Abstracts

Oils and Fats

Edited by
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Gossypol and its possible uses. K. S. Murty and T. R. Seshadri. *Indian J. Pharm. 4,* 153-7, 163 (1942). The properties and constitution of gossypol are reviewed. Its use as a dye and as a therapeutic substance are briefly mentioned. Experimental work by M. and S. shows that a kerosene solution of the Et_2O extract of fat-free cottonseed is an effective spray against white ants and bugs, but not against ants. In a concentration of 0.025 g. per 1500 ml. H_2O, it killed small fresh-water fish in about 30 min. (*Chem. Abs. 40,* 3219.)

Symposium on chromatography. General principles of chromatographic analysis. F. A. Robinson (Glaxo Lab., Ltd., Greenford, Middlesex). *Analyst 71,* 251-5 (1946). Partition chromatography. R. L. M. Synge (Lister Inst. Preventive Med., London). *Ibid.* 256-8. Chromatography in the analysis of fatty oils. K. A. Williams (6, Milner St., London). *Ibid.* 259-63. Some applications of chromatographic analysis in industry. F. R. Cropper (Imp. Chem. Industries, Ltd., Blackley, Manchester). *Ibid.* 263-5. Discussion on the four preceding papers. *Ibid.* 265-7.

The dielectric constants and absorption coefficients of fatty acids and triglycerides. N. Stepanenko and T. Novikova (Zagorsk State Pedagogic Inst.). *Acta Physicochim. U.R.S.S. 20,* 653-66 (1945). The dielectric constants and absorption coefficients were determined at a wave length of 3.44 m at temperatures from —60° to 100° for stearic, oleic, and linoleic acids and for tristearin and triolein. Various proposed formulas were tried for relating the results to the dipole moments of the same compounds measured in solution, but all failed, presumably because of molecular association (*Chem. Abs. 40,* 2705).

A method which permits the simultaneous determination of fat and sugars in pastry products. J. Terrier (Lab. cantonal, Geneva). *Mitt. Lebensm. Hyg. 36,* 398-401 (1945). The solubility of glucose, fructose, and sucrose in 90% EtOH is high enough to permit their extraction and determination together with that of the alcoholic soluble lipides. Method is given. (*Chem. Abs. 40,* 3535).

Determination of the hydroxyl number (acetyl number) of fats containing mono- and diglycerides or fat acids. Jacques Houget (Inst. biol. physicochim., Paris). *Bull. soc. chim. 11,* 139-41 (1944). The hydroxyl no. of fats is determined after free fat acids are esterified with MeOH. (*Chem. Abs. 40,* 3007.)

The oxidant effect of commercial salt in fats and oils. G. L. Hills and J. Conochie (Div. of Ind. Chem. Fishermen's Bend, Port Melbourne, Victoria). *J. Council Sci. Ind. Research 18,* 355-65 (1945). Commercial dairy salt prepared from seawater accelerated the oxidation of dry butterfat, lard, and beef fat, and of maize oil and peanut oil to a lesser extent. Imported salts, probably derived from rock salt, showed less activity. The oxidant action was due to traces of $MgCl_2$, which appeared to act as a heterogeneous catalyst. Chlorides of Ca, Al, Zn, and Be were similarly active. Grinding salt with 0.5% of Na_2CO_3 greatly reduced the oxidant action. Commercial salt in solution also accelerated the oxidation of incubated butterfat containing dispersed brine and of cold-stored butter, but this acceleration was not due to $MgCl_2$. (*Chem. Abs. 40,* 3623.)

Effect of growth of microorganisms upon formation of peroxides, free fatty acids, aldehydes, and ketones from oils with different iodine numbers. J. Hejna and L. R. Hedrick (Illinois Inst. Tech., Chicago). *J. Bact. 51,* 601 (1946). In coconut oil emulsion, most free fat acids were formed by *Aspergillus,* least free fat acids by *Pseudomonas*; peroxides, greatest reduction by *Aspergillus* and least reduction with *Pseudomonas.* With soya bean emulsion, most free fat acids were formed by *Penicillium,* least by *Serratia* (with NDGA); peroxides, greatest reduction by *Pseudomonas* (with NDGA); and least reduction with *Aspergillus.* In olive oil emulsion, most free fat acids were formed by *Serratia,* least free fat acids were formed by *Pseudomonas;* peroxides, greatest reduction by *Pseudomonas* (with NDGA) and least reduction with *Aspergillus.* There was no correlation between the rancidity detected organoleptically and the results of the chemical tests performed.

The oxidation of unsaturated fat acids by plant juices. H. Sullmann (Univ. Basel, Switzerland). *Experientia 1,* 323-4 (1945). Extracts from various parts (belonging to Solanaceae and Labiatea), and including root nodules of different leguminous plants, were able to accelerate the oxidation of unsaturated fat acids. These observations might have relationship to the metabolism of other biologically important substances (e. g. carotenoids, chlorophyll, phenolic compounds) in the plant. (*Chem. Abs. 40,* 3505.)

Hydrogenation of (plata, cold pressed) linseed oil. L. Palfray and R. Delaplanche (Inst. Catholique, Paris). *Industries corps gras 2,* 36-40 (1946). Hydrogenation was according to Palfray and at various temperatures between 18 and 70°. The relation between temperature of hydrogenation and I no., SCN no., solidification point, $d^{62°}$, $n^{62°}$, and % of various fat acids was tabulated and graphically presented. The oleic, linoleic, linolenic, and saturated acids present in the mixed acids of the various samples were: initial oil 7, 67, 17, 9%; sample hydrogenated at 18°, 16, 57, 17, 9%; *ibid.* at 32°, 30, 53, 8, 9%; *ibid.* at 44-45°, 49, 32, 0, 19%; *ibid.* at 54°, 54.6, 18.4, 0, 27%; *ibid.* at 61°, 42.5, 8.5, 0, 49%; *ibid.* at 75-77°, 7, 5, 0, 88%. Changes in composition were best illustrated by curves on one graph showing the progressive changes with higher temperatures of hydrogenation.

The replacement of stearic acid by palm oil. Soc. anon. des matières colorantes et produits chimiques de Saint-Denis. *Rev. gen. caoutchouc 18,* 320-1 (1941). Palm oil (I) and stearic acid (II) were compared in 2 rubber mixtures. In each type of mixture 1% of II and 1.5% of I gave about the same quality at the optimum state of vulcanization, but the mixtures containing I were more sensitive to overcuring than were those containing II. The particular grade of I used had an acid no. of 92.5 and a saponification no. of 75.5. (*Chem. Abs. 40,* 3017.)

THE QUESTION OF THE TOXICITY OF WHEAT GERM OIL. R. Lecoq (Lab. Hop. Saint-Germain-en-Laye). *Compt. rend. soc. biol. 137,* 76-7 (1943). Wheat germ oil tends to become rancid very rapidly and it also has been reported by McCollum and co-workers that wheat germ is toxic when given over a long period. Young rats were given a diet of untreated or of defatted wheat germ with addition of 1% $CaCo_3$ and 1.5% NaCl. After 100 days the animals having the defatted germ were in very poor condition and those having the untreated germ were well though their growth was slightly subnormal. This would be accounted for by the diets being rather low in protein and minerals. There was no evidence of toxicity. [*Nutr. Abs. & Revs. 15,* 447 (1946.)]

AN IMPROVED METHOD FOR QUANTITATIVE IMPREGNATION OF TEXTILES WITH GERMICIDAL EMULSIFIABLE OILS. Research Staff (U. S. Navy Med. Res. Unit No. 1, Berkeley, Calif.). *Science 104,* 60-1 (1946). Oil treatment of bed clothes to help control of respiratory infections is discussed.

PROOFS OF THE POSSIBILITY OF AN ADSORPTION OF THE GROWTH FACTOR PRESENT IN THE FATTY ACIDS OF SUMMER BUTTER. J. Boer, B.C.P. Jansen, A. Kentie, and H. K. Oosterhuis. *Arch. neerland. physiol. 28,* 57-72 (1944). Rats which received the fatty acids of summer butter with a diet giving optimal growth grew better than rats fed with the same diet but with other fatty acids. The increase in growth could not be observed if the basal diet consisted of wheat, rye, or potato flour or if the fatty acids of the summer butter were stirred with fuller's earth. It is concluded that a new growth factor is present in these fatty acids. It is different from vitamin F and is possibly adsorbed by fuller's earth. For the saponification of more than 500 g. butter without loss in activity it is recommended to proceed as follows: Cool the melted butter to 30°, add 55 g. KOH in 30 cc. water, and 1 cc. EtOH. Stir until the temperature does not increase more, add 1.5-1.6 l. of water and stir until the mass is homogeneous. Add 2 l. Et_2O and extract in a percolator. (*Chem. Abs. 40,* 3509-10).

A NOTE ON THE EFFECT OF TINPLATE AND OF LACQUERED SURFACES ON THE OXIDATIVE DETERIORATION OF BUTTERFAT. C. H. Lea (Low Temp. Sta., Cambridge). *J. Soc. Chem. Ind. 65,* 136-8 (1946). Little difference was observed in the storage life of butterfat when packed in sealed tinplate and in lacquered containers. Dispersed as very thin films of the order of 0.02-0.06 mm. in thickness, butterfat was considerably less stable on a tinplate surface than on lacquered blackplate, on "fruit" or "meat" lacquered tinplate or on glass. These observations are discussed in connection with parallel experiments on spray dried full cream milk powder, for which, on a number of occasions, better keeping properties have been observed in lacquered than in plain tinplate containers, particularly at high storage temperatures.

DISTRIBUTION OF CHOLESTEROL, CHOLESTEROL ESTERS, AND PHOSPHOLIPID PHOSPHORUS IN NORMAL BLOOD. F. F. Foldes and A. J. Murphy (Harvard Med. School, Boston). *Proc. Soc. Exptl. Biol. Med. 62,* 215-18 (1946). Total cholesterol, cholesterol esters, and phospholipid P were determined simultaneously in blood cells and plasma on 20 young healthy adults and 20 old patients with no known disorder of lipid metabolism. Practically no difference was found in the lipid values of the 2 age groups. Various ratios have been calculated from the lipid values determined. The possible importance of similar studies under pathological conditions is pointed out.

DISTRIBUTION OF CHOLESTEROL, CHOLESTEROL ESTERS, AND PHOSPHOLIPID PHOSPHORUS IN BLOOD IN THYROID DISEASE. F. F. Foldes and A. J. Murphy (Harvard Med. School, Boston). *Proc. Soc. Exptl. Biol. Med. 62,* 218-23 (1946). The plasma cholesterol, plasma cholesterol ester, and plasma phospholipid P were found to be significantly increased in hypothyroid patients. The changes of the plasma lipids were less consistent in hyperthyroidism. The plasma phospholipid P alone showed a significant decrease. The cell lipid values were found relatively constant both in hypo- and hyperthyroidism. Definite changes were also found in the different lipid ratios in hypothyroidism. The plasma cholesterol ester/total cholesterol ratio and the plasma cholesterol/plasma phospholipid P ratio were significantly increased. The cell cholesterol/plasma cholesterol and the cell phospholipid P/plasma phospholipid P ratios were significantly decreased.

THE RELATION OF THE DIET TO THE COMPOSITION OF TISSUE PHOSPHOLIPIDES. VI. LIVER LECITHIN AS RELATED TO THE CHOLINE AND FAT CONTENT OF THE DIET. W. H. Fishman and C. Artom (Wake Forest College, Winston-Salem, N. C.). *J. Biol. Chem. 164,* 307-12 (1946). Two-month old rats were maintained for 19 days on experimental diets in which the percentage of fats was varied from 0-40%. At this time, the livers of all the animals contained large amounts of neutral fats and low levels of total and choline- containing phospholipides. When low fat diets were supplemented, after 7 days, with choline, the phospholipide values were only slightly affected. On the other hand, when choline was added to diets containing 20% or more fats, the levels of choline phospholipides in the liver were as high as the corresponding values found in the liver of animals on a stock diet. This increase in the choline phospholipide fraction was accompanied by a decrease in the values for non-choline phospholipides. It appears that, under the conditions of these experiments, the level of lecithin in the liver is dependent on the dietary supply of both choline and fat.

A QUANTITATIVE STUDY OF THE PRODUCTS OF FATTY ACID OXIDATION IN LIVER SUSPENSIONS. A. L. Lehninger (Univ. Chicago). *J. Biol. Chem. 164,* 291-306 (1946). A washed rat liver enzyme suspension, in the presence of adenosine triphosphate, Mg ions, and malonate, oxidizes octanoate completely to acetoacetate, according to the equation $C_7H_{15}COOH + 3O_2 \rightarrow 2CH_3COCH_2COOH + 2H_2O$. There is no endogenous oxidative activity. This enzyme suspension, in the presence of ATP, Mg ions, and malonate, and in the absence of oxalacetate, oxidizes pyruvate quantitatively to acetoacetate, according to the equation $2CH_3COCOOH + O_2 \rightarrow CH_3COCH_2COOH + 2CO_2 + H_2O$. In the presence of oxalacetate, however, the yield of acetoacetate is diminished and extra citrate accumulates, evidence of the occurrence of the "Krebs condensation." When fatty acids are oxidized by the enzyme in the presence of fumarate and malonate, the yield of acetoacetate is diminished and extra citrate, α-ketoglutarate, and succinate accumulate in such amounts as to account quantitatively for the C of the fatty acid diverted from acetoacetate production. Acetoacetate does not form citrate in the presence of oxalacetate and ATP, indicating that the formation of citrate from fatty acid involves some precursor of acetoacetate. Odd C fatty acids are oxidized and form acetoacetate and citrate at approximately the same rates as their even C neighbors.

PATENTS

PROCESS FOR MAKING MARGARINE. J. Stanley (American Lecithin Co.). *U. S. 2,402,690.* A process for producing margarine of improved smoothness and texture, and improved anti-spatter and anti-leak properties comprises incorporating therein at any stage in the process of manufacture an aqueous imbibition of vegetable phosphatide and monoglyceride dispersed in edible oil.

HYDROXYLATION OF UNSATURATED FATTY COMPOUNDS. N. A. Milas (Research Corp.). *U. S. 2,402,566.* Process of producing 9,10-dihydroxy stearic acid comprises treating oleic acid, at a temperature below normal room temperature, with a substantially anhydrous solution of H_2O_2 in an inert organic solvent medium and in the presence of a catalytically active oxide of metal which forms unstable peracids, and recovering 9,10-dihydroxy stearic acid from the resulting reaction mixture.

METHOD OF PRODUCING NEUTRAL ESTERS OF MOLECULARLY DEHYDRATED PHOSPHORIC ACIDS. W. H. Woodstock (Victor Chemical Works). *U. S. 2,402,703.* The method of producing neutral alkyl tripolyphosphate esters comprises reacting 5 moles of trialkyl orthophosphate ester with 2 moles of P_2O_5.

DEMULSIFIER. M. De Groote (Petrolite Corp., Ltd.). *U. S. 2,400,393.* The product consists of oxyalkylated lower alkyl esters of a polymerized polyethylenic higher fatty acid and oxyalkylated sulfurized lower alkyl esters of a polymerized polyethylenic higher fatty acid; the alkyl radical of the lower alkyl esters containing not over 8 C atoms.

BREAKING PETROLEUM EMULSIONS. M. De Groote and B. Keiser (Petrolite Corp., Ltd.). *U. S. 2,400,394-5.* The new material that is used as the demulsifier consists of the reaction product involving 2 moles of a 1,2-disubstituted glyoxalidine and one or more moles of urea or the equivalent thereof.

BREAKING PETROLEUM EMULSIONS. R. A. Salathiel (Standard Oil Development Co.). *U. S. 2,401,966.* A method for resolving a water-in-oil emulsion comprises adding to it, a substance obtained by reacting bodied fatty oils and fatty acids with a polyethylene glycol containing at least 8 C atoms.

DEMULSIFIER. M. De Groote, B. Keiser, and A. F. Wirtel (Petrolite Corp.). *U. S. 2,403,343-5.* Special sub-resinous derivatives of fat acids with other organic compounds are described. They are intended for demulsification of petroleum.

INTERMEDIATE FOR AN INSECTICIDE. M. W. Farlow and W. A. Lazier (E. I. duPont de Nemours & Co.). *U. S. 2,402,541.* This invention relates to the manufacture of N-iso-butylundecylenamide by the pyrolysis of N-iso-butylricinoleamide.

TARNISH PREVENTION OF SILVERWARE. J. B. Rust (Montclair Res. Corp.). *U. S. 2,400,784-6.* A process for protecting silverware from tarnishing comprises depositing on the surface thereof thin continuous films of a fat acid salt of a primary aliphatic amine, polyethylene, polyamine, guanidine or substituted guanidines.

MANUFACTURE OF HIGHER FATTY ACID ESTERS OF CELLULOSE. J. W. Fisher (British Celanese, Ltd.). *U.S. 2,400,494.* Process for purifying cellulose esters of higher fatty acids which are contaminated with free higher fatty acid and cellulosic impurities comprises removing the free fatty acid without at the same time removing substantial amounts of cellulosic impurities from the cellulose ester by treatment with aqueous Et alcohol of concentration 65-75% by weight at a temperature of 35-50°.

REFINING USED CUTTING OILS. R. P. Dunmire (Buckeye Labs. Corp.). *U. S. 2,401,338-41.* Cutting oils and oil sludges from steel rolling comprising petroleum and lard or other fatty oils are refined by treatment with adsorbent under vacuum, volatile material is removed by distillation, the high boiling impurities are adsorbed by the solid adsorbent and the oils are recovered.

REFINING LUBRICATING OIL ADDITIVES. V. L. Chechot and L. S. Howe (Atlantic Refining Co.). *U. S. 2,401,-614.* The method of removing solid materials from an oil solution of an alkaline earth metal sulphonate having relatively poor filtering characteristics comprises mixing with the solution an organic solvent from the group consisting of aliphatic alcohols, glycols, and glycol ethers in a small but sufficient amount to lower the viscosity of the solution, and filtering the solution through a filtering medium capable of retaining the solid materials.

METHOD OF TREATING OILS. K. M. Laing (Aluminum Co.). *U. S. 2,403,088.* The method of treating vegetable and mineral oil lubricants comprises contacting the oil with an adsorbent composed of alumina and fuller's earth proportioned in ratio of not less than about 1 and not more than about 5 parts of alumina to 1 part of fuller's earth, the alumina being an adsorptive product prepared by heating within the range of 250-800° a substance selected from the group consisting of Al hydrates and alumina in gelatinous form containing free or loosely held water.

PURIFYING FAT ACID NITRILES. A. W. Ralston, L. T. Crews, and E. W. Colt (Armour and Co.). *U. S. 2,401,772.* The process of purifying a fatty acid nitrile comprises heating the nitrile with a small amount of maleic anhydride and washing the thus treated nitrile with water.

ANTICORROSION COMPOSITION. J. J. Miskel (National Oil Products Co.). *U. S. 2,403,293.* An anticorrosion coating composition for metals comprises chiefly mineral oil and a minor proportion as an anticorrosive agent of a fatty amido-amine containing fatty chains.