aged portions and these portions were then analyzed chemically.

Analysis of these samples indicated that damage to the seed caused considerable variation in percentages of oil, protein, ash, and in iodine number and acid of the oil. Sugars in the damaged portions of the soybean samples were generally low when compared with the sound portions.

Weather damaging of soybean seed caused a marked increase in percentage of crude protein. Oil percentages were sometimes higher and sometimes lower in the damaged portions. The iodine number of the oil was usually but slightly affected, and the acid number was higher in the damaged portions.

In order that the chemical analysis of the samples may be representative of the true composition of a strain, the seed analyzed should be of good quality and contain no more than a small proportion of damaged seed.

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ABSTRACTS

Oils and Fats

Edited by
M. M. PISKUR and MARIANNE KEATING

THE SYNTHESIS OF UNSATURATED FATTY ACIDS. K. Ahmad and F. M. Strong (Univ. Wisconsin). *J. Am. Chem. Soc. 70,* 1699-1700(1948). A convenient and practical synthesis of mono-unsaturated fatty acids has been suggested. Alkyl acetylenes react with iodochlorides to form acetylenic chlorides which in turn, *via* the nitrile or Grignard reaction and subsequent selective hydrogenation of the triple bond, are converted to the mono-unsaturated fatty acids. The method promises to be of general utility for synthesizing a variety of fatty acids and related long chain aliphatic substances.

FATS, OILS, AND FATTY ACIDS FOR INDUSTRIAL PURPOSES. Dale V. Stingley (Armour Chem. Div., Chicago). *Inst. Spokesman (Natl. Lubricating Grease Inst.) 11,* No. 10, 6-10(1948). A review covering statistical data, uses, classification, and separation of glycerides by solvent crystallization, liquid-liquid extraction, or fractional distillation. (*Chem. Abs. 42,* 3195.)

REDUCTION OF FATTY ACID ESTERS BY SODIUM. Anon. (Lab. Chevreul, Paris). *Bull. mens. ITERG 1947,* No. 93-9. The Du Pont process for the manufacture of fat alcohols is amply reviewed. On the basis of previously published theoretical considerations a modification of the process has been worked out by which yields of 94-8% have been obtained in the preparation of oleyl alcohol. The principal source of losses being the saponifying action on the esters of the Na alcoholate formed during the reaction, NH_4Cl or CO_2 is introduced to prevent the Na from combining with the alcohol. The quantity of Na required, however, is 20-40% higher than theory as against only 5% in the Du Pont process. (*Chem. Abs. 42,* 3310-11.)

COMBINATION DISPERSION OF LIGHT IN FATTY ACIDS AND THE HYDROGEN BOND. M. I. Batuev. *Bull. acad. sci. U.R.S.S. Ser. phys. 11,* 336-9 (1947). Frequencies corresponding to the O-H bond were observed in the vapor state of acetic and valeric acids. In the liquid state these frequencies were shifted, owing to H bonds. B. assumes that propylic and higher acids have in the fluid state a ring-type association structure, whereas formic and acetic acids show in addition a chain-type association. This can be shown in the behavior of $C{=}O$ frequencies of fatty acids when dioxane is added to them. (*Chem. Abs. 42,* 3261.)

SEPARATION OF THE SATURATED STRAIGHT-CHAIN FATTY ACIDS C_{11} TO C_{19}. L. L. Ramsey and W. I. Patterson (Federal Security Agency, Washington, D. C.). *J. Assoc. Official Agr. Chemists 31,* 441-52 (1948). A method, based on partition chromatography, is presented for the separation of the straight-chain saturated fatty acids C_{11}-C_{19}. The separation of the even-numbered acids from each other and of the odd-numbered members from each other is fairly complete in a single fractionation and recoveries of added acids are essentially quantitative. The fatty acids are separated on a column of silicic acid using a mixture of furfuryl alcohol and 2-aminopyridine as the immobile solvent, and n-hexane as the mobile solvent. The separation is followed by titration of percolate fractions of suitable volume with standard Na ethylate, and the separated acids are determined by titration in 70% alcohol with standard NaOH. Each acid is tentatively identified by its threshold volume, and the identification is confirmed either by a melting point determination or by adding an approximately equal amount of an authentic sample of the suspected acid to the unknown and testing the chromatographic homogeneity of the mixture on a fresh column.

STUDIES ON SYNTHETIC GLYCERIDES. II. LIPOLYTIC HYDROLYSIS OF SYNTHETIC GLYCERIDES WITH FATTY ACIDS OF 8-18 CARBON ATOMS. K. E. Schulte (Univ. Munchen, Germany).. *Biochem. Z. 318,* 220-6(1947). Fatty acids were prepared by oxidation of paraffins. Made into glycerides, these have been split by pig pancreas lipase just as natural food glycerides. (*Chem. Abs. 42,* 3007.)

X-RAY INVESTIGATION OF GLYCERIDES. VII. DIFFRACTION ANALYSES OF SYNTHETIC 1,3-DIELAIDIN. B. F. Daubert and S. S. Sidhu (Univ. Pittsburgh). *J. Am. Chem. Soc. 70,* 1848-9(1948). The preparation of 1,3-dielaidin by (1) direct synthesis from 1-trityl-2,3-dielaidin, a new compound, and (2) elaidinization of 1,3-diolein is reported. The X-ray and melting point data confirm the observations of Malkin relative to the existence of 2 crystalline forms called by him *beta* and *beta prime*.

DIRECTED INTERESTERIFICATION IN GLYCERIDES. E. W. Eckey (Procter & Gamble Co., Ivorydale, O.). *Ind. Eng. Chem. 40,* 1183-90(1948). Details of expts. are given in which interesterification of fats and oils is directed to max. increases of trisatd. constituents, in contrast to undirected interesterification in which the max. trisatn. appears at the equil. which coincides with arrival at random distribution of the fat acids among the glycerides. Method of prepn. of the interesterification catalyst, NaOCH$_3$ in xylene suspension, is given. Undirected interesterification of cottonseed oil at temps. of 100-220°F., with 0.1-0.06% NaOCH$_3$ and up to 20 hrs. time increased the cloud point of the oil from 26° to a max. of 59°. With as low as 0.06% catalyst, equil. was reached in about 30 min. at 120°F. Many other alkoxides were prepd. and were found approx. as active as NaOCH$_3$ on a molar basis. Results from a series of undirected interesterifications on cottonseed oil, palm oil, and tallow were plotted to show the relationship of the production of trisatd. constituents to the estn. of the satd. fat acids present; and another curve relates these results to random distribution. Tallow, because of natural random distribution, is almost unchanged by undirected interesterification. When the interesterification is carried out at temps. low enough to allow trisatd. constituents to ppt. out, the reaction continues to yield a larger trisatd. fraction. Palm oil of cloud point 75.2°F., m.p. 107.2°F., yield of stearin by crystn. from petrol ether at 50°F. 6.2% (of I no. 6.8), on interesterification at 100°F. yielded products of the following characteristics, resp.: 94.5°F., 130°F., 28% (I no. 1.6); with 80°F. reaction temp. the characteristics were, resp.: 100.4°F., 133.2°F., 36.1% (I no. 1.3). With cottonseed oil, interesterification at 50, 60, 70, and 80°F. showed that the process was slower at the lower temps., but the proportion of trisatd. constituents formed is greatest at the lower temps. if sufficient time is allowed. Stepwise reduction in temp during reaction gave greater production of the high-melting glycerides in a shorter time; *i.e.*, gradual reduction of reaction temps. from 70 to 40°F. through the reaction converted as much as 19% of the cottonseed oil to fully satd. glycerides. With tallow, interesterification at 120°F. produces little change; at 70° the cloud point was increased from 91 to 100°F., m.p. from 115.3 to 122°F., and high melting constituents from 13.9 to 30.7%. Cocoa butter, which contains about 60% satd. fat acids but only 2% trisatd. glycerides contained 46.6% (I no. 2.9) of trisatd. constituents after stepwise interesterification. Suggested practical applications for the process are: oil like cottonseed can be converted to the semi-solid type of shortening by exchange of radicals without hydrogenation, the plastic range and consistency of shortening contg. palm oil could be improved by interesterification, tallow likewise could be made a satisfactory material for shortening, the process could improve the efficiency of graining out satd. constituents of fish and other oils.

HYDROGENATION OF FAT OF SEALS FROM THE CASPIAN SEA. M. K. Akhmedli. *J. Applied Chem. U.S.S.R. 21,* 164-70(1948). The fat was refined with 22 Bé caustic at 40-50°, washed until washing water became neutral, dried, 50-g. samples tested, M-Al$_2$O$_3$ catalyst added (1% based on Ni), heated to 240°C., and H$_2$ run through at 3-4 l. per minute. The results are tabulated giving decrease of I no. with time of hydrogenation.

DESATURASE OF THE HIGHER FAT ACIDS. VARIATIONS IN THE APOENZYME CONTENT OF THE LIVER UNDER VARIOUS PHYSIOLOGICAL CONDITIONS. E. LeBreton and J. Clement-Champougny (Sorbonne, Paris). *Compt. rend. soc. biol. 141,* 729-31(1947). The desaturase apoenzyme content of the liver and intestinal mucosa of the rabbit fluctuates widely during digestion and during fasting. (*Chem. Abs. 42,* 2295.)

THE CULTURE OF OIL SEEDS IN TRIPOLI. G. Vivoli. *Olearia 2,* 135-53 (1948).

PRODUCTION, INDUSTRY, AND COMMERCE IN OIL PRODUCTS IN THE MALAY ARCHIPELAGO. A. Ferrara. *Olearia 2,* 157-66(1948).

THE PROGRESS AND DEVELOPMENT OF THE ESSENTIAL OIL INDUSTRY IN INDIA. Narendra Ch. Deb (Sylhet). *Indian Soap J. 13,* 189-94(1948).

THE NUTRITIVE VALUES OF FATS. S. Mukherjee (Chem. Dept., Calcutta Univ.). *Indian Soap J. 13,* 200-4(1948).

WATER-IN-OIL EMULSIONS. THE INFLUENCE OF MIXED EMULSIFIERS IN THE DIFFERENT FATTY BASES ON THE DEGREE OF DISPERSIONS AND STABILITY. K. Munzel. *Pharm. Acta Helv. 22,* 247-57(1947). Results indicate that, in general, combinations of a number of emulsifiers are not as effective as single emulsifiers in the preparation of water-in-oil emulsions. In some cases mixed emulsifiers give a high degree of dispersion, but the dispersity decreases considerably on storage, with the exception of cholesterol-lanolin mixture. Mixed emulsifiers may improve the stability of an ointment if one of the components increases the stiffness of the oil phase; such preparations, however, are too firm. The nature of the fatty base has a great influence. If the emulsifier is effective in a particular base it is so because it forms a film at the interface, alters the consistency of the base, or both. (*Chem. Abs. 42,* 3133.)

AUTOXIDATION OF EMULSIFIED FATS. Friedrich Kiermeier (Inst. Lebensmittelforsch., Munchen, Germany). *Biochem. Z. 318,* 256-64(1947). The influence of catalase on autoxidation of fat has been studied in emulsions in which the close association of catalase, fat, and water could be effected. The difficulty of translating the findings in such systems to natural conditions is pointed out. It is shown how in the case of a biocatalyst like catalase, which inhibits the rate of autoxidation, the presence of a trace of Mn changes the inhibition into an acceleration. (*Chem. Abs. 42,* 3008.)

FATS AND OILS. E. L. Burtis (U. S. Dept. Agr., Washington, D. C.). *Ind. & Eng. Chem. 40,* 998-9 (1948). A brief summary of the fats and oils industry is presented.

PRESENT STATUS OF THE SYNTHETIC FATS PROBLEM. K. Thomas and G. Weitzel *Suddeutschen Apotheker-Ztg. 87,* 255-6(1947).

ANTIOXIDANTS FOR OILS. NATURAL AND SYNTHETIC. T. K. Roy (Calcutta Univ.). *Indian Soap J. 11,* 203-9(1946). A review with 35 references. (*Chem. Abs. 42,* 3594.)

DECOMPOSITION OF FATS AND OILS IN THE AUTOCLAVE. J. Hetzer, *Seifensieder-Ztg. 73,* 4-5(1947); *Chimie & industrie 58,* 169(1947). Strict control during the dissociation of oils and fats under pressure is required. The simpler the process, the greater the need for control of manufacturing losses, especially of glycerol. The generally adopted proportion of "100 kg. of oil yield 8 kg. of glycerol" is quite wrong. The yield depends on the nature and properties of the material treated. A balance of the operation is given (not reproduced in the French abstract). (*Chem. Abs. 42,* 3591-2.)

FAT SYNTHESIS IN YEAST. A. G. C. White and C. H. Werkman (Iowa State College, Ames, Iowa). *Arch. Biochem. 17,* 475-482(1948). Smedley-MacLean and coworkers have established the conversion of acetic acid into fat and sterols by yeast. Recently, it was shown, by the use of C^{13}, that the long chain fatty acids of *Saccharomyces cerevisiae* can be formed by utilization of intact added acetate without prior conversion to carbohydrates. The conditions under which a relatively large and reproducible increase in fat may be obtained using non-proliferating cells of *S. cerevisiae* have been described: (1) A 24-hr. culture of cells. (2) An aeration time of between 24 and 48 hours. (3) An acetate concentration of 0.1 M. (4) An initial pH of between 6.5 and 8.0. Dried and lyophilized cells do not show the synthetic ability of freshly harvested cells.

BACTERICIDAL ACTION OF FATS AND OILS. K. Lembach (Cologne Univ., Germany). *Zentr. Bakt. Parasitenk, I Abt. Orig. 152,* 266-72(1947). Sunflower oil, castor oil, and cod-liver oil possess bactericidal activity against many bacteria. Bacteria are not dissolved by oils. Bacterial suspensions treated with cod-liver oil begin to show effects after 48 hours' contact. The bactericidal power of sunflower oil has not been previously described. (*Chem. Abs. 42,* 3457.)

STUDIES OF THE ACCURACY OF SOME METHODS USED IN THE DETERMINATION OF MILK FAT. H. Hostettler and H. Hanni (Eidg. milchwirtsch und bakteriol. Anstalt, Liebefeld-Berne, Switz.). *Mitt. Gebiete Lebensm. Hyg. 38,* 354-60(1947). Several modifications of Rose-Gottlieb's gravimetric fat determination and Gerber's acidobutyrometric method were compared and the most accurate procedure was described in detail. (*Chem. Abs. 42,* 3500.)

DIELECTRIC CONSTANT OF BUTTER. W. Mohr and Charles Hennings. *Milchwissenschaft 2,* 173-9(1947). Among various kinds of butterfat, the dielectric constant remains rather consistently within the range of 3.1 and 3.2. However, the values for butter vary between the limits 5.0 and 7.5, according to its contents of water and air. When butter is cut, the segregation of water causes a large increase in the dielectric constant. This constant is definitely related to the state of the water-in-oil emulsion in butter and its value serves as a criterion for butter quality. In the new Alfa and Fritz continuous process for butter manufacture frequent measurement of the dielectric constant provides information needed for the control of the emulsion state and ultimately the quality of the product. (*Chem. Abs. 42,* 2363.)

A NEW SYNTHESIS OF MARGARIC ACID. Mihovil Prostenik (Chem. Inst., Zagreb). *Arhiv Kemi 18,* 1-2 (in English, 3)(1946). The procedure developed here is simple, gives a satisfactory yield, and requires a very short time, for only a small number of steps are involved. The amount of CH_2N_2 required is very small. Purified palmitic acid serves as starting material; it is converted with $SOCl_2$ into palmitoyl chloride and the latter combined with CH_2N_2 to give 1-diazo-2-heptadecanone, which with Ag_2O gives the ethyl ester of margaric acid, then saponified to free Pure II, m. 64° (commercial samples m. 61°), was prepared. (*Chem. Abs. 42,* 3318.)

LARD TAKES ON NEW PROPERTIES. F. C. Vibrans (American Meat Inst. Foundation, Chicago, Ill.). *Food Ind. 20,* 855-8(1948). Improvements in taste, odor, appearance, and stability at room temperature are achieved without decrease in shortening or nutritional properties.

DISTINCTION OF ANIMAL AND VEGETABLE FAT. M. Staub (Kantonal Lab., Zurich, Switz.). *Mitt. Gebiete Lebensm. Hyg. 38,* 292-9(1947). The beginning of rancidity in fats and oils can be detected by the Ti sulfate reaction in which the colorless $Ti(SO_4)_2$, under the influence of the peroxides formed in rancid fats, changes into the yellow sexivalent Ti stage. (*Chem. Abs. 42,* 3589-91.)

LIPOXIDASE ACTIVITY AND FAT COMPOSITION OF GERMINATING SOY BEANS. R. T. Holman (Medical Nobel Inst., Stockholm, Sweden). *Arch. Biochem. 17,* 459-466(1948). The changes in fat content, iodine number of fat, linoleic and linolenic acid contents of the fat, chlorophyll and carotenoids, lipoxidase and catalase have been followed during the germination of soy beans. Carotenoids begin to increase on the 5th day, chlorophyll on the 7th. Fat content shows a decrease after the 3rd day, iodine value of the oil decreases after the 5th day. Linoleic acid and linolenic acid contents decrease after the 2nd day, and the loss of these acids is proportionately greater than the loss of total fat.

BEHAVIOR OF SYNTHETIC FATS FROM COAL AS FOOD. K. Thomas and G. Weitzel. *Deut. Med. Wochenschr. 71,* 18-21(1946).

THE GROWTH-PROMOTING ACTION OF VACCENIC ACID. J. Boer, B. C. P. Jansen, A. Kentie, and H. W. Knol (Univ. Amsterdam, Holland). *J. Nutr. 33,* 359-60 (1947). The experiments show that hydrogenated China wood oil, added to a diet with rape-seed oil, has a growth promoting action. Because the fraction of summer butter and the hydrogenated wood oil have a similar growth promoting action, and since both fractions consist chiefly of vaccenic acid, it is concluded that the growth promoting factor of summer butter is vaccenic acid.

THE EFFECT OF FAT ON THE ABSORPTION AND UTILIZATION OF GALACTOSE BY THE RAT. M. L. Nieft and H. J. Deuel (Univ. So. California School Med., Los Angeles). *J. Biol. Chem. 167,* 521-5 (1947). The percentage of ingested galactose which is excreted in the urine varies inversely with the percentage of fat in the diet. The rate of intestinal absorption of galactose also varies inversely with the percentage of fat in the diet. The fat effect appears to be independent of the type of fat at a 20% level, since butterfat, corn oil, and cottonseed oil give essentially the same results. However, if the fat level is cut to 10% cottonseed oil gives significantly lower urinary excretion values than either butterfat or corn oil.

SOME PHYSIOLOGICAL RELATIONSHIPS OF PROTEIN, FAT, CHOLINE, METHIONINE, CYSTINE, NICOTINIC ACID, AND TRYPTOPHANE. W. D. Salmon (Alabama Polytechnic Inst., Auburn). *J. Nutr. 33,* 155-68 (1947). The primary deficiency in diets containing 18% or less of casein was found to be labile Me groups unless supplementary choline or methionine was added. The deficiency of labile Me was aggravated by the addition of cystine or cystine and fat. The second demonstrable deficiency in low-fat diets containing 18% or less of casein was nicotinic acid. A high level of fat (30%) tended to counteract the deficiency of nicotinic acid. This was probably a nicotinic acid-sparing effect as the energy metabolism shifted from carbohydrate to fat and indicates that nicotinic acid, like thiamine, functions primarily in carbohydrate metabolism. Only when the deficiencies of labile Me and nicotinic acid were remedied, was a deficiency of cystine (or S amino acid) demonstrable. Methionine corrected both the labile Me and the S amino acid deficiencies. The possible nutritional significance of the findings is discussed.

THE MECHANISM OF OXIDATION OF MONOETHENOID FATTY ACIDS AND ESTERS. THE COURSE OF THERMAL CATALYTIC OXIDATION OF METHYL OLEATE. J. H. Skellon. *J. Chem. Soc. 1948,* 343-7. Highly purified Me oleate was oxidized at 120° by O_2 in the presence of a V catalyst, under conditions which resulted in little or no disruption or dimerization of the carbon chain. The initial attack by O_2 appears to take place mainly at the ethenoid linkage but the hydroperoxide undergoes rapid transition at this temperature and the final oxidation products are more complex. The neutral non-disrupted oxidation products were separated and examined directly, without study of the scission products. They consisted chiefly of an oily monomeric complex of approximate composition $C_{19}H_{36}O_6$, in which one molecular proportion of oxygen is considered to be present as an irreducible peroxide, and a smaller proportion of a compound identifiable with isomeric hydroxy-keto-stearates. The structure of the complex is discussed and a mechanism is advanced to account for the changes occurring during gaseous oxidation of monoethenoid fatty acids and esters.

THE INDUCED REACTION BETWEEN METHYL LINOLEATE AND BIXIN DURING OXIDATION BY LIPOXIDASE. G. N. Smith *et al.* (Parke, Davis and Co., Detroit, Mich.). *Arch. Biochem. 17,* 75-80 (1948). Evidence has been presented to show that a relationship exists between the spectral changes in Me linoleate and bixin during the coupled oxidation by lipoxidase. A proportionality exists between the increased absorption due to Me linoleate oxidation and the decreased absorption due to bixin oxidation and decolorization. An induced or coupled oxidation reaction thus exists between Me linoleate and bixin during lipoxidase oxidation. Three methods of estimating lipoxidase activity have been suggested based on the spectral changes of this system during oxidation.

ON THE MECHANISM OF ENZYME ACTION. XXXIII. FAT FORMATION IN FUSARIA IN THE PRESENCE OF A PIGMENT OBTAINED FROM FUSARIUM SOLANI D_2 PURPLE. F. F. Nord, J. V. Fiore, and S. Weiss (Fordham Univ., New York). *Arch. Biochem. 17,* 345-57 (1948). When FsD is grown on Czapek-Dox medium, maximum lipid formation and the highest carbohydrate conversion factor are accompanied by maximum pigment production in the mycelium, these maxima occurring on 10% glucose. On 2.5 and 5% glucose solutions, the fat and sterol formation reached their maxima after the first week, while, on a 10% solution, there is an increase in fat and pigment production but not in sterol after the first week. Thus, there is no relationship between sterol and fat formation.

NEW ZEALAND FISH OILS. 4. OBSERVATION ON THE OIL CONTENT OF FRESH WATER EELS. F. B. Shorland and J. Russell (Fats Res. Lab., Marine Dept., Wellington). *Biochem. J. 42,* 429-33 (1948). The oil content of the immature eels tended to increase continuously with length from approximately 7 to 17% in *A. australis* and from 7 to 23% in *A. dieffenbachii.* This was not so in the case of the immature eel which contained approximately 70% of the total oil reserves in the tail, comprising but 42-43% of the total weight of the fish. The observed results are consistent with the theory now put forward that just prior to migration a more uniform distribution of oil is attained by a partial transference of oil from the tail into the trunk and from thence to the head and ovary.

BONE MARROW FOR FAT STORAGE IN RABBITS. H. E. Newlin (Midwest Research Inst., Kansas City, Mo.). *Arch. Biochem. 17,* 125-8 (1948). The marrow cavities in the bones of rabbits serve as storage space for mobile supplies of lipids. The I number of these fats reflects that of the diet if the fat stores are depleted and then flooded with an unsaturated lipid. Rabbits can be fed diets in which 55-63% of the calories are included as cottonseed oil. Of this fat 78-92% is absorbed by various rabbits.

EFFICACY OF LIPOTROPIC SUBSTANCES IN TREATMENT OF CIRRHOSIS OF LIVER. F. Steigmann (Chicago). *J. Am. Med. Assoc. 137,* 239-42 (1948). Two hundred and forty-seven cases of cirrhosis were observed during a period of 10 years on 3 different therapeutic regimens. The most recently used regimen, which consisted of a diet high in protein, high in vitamins, high in carbohydrates, and low in fats supplemented by specific lipotropic substances (choline, choline and cystine, and methionine) proved to be the most efficacious, as evidenced by lower mortality and morbidity rates. There was also a higher percentage of recoveries under this regimen.

PATENTS

PRODUCTS OF THE FRIEDEL-CRAFTS CONDENSATION OF FURANE WITH UNSATURATED TRIGLYCERIDES. Anderson W. Ralston, Miles R. McCorkle, and Robert J. Vander Wall (Armour & Co.). *U. S. 2,443,269.* The invention comprises reacting a compound having a furane ring with a glyceride of fatty acid containing at least two double bonds and at least 18 carbon atoms in the presence of a Friedel-Crafts catalyst, the reaction being conducted at a temperature below 75°C.

PROCESS FOR TREATING GLYCERIDES. E. W. Eckey. *U. S. 2,442,531-5.* A process of rearranging the fatty acid radicals in triglyceride fat comprises the step of intimately contacting said fat with a low temperature molecular rearrangement catalyst to cause rearrangement of the fatty acid radicals in the fat molecules, the temperature being sufficiently low to permit crystallization of solid triglycerides of low solubility as such triglycerides are formed.

GLYCERIDE REARRANGEMENT. E. W. Eckey (Procter & Gamble). *U. S. 2,442,539.* This invention relates to controlling the molecular rearrangement of glycerides.

Recovery of glycerol. K. I. Keim (Palmolive-Peet Co.). *U. S. 2,444,296.* The invention relates to a process for refining glycerine and, more particularly, to an improved process for recovering glycerol and polyglycerols from glycerine foots.

Emulsified food fats of improved keeping qualities. F. H. Penn (Dallas, Tex.). *U. S. 2,444,307.* An edible food product comprising an emulsion of fatty glycerides and an aqueous product containing substantially equal proportions of an aliphatic hydroxy polybasic acid selected from the group consisting of tartaric, citric, and malic acids and an aromatic parahydroxy monobasic acid ester selected from the group consisting of propyl, butyl, and benzyl hydroxy benzoate.

Separation of higher fatty acids. Edwin W. Colt (Armour & Co.). *U. S. 2,443,184.* This invention relates to treatment of fatty acid mixtures to separate the same into portions containing differing kinds or proportions of the component acids of the mixture. More particularly the invention relates to processes wherein a fatty acid mixture is subjected to crystallization to obtain solid and liquid phases and wherein the mixture is pretreated to facilitate the separation of the acids in the crystallizing procedure.

Wax-oil separation with dehydration of solvent therefor. C. H. O. Berg. *U. S. 2,443,532.* This invention relates to a process of separating wax and oil from wax-oil mixtures by dehydrating the solvent used in the process.

Process for fat splitting. William K. Griesinger. *U. S. 2,442,925.* The present invention relates to the hydrolysis of fats and fatty oils and to agents for promoting same, and relates more particularly to the use of sulfonic acids of relatively high boiling polyalkylated benzenes in the splitting of such fatty materials.

Method of esterification. Johannes H. Bruun and John Harold Perrine. *U. S. 2,443,093.* The invention relates to a method of producing esters in which an organic acid is reacted with an alcohol in the presence of a catalyst under such conditions that a much higher than ordinary equilibrium is reached in a very short time, giving a high yield of good quality esters while employing reasonable quantities of reactants and catalysts.

Means of rendering animal fats. F. Schroeder. *U. S. 2,443,274.* This invention relates to a means and method of rendering animal fats and has for one of its objects the production of a simple and efficient means for passing the fats from one tank to another and draining off the rendered fats from the unrendered product.

Confectioners' hard butter prepared by low temperature interesterification. E. W. Eckey. *U. S. 2,442,536-7.* This invention relates to the preparation of confectioners' hard butter from vegetable oils.

Margarine oil production. Andrew Doyle Abbott (Procter & Gamble). *U. S. 2,442,538.* This invention relates to a process for the treatment of glyceride fats for use in edible products, and more particularly to a process for the treatment of predominantly unsaturated oils for use as a base stock in the manufacture of margarine.

Drying Oils

Edited by
ROBERT E. BEAL

Tall oil. W. A. Wachholtz. *Paint, Oil, Chem. Rev. 111,* No. 11, 28-31(1948). The pale glycerol ester of refined tall oil (acid value 10-15) air-dries overnight, bakes readily, and is useful as a check oil in tung oil varnish cooking. Most of the refined tall oil is consumed in alkyd manufacture. Treatment with acetylene produces a vinyl-like substance with better water resistance and drying speed than linseed oil. Fractional distillation can be used to separate nearly pure fatty acids having about the same composition as soybean oil acids but containing 10-15% of conjugated linoleic acid.

The influence of gaseous oxygen concentration and film thickness on the drying of linseed oil. P. Slansky. *J. Oil & Colour Chemists' Assoc. 31,* 161-76(1948). Films of linseed oil containing 0.1% Co catalyst air-dried faster with greater O_2 uptake, less iodine number decrease, less increase in refractive index, and less water resistance than similar films dried in an O_2-deficient atmosphere. When thick (40 microns) and thin (20 microns) films were examined in the same manner the thick films were more nearly comparable to those dried in an O_2-deficient atmosphere. Oxidation activates the double bonds and promotes more rapid oxidation if O_2 is available or a greater degree of polymerization in the case of thick films or those dried under an O_2-deficient atmosphere. A catalytic action not due to the presence of volatile decomposition products is shown to occur when two linseed oil films are allowed to dry with only a thin air space separating them. This action, which increases the drying rate, is believed to bear some relation to the fogging of photographic film by oxidizing oil films, which has been previously noted.

The physical and chemical treatment of drying oils. A. C. Elm. *Paint, Oil, Chem. Rev. 111,* No. 13, 11-19, 34-36(1948). The chemistry of dehydration, isomerization, blowing, and heat bodying in the production of improved drying oils is discussed with consideration of recent developments. Dehydration of purified ricinoleic acid yields equal amounts of conjugated and non-conjugated products. Equal amounts of the cis and the less easily oxidizable trans isomer are believed formed during dehydration or isomerization.

Chemical composition of the seeds of colliguaya intergerrima (duraznillo). A. R. Riganti, P. Cattaneo, and G. Karman. *Anales asoc. quim. argentina 35,* 21-33(1947). The dried seeds contain about 52% of drying oil, the principal chemical and physical characteristics of which are given. Fractional distillation of the methyl esters showed the major components to be oleic, linoleic, linolenic, and palmitic acids with minor amounts of myristic, stearic, arachidic, behenic, and palmitoleic acids. (*Chem. Abs. 42,* 3587.)

Argemone oil as a drying oil. G. S. Nanda and K. B. L. Mathur (Forman Christian Coll., Lahore). *J. Sci. Ind. Research (India) 6B,* 93-5(1947). Argemone oil dries slowly but with a drier composed of Pb 0.3%, and traces of Mn or Co as linoleates it gives a dry film in 24 hours. The drying time is shortened by dehydration of the oil, especially when bentonite and $KHSO_4$ are used as catalysts. (*Chem. Abs. 42,* 3587.)

PATENTS

Apparatus for polymerizing drying oils. L. J. Windholz, F. Windholz, R. Windholz, and M. Windholz. *France 859,924.* A drying oil is passed into a rotary heated cylinder, the polymerized product being stripped off by a scraper. (*Chem. Abs. 42,* 3590.)

Method of polymerizing non-wrinkling oils to wrinkling oils. G. M. Williams (New Wrinkle, Inc., Dayton, Ohio). *U. S. 2,441,738-9.* A non-wrinkling oil is heated in an inert atmosphere to 250° with allyl cobalt or to 300° with lead dipropyl to produce a wrinkling oil.

Drying oil-neoprene resins. C. E. Huff and J. H. Clynch (U. S. Rubber Co.). *U. S. 2,442,085-6.* A thermal copolymer is formed by heating together 100 parts of a drying or marine oil of 100-200 iodine number and 5-20 parts of polychloroprene or butadiene-1,3-styrene copolymer rubber at 400°F. until a homogeneous viscous resinous mass of suitable viscosity is obtained.

Copolymerization process. W. H. Lycan and H. L. Gerhart (Pittsburgh Plate Glass Co.). *U. S. 2,443,044.* An unsaturated glyceride oil is heated to 450-600°F. and cyclopentadiene, or polymers thereof up to the pentamer, is added while the temperature is maintained until the hydrocarbon has combined with the oil to form a naphtha-soluble polymer.

Synthetic drying oil. F. P. Otto (Socony-Vacuum Oil Co.). *U. S. 2,443,079.* Aromatic hydrocarbon material comprising largely dimethyl and trimethyl naphthalenes is catalytically hydrogenated to yield a product consisting largely of alkyl decalins. The product is chlorinated at 20-80° until 25-35% of Cl_2 has been added and subsequently dehydrochlorinated in the presence of Ca oxide until the Cl content has been reduced to about 4% by weight, to form a synthetic drying oil.

Soap

Edited by
LENORE PETCHAFT

Methods of testing irritant properties of soap upon the skin. John A. Killian and M. Elizabeth Marsh (Killian Research Laboratories, New York). *Proc. Sci. Sect. Toilet Goods Assoc.* No. 9(May, 1948). A standardized method of patch testing of toilet soaps is described. Squares of filter paper, which were saturated with freshly prepared soap solutions heated to 45°C., were applied to the subjects' arms and covered by Duke elastopatches. Patches were removed at varying periods of time and effects noted. The two primary factors are the length of time of contact of the soap solutions with the skin and the concentration of the soap solution applied to the skin. Another factor is the location of the patch. The results of varying time, soap solutions, and patch locations are reviewed.

Liquid hand cleaners. Milton A. Lesser. Soap Sanit. Chemicals *24,* No. 6, 37-40, 189, 191(1948). Liquid soaps are popular because of their convenience, sanitary form, and economy. Desirable properties of liquid soaps include clarity, neutrality, rapid lather production, good detergent action, satisfactory fluidity or viscosity and an agreeable but not too lasting odor. An important factor in this soap type is the concentration of soap, which will vary according to the use of the soap. Liquid soaps may be made in one of three ways: by saponification of oils, by reacting fatty acids with alkali, and by dilution of a prepared concentrated potash soap base. The clarity of the soap may be improved by such additives as glycerol, alcohol, or silicates, or the use of sequestering agents. New synthetic detergents may be used in place of the potash soap to prepare non-irritating cleaners. 34 references.

The quantitative analysis of synthetic detergents—extension of Igepon T method to various agents containing the sulfonic acid group. Dmitry A. Shiraeff (General Dyestuff Corp., New York). *Am. Dyestuff Reptr. 37,* 411-14(1948). A previously described method for the analysis of Igepon T has been applied to the analysis of other synthetics containing a sulfonic acid grouping if the product forms a water insoluble salt with a weak organic amine such as benzidine. This salt should be crystalline and easily filterable and soluble in some neutral organic solvent. The equation used in the determination is explained and examples given of the method adaptation in the analysis of Cyclopon A and an alkylaryl sulfonate type.

Non-ionic detergents. George E. Barker. *Soap Sanit. Chemicals 24,* No. 6, 46-8, 65(1948). The non-ionics have the following unique characteristics: decrease in solubility as temperature increases, compatability with water of any hardness without precipitation, low skin-defatting effect, low foaming ability and a pH near that of normal human skin. They also greatly increase the detergency of anionic detergents, particularly the alkylaryl sulfonates. The non-ionics may be used in commercial laundering where they have been found to be the best synthetics for cotton washing, in textile scouring, compounding built detergents for home laundering and dry cleaning detergents, in dishwashing, rug cleaning and compounding specialty cleaners.

Identification of cleaner ingredients. A Treffler. *Soap Sanit. Chemicals 24,* 43-5, 159(1948). Simple qualitative and quantitative tests for identification of alkali cleaners are reviewed. Preliminary tests might include microscopic analysis for crystalline forms of various alkalies, and sudsing test to indicate presence of soap or a detergent. A tannic acid color test will differentiate clearly between meta-, ortho-, pyro-, and other phosphates. Tests are also given for determination of moisture, pH, borax, phosphates, carbonates, and evaluation of detergency of soaps or synthetics either by the bottle suds test or the airotitrator.

Hydrocarbon sulfonylation. W. H. Lockwood (E. I. duPont de Nemours & Co., Inc., Deepwater Point, N. J.). *Chem. Ind. 62,* 760-3(1948). Aliphatic sulfonyl chlorides may be produced by the Reed process by reacting saturated hydrocarbons with sulfur dioxide and chlorine under the influence of actinic light. The mechanism of the reaction can be best explained on a free radical basis. The most important use of this reaction is in the production of surface active agents which are obtained by alkaline hydrolysis of the long chain sulfonyl chlorides.

The electrical conductance and density of solutions of potassium 9,10-dihydroxystearate and potassium stearate at 60°. N. W. Gregory and H. V. Tartar (University of Washington, Seattle). *J.*

Am. Chem. Soc. 70, 1992-5(1948). The electrical conductance and density of solutions of potassium 9,10-dihydroxystearate and potassium stearate in 0.001 N potassium hydroxide have been determined at 60°. Potassium hydroxide is used as a solvent to repress hydrolysis and obtain true readings. A comparison of data for the two compounds reveals that the hydroxyl groups have considerable influence in increasing solubility and conductance.

WHAT ARE THE FINANCIAL ADVANTAGES OF SAPONIFICATION WITH CARBONATE? J. Hetzer. *Seifensieder-Ztg. 73,* 23-5(1947).; *Chimie & Industrie 58,* 572 (1947). Use of K_2CO_3 instead of KOH for the manufacture of soft soaps offers no advantages and is even more expensive. For the preparation of soap and soap powders, the use of Na_2CO_3 instead of NaOH offers several advantages which are discussed. (*Chem. Abs. 42,* 4373.)

DETERMINATION OF THE FOAMING POWER OF SOAPS AND DETERGENTS. A. Noll. *Seifensieder-Ztg. 73,* 41-2 (1947); *Chimie & Industrie 58,* 276(1947). A new apparatus is used to eliminate subjective errors. A 250-cc. graduated cylinder (about 30 cm. tall, of which the upper 1/6 is ungraduated) is provided with a removable cover through which passes a rod to the bottom of which is fixed a perforated plate (12 5-mm. holes) with minimum clearance from the wall of the graduate. Place 50 cc. of the solution to be tested (e.g. 5% soap solution) in the graduate, put on the cover, read the level of the liquid, and raise and lower the perforated plate until the volume of foam remains constant. The results obtained are reproducible and vary widely with different products; e.g. with 5% solutions, a washing powder gave 77%; a powdered soap 175%, 2 ordinary soaps 208 and 274%, respectively, and a sulfonated fatty alcohol 360%. The method is simple, easy, and sensitive to differences in foaming power. The products are generally, but not necessarily, tested at a concentration of 5%. (*Chem. Abs. 42,* 3976.)

MERSOL AND MERSOLATE. H. Manneck. *Seifensieder-Ztg. 73,* 21-3(1947). Contrary to tensio-active sulfonates which, instead of the COOH groups of soap, contain a sulfonate radical combined to the hydrocarbon radical, not directly but through atoms or groups of atoms, in mersols the sulfonic radical is introduced directly into saturated hydrocarbons according to equation $RH+SO_2+Cl_2$, which corresponds to sulfochlorination. The raw materials used at the present time consist of a fraction obtained in the synthesis of hydrocarbons, b. 180-320°, containing 10-20 C, called Kogasin II. Neutral oils, fatty acids, cyclohexane, hydrogenation products of CO or water gas can also be used. Certain mersol derivatives also contain Se or Te instead of S. (*Chem. Abs. 42,* 4373.)

SORPTION OF CYCLOHEXANE VAPOR BY ALUMINUM DILAURATE. George W. Shreve (Stanford University, Calif.). *J. Colloid Sci. 3,* 259-61(1948). Two sorption-desorption isotherms were determined at 50°C. for the system aluminum dilaurate-cyclohexane. During the first run the aluminum soap remained in the gel form, but a transition from the gel to jelly form occured during the second sorption at 85% relative pressure. The jelly sorbed a great deal more cyclohexane at given vapor pressure than had the gel, indicating that the gel is metastable at least in the range 85-100% vapor pressure. Further, the jelly showed marked hysteresis during the desorption. In general, the form of the isotherms is similar to that observed for other jelly-forming colloids.

THE SOLUBILITY OF SODIUM SOAP IN ORGANIC SOLVENTS. A Bondi (Shell Development Co., Emeryville, Calif.). *J. Chem. Phys. 16,* 157-8(1948). Since Na soaps exhibit a m.p. and a series of transition points in the solid state, the ideal solubility curve changes its slope at many points. The ideal solubility curve for Na palmitate is compared with the solubility curves for Na palmitate in $p\text{-}MeC_6H_4OH$, $HOC_2H_4\text{-}OC_2H_4OH$, EtOH, $C_{16}H_{33}OH$, $C_4H_9NH_2$, $C_{16}H_{34}$, and Nujol, and for Na stearate in cyclohexane and PhEt, all at $\sim$ 315-390° abs. The ideal solubility of stearic acid is compared with its solubility in cyclohexane, BuOH, and MeOH, at $\sim$ 260-340° abs. The curves are discussed briefly; although presentation of soap solubility data in this manner simplifies the discussion of these complicated systems, it leaves many phenomena still unexplained. (*Chem. Abs. 42,* 3976.)