oil was recovered in the milling process to pay several times over for the drying process. The drying cost was calculated as $2.25 per ton. The extra oil obtained per ton of tung fruits amounted to 17.8 pounds, which, at 35 cents per pound, was worth $6.24. This leaves a balance of $3.99 extra profit per ton of tung fruit processed, which would soon pay for the drying equipment. It should be noted that a tray-type dryer of a different design than the above has been used for the drying of tung fruit broken into segments with satisfactory results.

At the time this study was made it was believed that the tung hulls could not be separated from the rest of the fruit if they contained more than 20% moisture. However, since that time one of the tung oil mills has successfully hulled moist tung fruit, the hulls of which probably contained 40 per cent moisture; no difficulty was encountered in obtaining a good separation.

In conclusion, it might be well to point out that, so far as we know, every tung oil mill now located in the South is making a real effort to obtain maximum tung oil yields. This objective is not easy to attain. At times, the fruits processed may be too wet, or too dry, or too old, for maximum tung oil yields. However, it is our hope that, as we learn more about the influence of various factors on the yield of tung oil at the mill, the benefits resulting from this knowledge will be passed on to the tung fruit producers in the form of increased returns from higher tung oil yields on their crops of tung fruits.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

The composition of the depot fats of aquatic animals. J. A. Lovern. Dept. Sci. & Ind. Research. Food Invest. Sp. Rpt. No. 51, 72 pp. (1942). The fat of most aquatic animals is derived mainly from ingested fat, and this accounts for the generally similar type of fat found throughout the whole range of species studied. It also accounts for the differences between the fats of freshwater and marine forms. Superimposed on this general type are various modifications which are more or less restricted to groups of closely related species, and the development of these specific types is closely bound up with the evolutionary history of the animals in question. The modifications themselves have been brought about by the selective operation of one or two processes, which function to widely varying extents and along different lines in different species. In some animals one or more of these mechanisms may not be in evidence at all. By means of a reversible hydrogenation/dehydrogenation process, fatty acids of the same number of carbon atoms, whether saturated, monoethylenic or polyethylenic, are interconvertible. Fatty acids may be converted into aliphatic alcs. and triglycerides into alkoxy-diglycerides. There may also be a selective production of fully-saturated glycerides. By processes of synthesis or degradation, fatty acids may be converted into derivatives of longer or shorter chain length. The mobiliation of depot fat is largely nonselective, but in some cases there may be a slight tendency to preferential mobilization of small molecules or of the more unsaturated constituents.

Rept. U. S. vegetable oil mission to Brazil, 1942, 117pp. The report contains statistical data on exports, production and amt. available, information on equipment, transportation and labor, and recommendation for increasing supplies of oils from this source.

Reagents for the determination of the tendency of fats to become rancid. Ch. S. Goreglyad. *Lab. Prakt. (U.S.S.R.), Sammelband 1938*, 72 (Pub. 1939); Chem. Zentr. 1940, I, 3722—With a view of finding a cheap reagent for testing the peroxide content of fats, expts. were carried out with phenol, picric acid, quinine, pyrogallol, etc. The last was found to be useful for the purpose when used in 1% ether soln. The following method is given: 2 c.c. of the melted fat is cooled to 45°, shaken with 1 c.c. HCl (d.1.19) and treated with 8-10 drops of pyrogallol soln. If the fat is rancid, a raspberry-red ring develops after 1-8 min. When an acetone soln. of pyrogallol was used a yellow ring developed after 10-15 min. However, it was difficult to detect this ring if the fat was also yellow. *(Chem Abs.)*

A rapid method of measuring the unsaturation of hydrogenated fats. H. Jasperson. *J. Soc. Chem. Ind. 61*, 115-17 (1942). Reagents—0.5-1.0% Br$_2$ by volume in glacial HAc. 2½% Hg(OAc)$_2$ in glacial HAc. 10% KI in aq. 0.1N Na-thiosulfate. CHCl$_3$, starch soln. Procedure—0.3-1.0 g. fat is weighted in flask and dissolved in 15 c.c. CHCl$_3$. After addg. 20 c.c. of Hg(OAc)$_2$ soln., titrate directly with Br reagent until color is faint yellow. The concn. of reagent is detd. by adding 5-10 c.c. into 20 c.c. KI soln., adding 15 c.c. CHCl$_3$ and 20 c.c. Hg(OAc)$_2$ soln. and titrating the I$_2$ liberated.

Boiling points of n-alkyl acids. W. O. Pool and A. W. Ralston. *Ind. & Eng. Chem. 34*, 1104-5 (1942). Freezing point and boiling point curves are presented for the satd. fat acids C$_6$ to C$_{18}$.

High-molecular-weight fatty acid derivatives. II. Sulfides, sulfoxides and sulfones. Byron A. Hunter. *Iowa State Coll. J. Sci. 15*, 215-21 (1941). III. Carboxylic acid salts and amides of dodecylamine and octadecylamine, *ibid.*, 223-30. *(Chem. Abs.)*

Reports on fat, oils and waxes. J. Fitelson. *J. Assoc. Off. Agr. Chem. 25*, 726-8 (1942). Titer test coloring matter and detn. of olive oil are discussed.

Report on unsaponifiable matter. G. Kirsten. *J. Assoc. Off. Agr. Chem. 25*, 728-33 (1942). Results on various oils by four different methods show that the S.P.A. method gives consistently higher results than do the other methods. Tests showed that while the S.P.A. method effected practically complete extn. of added unsaponifiable matter, the F.A.C. and modified Kerr-Sorber methods did not.

A NEW COLORIMETRIC METHOD FOR THE DETERMINATION OF FREE FATTY ACIDS IN MILK FAT. Vladimir N. Krukovsky and Georges Knaysi. *J. Dairy Sci. 25,* 659-61 (1942). A simple and quick colorimetric method for detn. of free fatty acids in milk fat is described. The method consists in dissolving 1 ml. of milk fat in 3 ml. of a satd. soln. of the base of neutral red in xylol and comp. with a set of standards of known oleic acid contents. The method is shown to be highly sensitive and accurate. In neutral fat and in xylol the dye base gives an orange yellow soln. Free fatty acids form red soaps with the dye base and the degree of shift to the red is proportional to the concn. of soap and, therefore, of the free fatty acids. Equal normal concns. of various fatty acids produce an equal shift in the color.

SEPARATION AND IDENTIFICATION OF FATTY ACIDS. VI. PREPN. OF PURE LINOLEIC AND LINOLENIC ACIDS BY THE HYDROXAMIC ACID METHOD. Yosiyuki Inoue and H. Yukawa. *J. Agr. Chem. Soc. Japan 17,* 771-5 (1941). The prepn. of linoleic acid from cottonseed and soybean oils, and of linolenic acid from linseed oil, is described; 35% of linoleohydroxamic acid is obtained from cottonseed oil, and about 20% from soybean oil, while 44 g. of linseed oil yield 8.7 g. of linolenohydroxamic acid. *(Chem. Abs.)*

POLYMERIZATION OF DRYING OILS. Waldo C. Ault, *et al. Ind. & Eng. Chem. 34,* 1120-3 (1942). The rates of thermal polymerization at 275° C. of the various conjugated trienoic esters investigated have the same order of magnitude, although methyl pseudoeleostearate polymerizes slightly faster than its positional isomers, methyl α- and methyl β-eleostearate. These rates are much more rapid than those of the two unconjugated trienoic fatty acid esters examnd. Additional evidence in conformity with Scheiber's theory of isomerization and the Kappelmeier theory of diene mechanism for polymerization of unsatd. fat acids or their esters has been presented. By a simplified interpretation of 1,4-diene addn. of conjugated trienoic acids, structures for a bicyclic trimer and a tricyclic dimer have been suggested to account for the physical properties of polymerized products.

THE COMPARATIVE NUTRITIONAL VALUE OF BUTTER AND OLEOMARGARINE. Council on Foods & Nutrition of the Am. Med. Assoc. *J. Amer. Med. Assoc. 119,* 1425-7 (1942).

FAT ABSORPTION IN THE LAYING HEN. R. M. Conrad and H. M. Scott. *Poultry Sci. 21,* 407-9 (1942). Evidence is presented which indicates that in the laying hen most of the total fatty acids of an egg yolk meal are absorbed by way of the portal system, rather than by way of the lymphatic system.

A BACTERIOLOGICAL COMPARISON BETWEEN SYNTHETIC AND NATURAL GLYCEROL. H. J. Peppler. *J. Bact. 44,* 233-5 (1942). Studies of growth on glycerol-salts media and of dehydrogenase activity of bacterial suspensions have shown that synthetic glycerol (Shell) is as good a substrate as glycerol derived from lipids. The cultivation of Phytomonas tumefaciens and Salmonella pullorum in synthetic glycerol media had no deleterious effect upon the virulence of these bacteria.

THE SYNTHESIS OF SOME METHYLATED FATTY ACIDS. A. K. Schneider and M. A. Spielman. *J. Biol. Chem. 142,* 345-54 (1942). A method has been developed for the synthesis of higher fatty acids. The α-methyl acids with even-numbered fundamental carbon chains from α-methylstearic to α-methylhexacosanoic acid have been synthesized. 10-Methyldocosanoic, 10-methyltetracosanoic, and 10-methylhexacosanoic acids were also made. The corresponding amides were prepd. as derivatives.

FAT METABOLISM AFTER LIVER INJURY. FATTY ACID UTILIZATION BY RATS TREATED WITH CARBON TETRACHLORIDE ON DIETS WHICH WERE FAT-FREE OR CONTD. FATS WITH HIGH OR LOW IODINE NUMBERS. Irwin C. Winter. *J. Biol. Chem. 142,* 17-24 (1942). Fatty acid bal. expts. were conducted on 3 groups of male rats treated with CCl_4 and litter mate normal controls. Three similar synthetic diets were used, one contg. 7% stearic acid, another 7% cod liver oil fatty acids, and the third fat-free. The fatty acid loss, or utilization, of the animals receiving the fat-free diet was a small fraction of that of the animals ingesting larger quantities of fat. There was no significant difference in fatty acid utilization between the normal and treated members of the fat-free group. The fatty acid utilization of the CCl_4 treated animals receiving the stearate diet was much reduced below that of their normal litter mate controls. When cod liver oil replaced stearic acid in the diet, the difference between normal and treated animals was definitely decreased. It is concluded that CCl_4 poisoning does not increase fatty acid synthesis, and that the lack of abundant quantities of non-essential unsatd. fatty acids is a prime factor in the decreased utilization of fatty acids shown to follow liver damage.

FAT-DEFICIENCY DISEASE OF RATS. THE RELATION OF THE ESSENTIAL UNSATURATED ACIDS TO TUMOR FORMATION IN THE ALBINO RAT ON NORMAL DIET. I. S. MacLean and L. C. A. Nunn. *Biochem. J., 35,* 983-9 (1941). Walker tumor tissue was implanted in rats of 100-150 g. weight, fed on a normal diet containing fish meal and oil cake. Large tumors developed in 10-14 days. The proportion of lipoid substance to fat-free dry weight was determined in skin, carcass and liver and compared with the corresponding values in the controls. The figures were very variable and no significant differences were established. The highly unsaturated acids were estimated as bromide insoluble in cold benzene and their ratio to the fat-free dry weight determined in skin, liver and carcass. In all tumor-bearing animals, there was a marked fall in this ratio in the subcutaneous tissue when compared with the corresponding figures for the normal control rats. No such difference was detected in the carcass and liver fats. In the only experiment in which tumors failed to develop the controls showed abnormally low percentage ratio of highly unsaturated acid to the fat-free dry weight of the tissue.

HYDROLYSIS OF FATS AND FATTY ACID ESTERS. IX. Toyoki Ono. *J. Agr. Chem. Soc. Japan 17,* 199-209; Bull. Agr. Chem. Soc. Japan 17, 22-4 (in English) (1941). There is no relation between rate of hydrolysis at 30° of highly unsatd., unsatd., and satd. oils by pancreatic and Ricinus lipase and the degree of unsatn., but at 0° and —4° the rate of hydrolysis decreases in the above order. *(Chem. Abs.)*

PATENTS

REFINING OF ANIMAL AND VEGETABLE OILS. B. Clayton (Refining Inc.). *U. S. 2,292,822.* The process comprising decolorizing, neutralizing with Na_2CO_3

and vacuum treatment before removal of soap stock by centrifuging is described.

Recovery of refined products from tall oil. Isador Miller. *U. S. 2,291,824.*

Oil treatment. Eddie C. Glenn (Industrial Patents Corp.). *U. S. 2,292,027.* The method of bleaching refined glyceride oils comprises heating the oil to a temp. of from 160° F. to 220° F., addg. thereto from 0.1% to 1% of a solid adsorbent, agitating the mixt. of adsorbent and oil, sepg. the adsorbent from the oil, heating the oil to a temp. of from 365° F. to 400° F. under a vacuum and treating the oil with steam.

Method of separating fatty acids. Latimer D. Myers and Victor J. Muckerheide (Emery Industries, Inc.). *U. S. 2,293,676.* Stearic and palmitic acids are sepd. from unsatd. fats by crystn. from methyl alc. soln. contg. water (less than 15%).

Liquid phase extraction of glyceride oils and acids. Stephen E. Freeman (Pittsburgh Plate Glass Co.). *U. S. 2,291,461.* A process of selectivity separating a fraction rich in glycerides of relatively short chain length from a glyceride oil contg. them, in admixt. with glycerides of relatively long chain length comprises contacting the oil with an organic polar solvent contg. as a polarizing group one of the class consisting of amino and amido, which solvent at low temps. is relatively immiscible with the long chain glycerides, the conditions of contacting the glyceride and solvent being such that the system remains liquid and the glycerides are incompletely dissolved, separating the two resultant liquid phases and removing the solvent phase to obtain said desired fraction.

Process for hydrogenating soybean oil. Arne Gudheim (Lever Bros. Co.). *U. S. 2,293,729.* A method of stabilizing soybean oil against reversion under deep frying conditions utilizing temp. in the nature of 375° F. comprises hardening the oil and reducing the iodine value to at least 75 by passing H through the oil mass in the presence of a Ni catalyst while maintaining the oil at a temp. of less than 110° C.

Wax coating composition. J. D. Ingle (Industrial Patents Corp.). *U. S. 2,292,323.* This invention relates to a method of inhibiting the growth of mold on cheese. The wax compn. comprises paraffin, a small proportion of palmitic acid and propionic acid.

Simulated fat and method of preparing same. Frank H. Hoy (Hoy Equipment Co.). *U. S. 2,290,854.* A meltable meat coating composition consists of an intimate mixt. of from 50 to 90% by wt. of fat and from 50 to 10% by wt. of a binder composed of finely subdivided, partially-solid, cooked skin.

Thickening of solutions. Morris B. Katzman and F. J. Cahn (The Emulsol Corp.). *U. S. 2,291,634.* An aq. soln. of at least 5% of a monoethanolamine salt of the sulphoacetic acid amide of the lauric acid ester of monoethanolamine, and contg. a proportion of a salt of monoethanolamine with a water-soluble aliphatic acid, which latter salt is soluble in said soln. sufficient to appreciably thicken the same.

Modifying castor oil. Alexander Schwarcman (Spencer Kellogg and Sons, Inc.). *U. S. 2,292,902.* In modifying castor oil, the process comprises heating it in the presence of a minor amt. of dissolved camphor sulfonic acid for a period at least sufficient to make the oil miscible with mineral lubricating oils.

Catalytic oxidation. Donald J. Loder and P. L. Salzberg (E. I. du Pont de Nemours & Co.). *U. S. 2,292,950.* A process for the prepn. of a satd. polycarboxylic acid from non-drying and semi-drying hydroxylated fatty acids and unsatd. fat acids of more than eight carbon atoms and their esters comprises simultaneously oxidizing and cleaving the chain of said compds. by subjecting them to oxidation by means of an oxygen-contg. gas in the presence of an oxidation catalyst, a solvent for the substance to be oxidized and a co-oxidizer.

Coating and impregnating product and process. Ivor M. Colbeth (Baker Castor Oil Co.). *U. S. 2,291,794.* A composition of matter comprises substantially solid oxidized castor oil that is insoluble in ether alcohol, acetone, benzol, carbon disulphide, water and turpentine, and a sufficient amt. of diethylene glycol ethyl ether to form an emulsion when mixed with water.

Condensation product. Eugene Lieber (Standard Oil Development Co.). *U. S. 2,291,396.* A compn. comprising a waxy mineral lubricating oil having added thereto a small amt. of a substance having pour depressor properties and comprising essentially a condensation product of a polyalkylene polyamine and a fatty acid.

Abstracts

Soaps

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Soap specifications developed by A.S.T.M. Anon. *Oil, Paint and Drug Reporter 142*, No. 8, 47 (1942). Summary of the work of the committee D-12. Changes in the old soap specs. are given.

Soap factory equipment. I. Handling raw materials. N. G. Weir. *Soap, Perfumery and Cosmetics 15*, 378-81 (1942). Convenient arrangements for melting-out, handling caustic and salt, bleaching, and pumps, motors, etc. for the small and medium-size plant are reviewed.

Making modern shaving creams. David I. Day. *American Perfumer 44*, 47-49 (1942). Manufacturing formulas and advertising angles are discussed.

(Report on) biochemistry: glycerol from coconut oil. R. R. Worsley. *East African Agr. Research Sta., Amani, Ann. Rept. 13*, 11-12 (1940). (Pub. 1941). In making soap from coconut oil, the soap can be salted out only by having at least 20% NaOH in the lye, the neutralization of which would require large quantities of H_2SO_4. The use of H_2SO_4 was