

Abstracts

Oils and Fats

Edited by
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NEUTRALIZATION OF PALM OILS. CHROMATOGRAPHICAL PROCESS. M. Loury. *Bull. mat. grasses inst. colonial Marseille* 27, 151-61 (1943); *Chem. Zentr.* 1944, I, 906. The literature on the subject is reviewed. Samples of peanut and palm oils, to which were added, resp., 20 and 31% free fat acids were used in the tests. The adsorbents tried were Al_2O_3 and silical gel; the solvents were C_6H_6 , trichloroethylene and petroleum ether. The latter was suitable because of its volatility. Al_2O_3 was a good adsorbent when the amount used was 10 times that of the free fat acids; however, recovery by elution was hindered, also as a base it combined chemically with the acids. With silica 3 times more was necessary or 30 times on the basis of the fat acids. The results showed no practicability. The necessary amount of adsorption agent was very large and the yield of neutral oil small. There was also the difficulty of elution of fat acids that require work with solvents. Conclusion: a practical realization of the process at least at present was not demonstrated. (*Chem. Abs.* 39, 3446.)

A NEW CUTTING-WIRE PLASTOMETER. APPLICATION TO VISCOUS AND PLASTIC MATERIALS. L. L. Lyon and R. D. Vold. *Ind. Eng. Chem., Anal. Ed.* 17, 585-90 (1945). The construction and operation of a cutting-wire plastometer suitable for use with substances of high viscosity are described, and typical results with asphalt and aqueous solid soaps are presented. Methods are given for the evaluation of the data in terms of yield values, elastic aftereffect, and viscosity.

THE BINARY SYSTEM STEARONITRILE-PALMITONITRILE. E. J. Hoffman, C. W. Hoerr and A. W. Ralston. *J. Am. Chem. Soc.* 67, 1542-5 (1945). The investigation of the system stearonitrile-palmitonitrile shows that mixtures of these compounds exhibit dimorphism, although no such behavior was observed in the case of the pure components. The α -form shows the formation of a compound containing one mole of each component, with a meritectic or incongruent melting point. The α -form can be obtained only by cooling a molten mixture of the nitriles. The β -form, which can be obtained only by transition from the α -form, exhibits the same type of system as the α -form. The α -form melts to form an isotropic liquid whereas the β -form passes through a series of mesomorphic states before producing an isotropic liquid.

PRESENCE OF ANTIOXYGENIC SUBSTANCES IN ANIMAL TISSUES. P. Dubouloz, M. F. Hedde and F. Rousset. *Compt. rend. soc. biol.* 137, 457-8 (1943). Substances (inhibitols) which retard the oxidation of vitamin A, as previously described, were found in the unsaponifiable lipide fractions from dog liver, lung, kidney, spleen, adrenals, nerves, red corpuscles, and serum; also in a mollusk and in yeast. They are soluble in cold MeOH. Liver, kidney, adrenal, and muscle tissues freed from lipide-soluble inhibitols by extraction with petroleum ether still contain water-soluble inhibitols, readily extracted by MeOH, which retard the oxidation of vitamins A and C. The most concentrated preparation obtained showed maximum ultraviolet absorption at approximately 270 $m\mu$. (*Chem. Abs.* 39, 3051-2.)

INVESTIGATIONS ON THE KEEPING QUALITY OF PORK FROM ANIMALS WHICH HAVE BEEN FED FEED CONTAINING SUGAR. Jens Madsen. *Nord. Jordbrugsforskning* 1943, 340-6. When hogs were fed 1-3 kg. of sugar in the feed the day before slaughtering, the meat and the liver were found to contain larger amounts of glycogen. After storage, the fresh meat had a fresh, very delicious taste. The lard had better surface color and could be kept twice as long as ordinary lard. (*Chem. Abs.* 39, 3598.)

SUBSTANCES ADSORBED ON THE FAT GLOBULES IN CREAM AND THEIR RELATION TO CHURNING. VI. RELATION OF THE HIGH-MELTING TRIGLYCERIDE FRACTION TO BUTTERFAT AND THE "MEMBRANE." R. Jenness and L. S. Palmer. *J. Dairy Sci.* 28, 653-8 (1945). High-melting triglyceride fractions of rather similar properties were obtained from butterfat, washed-cream buttermilk extracts and washed-cream butter-serum extracts by crystallization from ethanol. Fractions twice crystallized from ethanol had I numbers of 5.0-7.1, saponification numbers of 198.8-204.0 and melting points of 52-53°. Yields of this material from buttermilk extract were similar to those from butterfat solutions of like concentration but the yield from butter-serum extracts was invariably much greater. The significance of this finding has been discussed.

PROPIONIC ACID, SODIUM PROPIONATE AND CALCIUM PROPIONATE AS INHIBITORS OF MOLD GROWTH. I. OBSERVATIONS ON THE USE OF PROPIONATE-TREATED PARCHMENT IN INHIBITING MOLD GROWTH ON THE SURFACE OF BUTTER. J. C. Olson, Jr., and H. Macy. *J. Dairy Sci.* 28, 701-10 (1945). Parchment paper treated in 5% Ca propionate solution acidified to pH 5.5 with lactic acid was fully as effective in inhibiting mold growth on unsalted butter as parchments treated in 10% unacidified solution. Further, butter wrapped in parchments treated in the 5% acidified solution showed marked superiority in keeping quality, as judged by surface flavor over controls or other prints wrapped in parchments treated in unacidified solutions of higher concentration. No advantage was obtained by using a solution consisting of a mixture of either propionate with NaCl for the treatment of wrappers. Solutions of either propionate were superior to a saturated solution of NaCl for the inhibition of surface mold growth. Below 0°F. pre-storage of butter, wrapped in propionate-treated parchment, did not prevent subsequent protection against mold growth on storage at higher temperatures. Ca propionate-impregnated parchments were found to be effective only when used in dry wrapping. Immersing such paper in water before wrapping resulted in leaching the propionate from the paper and consequently a loss of effectiveness. Heating acidified or unacidified propionate solutions did not impair their effectiveness. The species of penicillium used was markedly more resistant to the inhibiting effect of the propionates than species of other genera studied.

THE FATS OF THE BACON PIG WITH REFERENCE TO CARCASS QUALITY. THE EFFECT OF DIET ON THE COMPONENT FAT ACIDS OF THE BACK FAT. F. B. Shorland and P. B. D. de La Mare. *J. Agr. Sci.* 35, 33-8 (1945).

The fat acid composition of the back fats of pigs whose basic diets were skim milk or buttermilk were determined. Pigs whose diets were supplemented with copra contained up to 13 mol. % of myristic acid, with smaller amounts of lauric acid. Experimental evidence supports the view that dietary linoleic acid is assimilated to a greater extent by slow-growing than by fast-growing pigs. Dietary lauric and myristic acids, however, appeared in greater proportions in the depots of fast-growing as compared with slow-growing pigs. The di- and polyethenoid C₁₈ acids of the fat of unsupplemented milk-fed pigs appeared not to contain appreciable amounts of linoleic acid. THE RELATION BETWEEN GROWTH RATE AND CHEMICAL COMPOSITIONS OF PIG DEPOT FAT. *Ibid.* 39-43. Evaluation of published data on the composition of pig depot fats shows that the Callow theory appears to explain the I value of fats both of groups of animals and of depots of an individual pig. When, however, the fat acid compositions of the fats are considered, the theory is untenable in respect to the depots of an individual pig. Differences in unsaturation between outer back fat, inner back fat and perinephric fat are essentially determined by differences in the ratio of oleic acid to stearic acid, differences in linoleic acid content being inconsiderable. The growth-rate curve theory does not explain data for depot fats of sheep. Differences between different depots both of the pig and of the sheep seem to be characteristic of the species and cannot readily be altered by altering either the quantity or quality of the diet. (*Chem. Abs.* 39, 2100.)

THE COMPOSITION OF RABBIT DEPOT FAT AFTER FEEDING OF A SATURATED FAT HAVING SOME ODD-NUMBERED C ATOM CHAINS. A. Hock. *Z. ges. expl. Med.* 113, 245-55 (1943). The rabbit assimilates fat acids of both even and uneven numbers of C atoms easily, so that a clear difference could not be detected between control and experimental animals. Even-numbered fat acids under C₁₄ were not stored, and of uneven-numbered acids the longest chains stored were small quantities of C₁₅ and C₁₇ acids, but the latter point cannot be established with certainty. (*Chem. Abs.* 39, 3339.)

ROLE OF UNSATURATED FATTY ACIDS IN CHANGES OF ADIPOSE AND DENTAL TISSUES IN VITAMIN E DEFICIENCY. H. Dam and H. Granados. *Science* 102, 327-8 (1945). The examination of the chemical nature of the enamel pigment has eliminated the possibility of its being a lipochrome, porphyrin or melanin. It is, therefore, also demonstrated that the highly unsaturated fatty acids in absence of vitamin E act on the enamel organ in such a way as to inhibit the deposition of the normal iron-containing layer, resulting in white appearance of the enamel surface.

THE FORMATION OF MONO- AND DI-GLYCERIDES DURING THE HYDROLYSIS OF TRIGLYCERIDE BY PANCREATIC LIPASE. A. C. Frazer and H. G. Sammons. *Biochem. J.* 39, 122-8 (1945). During the first 5 hr. of pancreatic lipolysis of olive oil no free glycerol can be demonstrated and the acetyl value of the glyceride fraction rises from 5-64. No significant glycerol destruction can be demonstrated during the first 5 hr. of pancreatic lipolysis. Material recovered from the intestines of a group of 12 rats shows a proportion of lower glycerides comparable to the *in vitro* experiments. It is concluded that fatty acids and di- and monoglycerides are the only products of hydrolysis of olive oil by pancreatic lipase during the first 5 hr.

of digestion. The partial hydrolysis of glycerides, demonstrable during the first 5 hr. of lipolysis, is in accord with the Partition Hypothesis of fat absorption, but not with the Lipolytic Hypothesis. It is suggested that lower glycerides may form the basis for the formation of phospholipid at the oil-water interface in the intestinal cell.

HEMOLYTIC ANEMIA PRODUCED BY THE FEEDING OF FAT AND CHOLINE. J. E. Davis and J. B. Gross. *Am. J. Physiol.* 144, 444-6 (1945). The administration of 2 doses each, daily, of 60 g. of fat and 10 mg. per k. of choline chloride to 3 normal dogs caused rapid reductions of 20-37% in their erythrocyte counts, accompanied by significant elevations of icteric indices. The addition of ¼ lb. of butter and 400 mg. of choline to the breakfasts of 2 human subjects caused depression of their red blood cell counts during the following 36 hours, succeeded by a subsequent reticulocytosis.

INFLUENCE OF NORMAL AND LOW-FAT DIETS UPON THE EXCRETION OF LIPIDES. J. E. Sola. *Rev. asoc. argentina dietol.* 2, 267-76 (1944). Five human subjects were fed a normal diet, balanced in all respects, for 20 days; they were given a diet, equally balanced except that carbohydrates replaced the lipides. No relation was found between the quantity of lipides ingested and those eliminated, or the weight of the feces or dried extracts. On either type diet the quantities of lipides excreted were equal. Analyses of fractions of the lipide extract of feces seemed to indicate a redistribution, the fat acids being higher and the neutral fats lower in extracts from normal-diet feces than those from low-fat-diet feces. The lipides excreted seemed to be entirely of endogenous origin. (*Chem. Abs.* 39, 3341.)

THE DIETARY PRODUCTION OF FATTY LIVERS RESISTANT TO THE ACTION OF CHOLINE. M. L. MacFarland and E. W. McHenry. *J. Biol. Chem.* 159, 605-9 (1945). The administration of a beef liver fraction to rats maintained on a high carbohydrate, fat-free diet causes the production of fatty livers resistant to choline, but the liver fat can be reduced to low levels by supplying inositol. The use of biotin in place of the liver fraction causes fatty livers which are partially responsive to either lipotropic agent and completely prevented by a conjoint supply of choline and inositol.

PARENTERAL NUTRITION. I. STUDIES ON FAT EMULSIONS FOR INTRAVENOUS ALIMENTATION. J. M. McKibben, A. Pope, S. Thayer, R. M. Ferry and F. J. Stare. *J. Lab. Clin. Med.* 30, 488-97 (1945). Corn-oil emulsions of fine particle size have been prepared with a number of different stabilizers, including Igepon T, cetylphosphoric acid, edible gelatin, pharmaceutical gelatins, infusion gelatins, commercial soybean phosphatides, and purified soybean phosphatides. Emulsions prepared with all but the last 2 stabilizers produced severe or fatal reactions when infused into dogs in amounts to equal the usual caloric intake or less. The use of commercial soybean phosphatides produced hemolysis and urticaria, whereas the purified preparation produced only minor changes. Refined coconut-oil emulsions stabilized with purified soybean phosphatides have so far been the most successful in infusion studies. (*Chem. Abs.* 39, 3817.)

THE FUNGISTATIC AND FUNGICIDAL ACTION OF FATTY ACIDS AND RELATED COMPOUNDS. O. Wyss, B. J. Lud-

wig and R. R. Joiner. *Arch. Biochem.* 7, 415-25 (1945). A number of saturated and unsaturated fatty acids and related compounds were tested for their fungistatic and fungicidal activity. The long chain saturated and unsaturated fatty acids were superior to other acids and related derivatives both in their inhibition of fungous growth and killing of fungous spores.

THE HYDROLYSIS OF FATS BY MEANS OF PHOSPHORIC ACID. Xavier Gueniot. *Bull. mat. grasses inst. colonial Marseille* 27, 167-74 (1943); *Chem. Zentr.* 1944, I, 1444. Fat is hydrolyzed with H_3PO_4 . The speed of hydrolysis depends on the acid concentration up to a maximum of 12% acid; at which hydrolysis is obtained in 2 hrs. at 200°. The reaction is slow at the start, accelerates and then toward the end strives asymptotically to a maximum. Up to 150° there is almost no hydrolysis; above that the reaction is significant. Reagents that usually improve hydrolysis have little influence, except that bentonite improves it considerably. Glycerides of lower fat acids are hydrolyzed more easily than those of higher fat acids; glycerides of unsaturated acids more easily than those of saturated acids. The presence of phosphatides promoted hydrolysis; slime and pectins hindered it. The fat acids obtained are clear and their molecular structure is unchanged. Glycerol can be completely recovered. The speed of the reaction is equal if not greater than that of the other best processes. The application of H_3PO_4 in place of H_2SO_4 for hydrolysis, therefore, appears advantageous. (*Chem. Abs.* 39, 3444.)

PATENTS

REGENERATION OF CATALYTIC MATERIAL. F. E. Frey (Phillips Petroleum Co.). *U. S.* 2,381,659. A process for the regeneration of sulfurpoisoned solid contact metal and metal oxide hydrogenation catalysts com-

prises contacting the catalyst with a solution of one metal nitrate to convert water insoluble S to a soluble form, roasting the catalyst in air at 600-700°F. to drive off gases and form oxides, cooling the catalyst and contacting it with an aqueous solution of an alkali metal carbonate to convert soluble salts of the catalyst metal to insoluble carbonates, washing away the soluble material with water, and drying the catalyst prior to re-use.

MINERAL OIL COMPOSITION AND IMPROVING AGENT. O. M. Reiff and J. J. Glammara (Socony-Vacuum Oil Co., Inc.). *U. S.* 2,357,359. An improved mineral oil composition contains a minor proportion of a phosphite ester of wax-substituted phenol carboxylic acid. The pour point and viscosity are improved.

FLOTATION REAGENT. E. H. Hoag. *U. S.* 2,371,292. A flotation reagent for the concentration of barite ores comprises tall oil, lauric-acid-ester-diethylene glycol-ammonium sulphate and an alcohol selected from the group consisting of hexanols, heptanols, octanols, non-anols, decanols and dodecanols.

PETROLEUM DEMULSIFIERS. M. De Groote and B. Keiser (Petrolite Corp., Ltd.). *U. S.* 2,381,576-7. These are certain subresinous esterification derivatives of acylated polyamines.

PETROLEUM DEMULSIFIERS. M. De Groote and B. Keiser (Petrolite Corp., Ltd.). *U. S.* 2,381,115-6. These are certain subresinous esterification derivatives of high molal hydroxy acid amides.

PETROLEUM DEMULSIFIERS. M. De Groote and B. Keiser (Petrolite Corp., Ltd.). *U. S.* 2,381,117. These are ester-linked acyl amides.

PETROLEUM DEMULSIFIERS. M. DeGroote and B. Keiser (Petrolite Corp., Ltd.). *U. S.* 2,381,118. These are certain ester-linked acylated derivatives of poly-amino ether alcohols.

Abstracts

Drying Oils

Edited by
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OPTICICA OIL IN THE PAINT INDUSTRY. L. Huffman. *Am. Paint J.* 29, No. 50, 48-54 (1945). A review.

THE FUTURE OF SOYBEAN OIL. O. H. Alderks. *Chem. Eng. News* 23, 1168-70 (1945). A review; 19 references.

SATURATED FATTY ACIDS OF TALL OIL. H. Bergstrom and K. G. Trobeck. *Svensk Pappenstidn.* 48, 302 (1945). A brief note indicates the possible existence of carnaubic acid ($C_{24}H_{48}O_2$) in tall oil. (*Chem. Abs.* 39, 4238.)

RESEARCH DEVELOPMENTS IN SOYBEANS AT THE NORTHERN REGIONAL RESEARCH LABORATORY. A. K. Smith and J. C. Cowan. *Soybean Digest* 5 (11) 43-44 (1945). A method for conjugating soybean and other oils by heating them with a carbon-black nickel catalyst is described. The treated oils, called "Norconols," contain 30 to 35 percent conjugation. In the case of soybean oil, the treated oil sets-to-touch 2 to 3 times faster than alkali-refined soybean oil, and its polymerization rate is approximately equal to that of linseed oil. The use of soybean meal as an extender for phenolic resin plywood glue is also described.

DRYING OILS FROM SORBITOL AND LINSEED FATTY ACIDS. J. D. Brandner, R. H. Hunter, M. D. Brewster and R. E. Bonner. *Ind. Eng. Chem.* 37, 809-12 (1945). Sorbitol was esterified with linseed fatty acids, and the rate of reaction and degree of esterification were determined. The rate of reaction was measured by the first-order rate constant and was found approximately to double when the temperature was raised from 180° to 200° C. The rate also increased with an increase in the ratio of linseed fatty acid to sorbitol, and acetates, carbonates, oxides and hydroxides of calcium and barium were effective catalysts. About 0.5% of a mixture of calcium acetate (3 parts) and barium acetate (1 part) approximately doubled the rate for all ratios of fatty acid to sorbitol. The degree of esterification increased with an increase in the ratio of fatty acid to sorbitol and increased with a decrease in reaction temperature. Sorbitol drying oils of different degrees of reaction were reduced, by vacuum stripping, to approximately equal acid numbers of 8.8 to 11.2, and phenolic varnishes were prepared from each and compared. Only slight improvement in the properties was found for varnishes from oils