefins were studied to determine the influence of structure on the ease of ester formation. Olefins from dehydrogenation, polymerization, cracking, dehydration, dehydrohalogenation, and naphtha by-products were investigated. Best conversions were obtained from types $RCH{=}CH_2$ and $RCH{=}CHR$ with primary alkyl acid esters of dibasic acids, reacting in the presence of catalysts which are strong proton generators, such as perchloric acid. With primary alkyl acid *o*-phthalates and the preferred olefins, the conversion to neutral esters ranged between 70 and 80% and the yields on phthalic anhydride approximated 90%. Several of these *o*-phthalate esters are described as plasticizers for poly(vinyl chloride).

• Biology and Nutrition

THE PROPERTIES OF ISOLATED HUMAN CARDIAC AGE PIGMENT. I. PREPARATION AND PHYSICAL PROPERTIES. D. D. Hendley, A. S. Mildvan, M. C. Reporter, and B. L. Strehler (Johnson Foundation, Univ. of Penn., Philadelphia). *J. Gerontol.* **18**, 144–150 (1963). Although little fluorescent lipid could be extracted from the age pigment fraction of child hearts, the total lipid fluorescence of child heart seems comparable to that of adult heart, suggesting that much of the total lipid fluorescence of heart was present in cellular elements other than lipofuscin. Lipid extracts of the particles showed a fluorescence emission spectrum similar to that of extracts of the crude homogenate. A flavin-like component extractable from the particles does not seem to contribute appreciably to the total fluorescence. The fluorescence emission intensity of lipid extracts at 510 mμ was relatively unaffected by preparative procedures, in contrast to the increases frequently seen at 420 mμ.

PANCREATIC LIPASE HYDROLYSIS OF COW MILK FAT. E. L. Jack, C. P. Freeman, L. M. Smith and J. B. Mickle (Dept. of Food Science and Tech., Univ. of Calif., Davis). *J. Dairy Sci.* **46**, 284–290 (1963). Knowledge of the position of individual fatty acids within the triglycerides is necessary to the understanding of the utilization of a fat. Pancreatic lipase hydrolysis to convert triglycerides to 2-monoglycerides has been used to study this type of glyceride structure in many food fats, but it has recently been claimed that it cannot be used with cow milk fat because butyric acid is hydrolyzed more rapidly than the other acids. This study was undertaken to determine if there were conditions under which this technique could be applied validly to milk fat. The criteria set forth for the applicability of this technique were: (a) nonpreferential hydrolysis of triglyceride species; (b) absence of a substantial amount of complete hydrolysis; and (3) absence of a significant amount of acyl migration during the hydrolysis reaction. Although there was no evidence of preferential hydrolysis at the one-third stage, there was some complete hydrolysis, and acyl migration did not appear to be occurring at a significant rate. The validity of the procedures employed was demonstrated on a fat of known and unique structure, pig body fat. Therefore, the technique can gave results that may be used to establish general relationships. In cow milk fat the majority of the fatty acids were found to be uniformly distributed within the glyceride, except for C_4 and C_6, which are predominantly in the external positions, and C_{16}, which tends to concentrate in the two position.

EFFECT OF THE LEVEL OF DIETARY PROTEIN WITH AND WITHOUT ADDED CHOLESTEROL ON PLASMA CHOLESTEROL LEVELS IN MAN. J. M. R. Beveridge, W. F. Connell and C. Robinson (Dept. of Biochem. and Med., Queen's Univ., Kingston, Ontario). *J. Nutr.* **79**, 289–295 (1963). Sixty-five male university students were divided into two groups and given a formula ration providing protein and fat (butter) at levels of 15 and 30%, respectively, with or without a supplement of 500 mg cholesterol/950 Cal. for 8 days. The two groups were each divided into 5 sub-groups and transferred for another 8 days to diets in which the protein moiety was changed to 5, 10, 15, 20 and

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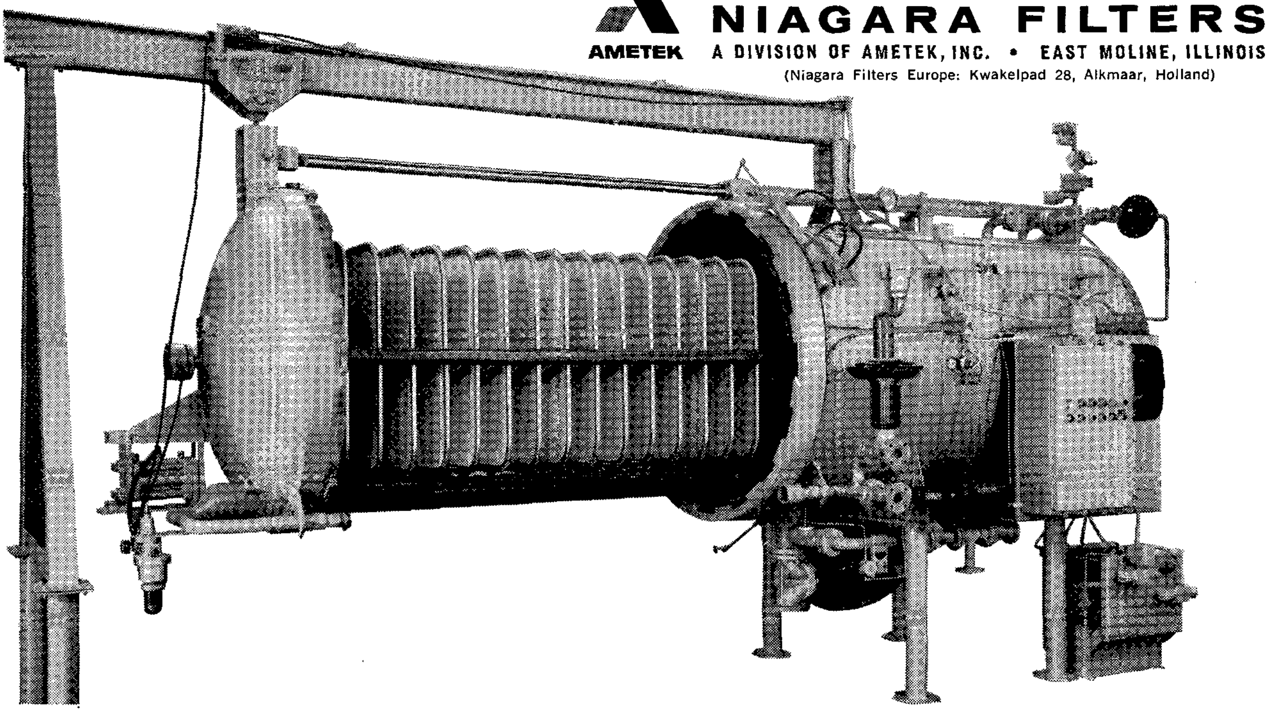

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CONCENTRATED MISCELLA. A. G. Neshchadim (All-Union Inst. of the Food Industry). *Maslob.-Zhir. Prom.* 12, 9–13 (1962). A description of a new method of non-isothermal multistage countercurrent extraction of oil. To obtain highly concentrated miscella by this method it is necessary to decrease sharply the ratio between the quantity of solvent and oil. In addition, at each stage the process must be carried out at elevated temperatures.

EVALUATION OF THE OIL CONTENT IN OIL-CONTAINING MATERIALS. B. E. Ovcharenko and V. F. Borisova (Ukrainian Sci.-Res. Inst. of the Meat Industry). *Maslob.-Zhir. Prom.* 12, 6–9 (1962). A method was devised for determining the oil content in oil-containing materials, based on the linearity of the refractive indexes of a solution of oil in *a*-monobromonaphthalene as a function of oil concentration. For example, for sunflowerseed oil the refractive index varied by 0.00275 for each 1% change in oil concentration. Study was made also of the relationship of time of extraction and the amount of oil extracted by *a*-monobromonaphthalene. The method is simple and convenient to use. Its accuracy in the use of the refractometer is ± 5%.

EXPERIMENTAL WORK OF THE VINNITSKII FAT AND OIL COMBINE. B. F. Ermakov, A. P. Rabota, and E. O. Verner (Vinnitskii Fat and Oil Combine). *Maslob.-Zhir. Prom.* 12, 27–28 (1962). At the Vinnitskii Fat and Oil Combine hydrogenation of confectionery fat was carried out using freshly evolved electrolytic hydrogen. A flowsheet for this process is included in the report. Results showed that hydrogenation using freshly evolved hydrogen made it possible to lower the melting point of the confectionery fat by 1.5 to 2C while retaining a hardness of 550–618 g./cm. In addition, the acid number of the hydrogenated fat was lowered.

REMOVAL OF SULFUR COMPOUNDS FROM HYDROGEN. B. N. Chubinidze and V. I. Brekhov (Saratov Fat Combine). *Maslob.-Zhir. Prom.* 12, 24–26 (1962). At present almost all the hydrogenation plants in the U.S.S.R. use ethanolamine methods for removal of sulfur compounds from the hydrogen. An example is given of the purification of H_2 at the Saratov Fat Combine plant. Here, natural gas is used as the source of hydrogen. Purification involves two stages: (1) freeing of the natural gas from sulfur compounds and (2) removal of CO_2 from the hydrogen. Instead of ethanolamine a new absorbent, GIAP-10, developed by the State Institute of the Nitrogen Industry (GIAP), was employed for removing sulfur compounds. A flowsheet for the new purification process is provided. The new absorbent, GIAP-10, absorbs both organic and inorganic sulfur compounds.

COMPOSITION OF THE SWEET WATERS OBTAINED IN NON-REAGENT SPLITTING OF FATS. M. V. Irodov (All-Union Sci.-Res. Inst. of Fats). *Maslob.-Zhir. Prom.* 12, 21–24 (1962). A study of the composition of the sweet waters in relation to the nature of the fat split, and to a number of other factors, such as degree of splitting of the fat, glycerol content in the waters and hardness of the original water. Fats studied were hydrogenated sunflower oil, bone fat, beef fat, and coconut oil. The fat was placed in an autoclave and heated to a temperature of about 220–225C. After 30 or 60 minute intervals samples were removed for determination of the contents of glycerol and free and combined fatty acids. Results obtained on splitting the different fats in the presence of distilled water are tabulated.

EXTRACTION OF VEGETABLE OILS. M. A. Zharskii. *Maslob.-Zhir. Prom.* 12, 37–38 (1962). A description is given of the Blaw-Knox rotary extractor for extracting oil directly from seed. A pressing system is also described.

A DIRECT-READING CONCENTRATOMETER. N. P. Yusupbekov, Kh. Tashpulatov, and A. Abdurakhimov (Tashkent Polytech. Inst.). *Maslob.-Zhir. Prom.* 12, 33–34 (1962). In a number of instances the measurement of concentration of solutions is of great significance in the control of commercial processes. Existing direct-reading concentratometers, employed chiefly in the chemical industry, have failed to find wide application in the fat and oil industry, because they are cumbersome, complex in design, and inaccurate. A new densitometer is proposed which, because of the relationship of density to concentration of solutions, can be used as a concentratometer. The device can be employed to measure concentration of miscella in any type of oil extractor.

COMPARISON OF LABORATORY TECHNIQUES FOR THE DETERMINATION OF PESTICIDE RESIDUES IN MILK. J. L. Henderson (Foremost Dairies, Inc., 425 Battery St., San Francisco, Calif.). *J. Assoc. Offic. Agr. Chem.* **46** (2), 209–215 (1963). Of the techniques available for specific pesticide residues, fly bioassay is non-specific and not very sensitive; total organic chloride determination also lacks specificity; the AOAC colorimetric method produces variable results, lacks sensitivity for low levels of residues, and does not cover the range of residues likely to be present in milk. Chromatographic tests are most satisfactory. Microcoulometric gas chromatography has many advantages but requires a skilled analyst. Electron-capture gas chromatography is promising but has not been fully developed. The Mills test, which combines column cleanup with identification by paper chromatography, is a rapid, practical screening test. In a collaborative comparison of the chromatographic procedures, microcoulometry tended to give higher results than the Mills test; electron-capture gave lower results than the other two methods. Details of all tests must be followed closely for good results.

APPARATUS FOR TREATING OILS AND FATS. E. Gfeller (Basel, Switzerland). *U.S. 3,089,755.* An apparatus for the selective hardening of unsaturated vegetable and animal oils and fats comprises, in combination: an autoclave having partitioning walls for dividing the autoclave into a plurality of adjacent chambers (partitioning walls having passage means at predetermined levels for permitting passage of material from chamber to chamber when the level has reached the passage means), means for conducting material to be treated in longitudinal flow through the chambers, a mixing means outside each chamber, first pipe means connecting the means with the chamber and having an outlet opening below the level of the passage means, second pipe means for supplying hydrogen gas in the form of individual jets to the mixing means, and third pipe means for conveying material from the chamber to the mixing means.

PROCESS FOR THE PREPARATION OF COCOA BUTTER SUBSTITUTES. J. M. Arnold (N. V. Twincon). *U.S. 3,093,480.* A fat in solid to semi-solid form is subjected to at least one low-temperature extraction at a temperature between −5 and +10C with a total quantity of acetone of 2 to 20 times as great as the fat to provide a first fat fraction as residue. The residue is subjected to at least one subsequent extraction at a temperature between 10 and 35C with a total quantity of acetone from 1 to 15 times as great as the quantity of the fat, resulting in an extract containing the cocoa butter substitute.

PLASTIC GLYCERIDE FAT AND PROCESS FOR PREPARING IT. E. W. Eckey and R. O. Alderson (Procter & Gamble Co.). *U.S. 3,093,481.* A plastic glyceride fat composition contains from 0.01 to 0.5%, by weight, of a non-emulsifying and non-surface-active fatty acid ester of a carbohydrate selected from the group consisting of oligosaccharides and dextrin. At least half of the hydroxyl groups of the carbohydrate are esterified with saturated fatty acid having from 14 to 22 carbon atoms, not more than half of the hydroxyl groups are unesterified, and any additional fatty acid groups of the ester are selected from fatty acids having from 2 to 12 carbon atoms and unsaturated fatty acids having from 14 to 22 carbons.

SALAD DRESSING. A. Partyka (National Dairy Products Corp.). *U.S. 3,093,485.* An emulsified salad dressing which is stable against freezing conditions comprises, in combination, an edible oil which includes soft oil and winterizable components, a freeze resistant starch in an amount sufficient to imbibe the moisture in the salad dressing and retain the water under freezing conditions and an emulsifying agent in an amount equivalent to egg yolk at a level in excess of 8% of the soft oil in the edible oil. The edible oil comprises more than 5% and less than 65% of the salad dressing and has an iodine value of between 75 and 115. The winterizable components in the edible oil are present in an amount such that the oil clouds when held in an ice bath for 5.5 hours.

SALAD DRESSING. O. J. Krett and S. L. Gennuso (National Dairy Products Corp.). *U.S. 3,093,486.* An emulsified salad dressing which is stable against freeze-thaw conditions comprises, in combination, an edible oil, a modified freeze resistant starch in an amount sufficient to imbibe all of the moisture present in the salad dressing and retain the water under freeze-thaw conditions, and an emulsifying agent in an amount sufficient to effect emulsification. The edible oil comprises more than 5% and less than 35% of the salad dressing.

REFINING SOYBEAN OIL. R. J. Fiala (A. E. Staley Mfg. Co.). *U.S. 3,093,667.* Crude oil is first water degummed with water containing a small amount of acetic anhydride as a degumming aid. The wet gums are separated from the oil, and the degummed oil is washed. The improvement in the washing operation comprises washing the degummed oil without any intervening treatment and in a non-attenuated condition in the presence of 125–130% of the sodium hydroxide required to neutralize the free fatty acid content of the degummed oil.

composition of male human depot fat with variation in diet (basal, corn oil, and cod liver oil).

The seed fat of hops (Humulus lupulus L.). J. B. Roberts (University of London). *Chem. Ind. (London)* **1963**, 608–9. Extraction of the ground seeds of Eastwell Golding hops (1961 crop) with light petroleum yielded 32% of liquid seed fat, which after two weeks storage at 0C formed a skin and developed a rancid odor. The fat had a saponification number of 194 and contained 2.2% unsaponifiable matter from which β-sitosterol was isolated by chromatography on alumina. Gas chromatography of methyl esters showed the fat to have the following fatty acid analysis: palmitic 7%, stearic 3, oleic 10, linoleic 60, linolenic 15, and 18:3 (6,9,12) 5%. By the same technique hemp seed oil contained: palmitic 7%, stearic 3, oleic 17, linoleic 59, linolenic 14, and only a trace of 18:3 (6,9,12).

Studies on cooking fats and oils. A. I. Fleischman, A. Florin, J. Fitzgerald, Anne B. Caldwell, and Gertrude Eastwood (St. Vincent's Hospital, Montclair, N.J.). *J. Am. Dietet. Assoc.* **42**, 394–98 (1963). The fatty acid composition of various cooking oils and fats was determined by gas-liquid chromatography. Linoleic acid values reported were: sesame 45.55%, corn 66.50, coconut 0.57, cottonseed 65.46, olive 2.51, peanut 39.40, safflower 91.40, and soy 64.50. The linoleic content of 7 ''solid vegetable fats'' (not identified) were: 40.12, 18.00, 9.93, 25.80, 23.40, 40.60 and 41.80%. Analyses of oils which had been used to fry potatoes or chickens or oils which had been heated under laboratory conditons (495F) indicated that the polyenoic acid content had been significantly decreased (in some cases by as much as 30%), along with a concomitant apparent increase in palmitic acid content.

Quantitative estimation of some phosphatides and their hydrolysis products by thin layer chromatography. W. M. Doizaki and L. Zieve (Lab. for Cancer Res., Radioisotope Svc. and Dept. of Med., Minneapolis, Veterans Hosp., Univ. of Minnesota). *Proc. Soc. Exp. Biol. Med.* **113**, 91–95 (1963). The use of thin layer chromatography for analyzing phosphatides and their hydrolysis products quantitatively is described and applied to the analysis of serum phosphatides. The results are similar to those obtained with silicic acid impregnated paper chromatography and column techniques, though the time for the analysis is markedly shortened.

Analysis of lard by gas chromatography. Use of the flame ionization detector. J. P. Wolff. *Rev. Franc. Corps Gras* **10**(4), 187–195 (1963). It has been possible because of the great sensitivity of the flame ionization detector to detect secondary components which would not normally be observed when a thermal conductivity detector is used. The per cent tallow used to contaminate lard can be calculated from the following equation:

$$S=\frac{100(C_{14}\ \text{unsat}-C_{15}\ \text{branched})}{C_{14}}+\frac{100(C_{14}\ \text{total}-C_{15}\ \text{total})}{C_{16}}$$

The method is applicable when the tallow concentration is between 5% and 50% with a precision in the order of 10%.

Problems in the filtration of oils. C. Several observations on the filtration of fats. C. Defromont and D. Delahaye (Pilot Plant of the Inst. of Fats and Oils, Paris, Fr.). *Rev. Frac. Corps Gras* **10** (4), 187–205 (1963). The pilot plant has used two methods to study filtration. With the first, the speed of warpage of the filtering surface and thus the quantity of air necessary to dry the cake can be determined. The second uses very small surfaces which permit an accurate study and classification of filtering material. The first section of the work gives results obtained on the loss of charge of filtering material as a function of the speed of the passage of air and of oil at various temperatures. The second section gives several results on the possibility of the separation of oil in water.

Parameters of emulsion stability. R. D. Vold and R. C. Groot (Univ. of So. Calif., Los Angeles, Calif.). *J. Soc. Cosmetics Chemists* **14**, 233–244 (1963). In this report a clear distinction is made between the various usages of the term ''stability'' and consideration is given to the fundamental properties of the system which are likely to be important according to each definition. The ultracentrifugal method is then described briefly and its use illustrated for determining the effect of the concentration of sodium dodecyl sulfate and of added sodium chloride on the ultracentrifugal stability of mineral oil-water emulsions. Possible chemical changes are not considered in this presentation, and the emulsions treated are all of the oil-in-water type, although many of the same considerations would apply to water-in-oil emulsions.

Application of dilute nitric acid solutions to the degumming of peanut oil. R. Guillaumin and N. Drouhin (Lab. of Inst. Fats and Oils, Paris, Fr.). *Rev. Franc. Corps Gras* **10** (4), 207–213 (1963). Dilute nitric acid was successfully used to degum peanut oil.

Applications of differential thermal analysis to the study of fats and oils. III. Study of cocoa butter. A. Mathieu, H. Chaveron, R. Perron and C. Paquot (Lab. of Lipochem. of C.N.R.S. and Lab. Syndical of Chocolate). *Rev. Franc. Corps Gras,* **10** (3), 123–126 (1963). Differential thermal analysis because of its sensitivity and because it can record crystallization during various rates of cooling distinguishes between a pressed cocoa butter and a hexane extracted cocoa butter using only a 0.3 g. sample. In addition, the addition of 12% or more extracted cocoa butter to pressed cocoa butter can be detected.

Studies in essential oils-Raman effect, Part II. V. Mohan (Dept. of Physics, Annamalai Univ., Annamalainagar, S. India). *Indian Oil Soap J.* **28** (7), 171–179 (1963). The Raman spectra of cineole, eucalyptus, cajeputi, anethol, aniseed, sweet fennel, and cedarwood oils were taken. With the help of Raman frequencies observed for the oil, the various constituents were identified.

The influence of light on changes in olive oil. III. Virgin olive oil. J. M. R. de le Borbolla and Miss R. Vazquez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites (Seville, Spain)* **14**, 12–15 (1963). Virgin olive oil was exposed to natural and artificial light of varying wavelengths for a period of 40 days. The increase in peroxide value of each sample was followed. Susceptibility to oxidation was found to parallel the absorption spectrum of the oil. Minimum oxidation and absorption occurred at 530–630 mμ. Maximum oxidation and absorption occurred above 630 mμ, due to the absorption of chlorophyll at these frequencies. The use of sodium vapor lamps in olive oil processing plants is recommended to minimize oxidation of the oil.

The olive tree and olive oil, major factors in the economy of Spanish agriculture. E. Morales. *Grasas y Aceites (Seville, Spain)* **14**, 16–24 (1963). A review of the importance of the olive industry to Spain, and suggestions for improving this sector of the Spanish economy.

Content of unsaturated fatty acids in margarine. B. I. Khomutov and P. K. Zolotareva (Lab. of the Ministry of Public Health U.S.S.R.) and L. N. Gening, V. K. Balashova, and E. A. Vol'novskaya (Moscow Margarine Works). *Maslob.-Zhir. Prom.* **12**, 15–17 (1962). A brief survey of the foreign literature showed that there were no data on the content of unsaturated fatty acids in margarine from Soviet factories. In order to help fill this gap, the present study was made for fatty bases obtained under the production conditions of the Moscow Margarine Works. Physical and chemical characteristics of the margarine bases were determined. Contents of both linoleic and linolenic acids were also determined. Quantity of monounsaturated fatty acids was calculated from I.V. and content of polyunsaturated fatty acids. Content of saturated fatty acids was found by difference, assuming a total content of 95.5% of the fat as fatty acids. A content of linoleic acid ranging from 5.24 to 13.53% was found to be typical of the Soviet margarine fat bases tested. This was in fair agreement with linoleic contents of foreign margarines reported in the literature.

Best transportation of liquid margarine. N. I. Kozin and V. I. Varibrus (G. V. Plekhanov Agr. Inst.) and M. A. Barannikov (Moscow Soap Works). *Maslob.-Zhir. Prom.* **12**, 17–18 (1962). A method was developed for obtaining margarine emulsions characterized by high stability and good technological properties for use in confectionery and bakery goods. Another advantage of the emulsions is their easy transport. Essentially the method consists in obtaining an oil-in-water type of emulsion with any given fat concentration within the limits of 3 to 82–83%. Spray-dried milk (whole or de-fatted) containing albumin-casein was used as the emulsifier. Sodium citrate and phosphate was employed to render the albumin soluble. Also, the presence of the sodium citrate prevented coagulation of the casein from solution at elevated temperatures. Beet sugar may be added in various quantities depending on the product for which the emulsion is destined. Salt may be added if desired. Crude emulsification was accomplished in an emulsifier machine, while fine emulsification was carried out in a homogenizer at pressures close to 20 atm. The emulsions are measured as liquids, and should be used within a period of days after their preparation.

Non-isothermal multistage extraction resulting in highly

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of persulphate. The total oxygen content can be determined by the iodometric method while a colorimetric method using titanium chloride (which does not react with persulphate) is used for the determination of perborates plus percarbonates. The persulphate content is determined by difference. Details of the method are discussed.

Evaluation method of the cleaning action of surfactants on painted surfaces. A. Arpino and V. DeRosa (Staz. Sperim. Oli e Grassi, Milan). *Riv. Ital. Sostanze Grasse* **40**, 55–62 (1963). A standardized laboratory method for evaluating the cleaning power of detergents on soiled painted surfaces is described. The artificial soil used in the test is a mixture of mineral oil, silicates, iron oxide, lauryl alcohol, stearic acid, waxes and carbon black. This composition approximates that of the analyzed soil found on automobile bodies. The soil is sprayed onto metal strips and these are then tested in a Gardner washability tester. The amount of soil removed is measured by the reflectance of the metal strip. Examples of statistical evaluation of the results are given.

D-12 tackles specification. *Soap Chem. Specialties* **39** (4), 49–52, 169 (1963). ASTM Committee D-12 on Soaps and Other Detergents has adopted tentative specifications for combination soap/synthetic detergent bar. They have also published proposed specification for dry cleaning detergent-non charge type.

Liquid synthetic detergents. B. M. Milwidsky (Haifa, Israel). *Soap Chem. Specialties* **39** (4), 53–6 (1963). In part II of his article on liquid soaps and detergents, the author discusses light- and heavy-duty liquid detergents, the role of CMC, optical brighteners, and sequestrants. Typical formulations are given for heavy-duty liquid detergents and for solvent type detergents.

Application of surfactants in the preparation of virus and vaccines. J. Vallee (School of the application of fats and oils). *Rev. Franc. Corps Gras* **10** (4), 183–185 (1963). The author discusses briefly the types and applicability of each type of surfactant used in the production of vaccines.

ABS study reveals effect of syndet structure. Anon. *Chem. & Eng. News* **41** (22), 70–71 (1963). Biodegradability and fish toxicity tests were run on C_8 through C_{16} chain length alkylbenzene sulfonate (ABS) detergents. Two isomers of each chain length were studied: one with the benzene ring at the C-2 position and one with the ring at the midchain position. The C-2 ABS isomers were more easily degraded than the midchain isomers. C-2 isomers were found less toxic than midchain isomers, and toxicity increased with chain length in both cases. Mixtures showed poorer biodegradability and more toxicity than the average value calculated from the components, indicating possible interaction.

Determination of the quantity of benzine and alcohol in alcohol-water solutions of alkyl sulfates of secondary alcohols. V. I. Babaev, T. S. El'kina, and K. G. Besedina (Shebekinskii Combine for Synthetic Fatty Acids and Fatty Alcohols). *Maslob.-Zhir. Prom.* **12**, 28–29 (1962). The following method was developed for determining the quantity of benzine and alcohol in water-alcohol solutions of alkyl sulfates of secondary alcohols. To a weighed portion (1–20 g.) of the solution, the calculated quantity of sulfuric acid needed for decomposing the alkyl sulfates was added. The mixture was then heated for 15 to 30 min. at 100–120C, and the vapors of benzine and alcohol were collected in a closed vessel containing an oxidizing chromic mixture. The alcohol vapors in the vessel are oxidized and do not interfere with the subsequent determination of the benzine content by means of a gas analyzer. Then the oxidizing solution is titrated with Mohr's salt, and the alcohol content calculated. Results of a test showed that the error in the determination of the quantity of benzine did not exceed 5.8%.

Side reactions during the sulfating of fatty alcohols. V. S. Varlamov and T. M. Ivanova (All-Union Sci.-Res. Inst. of Fats). *Maslob.-Zhir. Prom.* **12**, 19–21 (1962). A study was made on the effect of such factors as concentration, excess of acid, temperature, and duration of reaction on the sulfation of whale oil fatty alcohols. Conditions and results of the sulfating reaction are tabulated. Results showed that by-products formed to the least extent on sulfating with 98% H_2SO_4 at 30C for a period of 30 minutes.

Machine for stamping and cutting soap. O. Ya. Pronin (V. V. Kuibyshev Krasnodar Fat and Oil Combine). *Maslob.-Zhir. Prom.* **12**, 29–31 (1962). A cross-sectional diagram of the machine is shown.

Predicting the performance of laundry detergent composition. A. M. Schwartz and J. Berch (Harris Res. Labs., Inc.). *Soap Chem. Specialties* **39** (5), 78–81, 158–160 (1963). A test is described which will reliably predict the field performance of laundry detergents. This laboratory soil accumulation test method uses reflectance value as a measure of detergency.

Testing biodegradability of detergents. I. A. Eldib (Eldib Eng. and Res.). *Soap Chem. Specialties* **39** (6), 59–63, 109–112 (1963). The author briefly describes techniques available for evaluating the biodegradability of detergents: dilution method, manometric (Warburg) method, river die-away test. A better procedure is the use of continuously operated pilot plants simulating biological sewage treatment plants. One setup simulates the activated sludge process and another simulates the trickling filter process.

Protein derived detergents. R. R. Riso (Stepan Chemical Co.). *Soap Chem. Specialties* **39** (5), 82–84, 151, 153, 155, 157–158 (1963). The protein is hydrolyzed to the low molecular polypeptide state. The polypeptide is then condensed with a fatty acid to form a complex amide in which the reactants are joined together at the amino group of the polypeptide. These protein surfactants are extremely versatile and useful. Their incorporation in commercial products can range from the mildest action in toiletries for the care of infants, through shampoos, hair waving and grooming preparation, dyeing solution and hand cleaners, to dishwashing compounds. One of their outstanding properties is their susceptibility to biodegradation.

Shampoo containing amine oxide. E. W. Lang (Procter & Gamble Co.). *U.S. 3,086,943.* A detergent composition especially adapted for shampooing hair by its effect in reducing the static electrification of combed dry hair consists of: (a) from 5–20% of a water-soluble detergent having the formula RZXM, in which R is acyclic hydrophobic radical containing from 8 to 18 carbons, X is an anion selected from the group consisting of $SO_3^=$, $OSO_3^=$, and $COO^=$, Z is an intermediate linking member consisting of ether, polyether, ester, amide, and amine linkages and M is a cation to neutralize the charge of the anion; (b) from 2–15% of an amine oxide having the general formula $R_1R_2R_3N \rightarrow O$ in which R_1 is an alkyl radical containing from 10 to 16 carbons and R_2 and R_3 are each selected from the group consisting of methyl and ethyl radicals; and (c) water.

Foam breakers. H. Wedell (Bohme Fettchemie G.m.b.H.). *U.S. 3,086,944.* A non-foaming aqueous wetting composition comprises water and a mixture of (1) 75–98 parts of an addition product formed by less than 5 mols of a low-molecular weight alkylene oxide with a high-molecular weight organic compound containing a hydrocarbon radical with up to 12 carbon atoms and an exchangeable hydrogen atom linked to the hydrocarbon radical through an atom selected from the group consisting of oxygen, nitrogen and sulfur as wetting agent; and (2) from 2 to 25 parts of an addition product formed by more than 4 mols of a low-molecular weight alkylene oxide with a high-molecular weight organic compound containing a hydrocarbon radical with more than 12 carbons and an exchangeable hydrogen atom linked to the hydrocarbon radical through an atom selected from the group consisting of oxygen, nitrogen and sulfur as emulsifying agent, and as defoaming agent, from 0.5 to 30 parts per 100 parts of total alkylene oxide addition products of a carboxylic compound selected from the group consisting of high-molecular weight fatty acids and their substantially water-insoluble metal salts.

Surface-active urethanes and a process for preparing them. L. Orthner, M. Reuter, and F. Landauer (Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning). *U.S. 3,086,986.* Surface-active compounds of the $ROCONR_1CH_2CH_2SO_3Na$ in which R is an alkyl radical having 8–12 carbon atoms and R_1 is a member selected from the group consisting of 2-ethyl-hexyl and *n*-octyl are described.

Tank protective oils. K. F. Schiermeier (Shell Oil Co.). *U.S. 3,090,690.* An improved tank protective oil composition consists of from 10–15% of an oil-soluble alkali metal petroleum sulfonate in the molecular weight range of from 350 to 900, 4 to 6% of a partially ammoniated fatty acid selected from the group consisting of oleic and tallow fatty acids having a TBN-E value in the range of 20 to 50, and the balance a mineral oil having a viscosity index of from 15 to 48 and a viscosity at 100F from 450 to 600 SUS.