Abstracts

Oils and Fats

Edited by
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A NEW TECHNICAL EMULSION PROCESS. W. Ruziczka. *Fette u. Seifen 49,* 296-7 (1942). The process for which patents have been applied comprised emulsification by dissolving the material in an org. solvent and pptg. by addn. of water. The process can be used in the manuf. of lacquer coatings and emulsions, oiling textiles, etc.

STABILITY OF L-ASCORBIC ACID, ESPECIALLY ITS ACTIVITY ON FATS AND FAT ACIDS. R. Strohecker and E. Buchholz. *Fette u. Seifen 49,* 351-3 (1942). 0.5 g. or 0.5 cc. of fat or oil are treated 10 mins. at 50-55° with exactly 1 cc. of 0.1% soln. of ascorbic acid (I) and after standing over night 10 cc. of water was added and amt. of residual I was detd. Under these conditions the various fats and oils destroy from 0 to 44% of the I. Me and Et alc. were almost inactive while Bu and Am alc. destroyed appreciable I. Formic, capric, lauric or myristic acid destroyed all the I; while acetic butyric or capronic are weaker. Oleic or linolenic destroyed about one-half, while linoleic destroyed all the I used in the test.

SESAME OIL TUMORS. A. H. Conrad, A. H. Conrad, Jr., and R. S. Weiss. *J. Am. Med. Assoc. 121,* 237-41 (1943). Invasive tumors may be produced by injection of estrogenic substance in sesame oil. It is our belief that the tumors are due to the oil and not to the combination of estrogen and oil. The injection of oils carrying active drugs and endocrine prepns. into the subcutaneous tissues should be avoided. Subcutaneous and intramuscular oil injections into the arms may produce in some persons painful and disabling tumors. Owing to the anatomicophysiologic factors involved, the tumors may increase in size and no. by migration of oil droplets, so that operative measures may become necessary.

THE PRESENT STATUS OF PHOSPHATIDE RESEARCH. IV. PHOSPHATIDE DETERMINATION IN SOYBEANS AT VARIOUS DEVELOPMENT STATES. Helga Duftschmid and W. Halden. *Fette u. Seifen 49,* 348-51 (1942). Data on phosphatide P, alc. sol. P, total fat, total N and moisture, resp., were: green soybeans, 14 days before ripening 0.059-0.122, —, 17.3-17.8, —, 51.2; ripe soybeans 0.089-0.125, 0.085, 17.5, 5.9, 69.1; beans after 1 year storage 0.067, —, 19.7, —, 12.6. The phosphatide content decreased with the decrease in moisture, *i.e.,* at 69.1% moisture the phosphatide content was 0.125, at 11% H_2O the phosphatides were 0.047. The analytical methods were also presented.

FAT CHEMISTRY WORK COURSE AND ITS ECONOMIC STATUS. I. THE MEANING OF REDUCTION AND OXIDATION POTENTIAL IN FAT CHEMISTRY. Kurt Lindner. *Fette u. Seifen, 49,* 88-93 (1942). A review.

THE INTERRELATION OF CALCIUM AND FAT UTILIZATION. C. E. French and R. F. Elliott. *J. Nutr. 25,* 17-21 (1943). The evidence presented indicates a slight interference of oleo oil with Ca utilization by the albino rat. The acidity of the contents of the duodenum, jejunum, ileum, and cecum was, in general, diminished by increase in the fat content of the diet, this decrease in intestinal acidity being associated with decrease in retention of Ca.

CONVERSION OF CARBOHYDRATES INTO FAT WITH FAT FORMING MICROORGANISMS. A REVIEW OF NEW SWEDISH INVESTIGATIONS. Felix Munin. *Fette u. Seifen 49,* 123-6 (1942).

GERMAN OIL SEEDS OF THE 1940 AND 1941 HARVEST. I. RAPE, RAPE TYPES, AND POPPY. H. P. Kaufmann. *Fette u. Seifen 49,* 169-79 (1942). Data on the effect of various fertilizers and types of soil on the yields and compn. of the seeds are presented.

FAT ACID STABLE COATINGS. FROM THE VARNISH FACTORY OF GRAU-RELIUS. *Fette u. Seifen 49,* 189-93 (1942). Coatings of oil lacquer, bitumen, "Harvel," alkydal, plasticized phenol, rubber, and benzyl cellulose bases do not withstand fat acids or alkali. Synthetic vinyl chloride resins and nitrocellulose coatings withstand hot fat acids and alkalies but not hot soda solns. Best stability against alkali, warm fat acids, and boiling soda solns. was obtained with coatings based on special hardened phenol resin and on urea resin-nitrocellulose coatings.

LIQUID-LIQUID EXTRACTION EMPLOYING SOLVENTS IN THE REGION OF THEIR CRITICAL TEMPERATURES. A. W. Hixson and J. B. Bockelmann. *Trans. Am. Inst. Chem. Eng. 38,* 891-930 (1942). A group of solutes and solvents have been found whose solutions exhibit lower critical sol. temps. The solutes are for the most part members of long chain fatty acids and the glyceryl esters while the solvents are the liquefied, normally gaseous hydrocarbons such as liquid propane. Examn. of the solubility behavior of several members of a homologous series indicates that each unconjugated double bond in a straight chain mol. lowers the critical soln. temp. with liquid propane about 10 degrees C., while each addl. methylene group in a satd. long chain mol. lowers the critical soln. temp. with liquid propane by 3° C. The use of liquid propane at temps. close to its critical temp. makes it possible to effect the sepn. of the free fatty acids from a mixt. with a vegetable oil such as cottonseed oil. There are also indications that the color of the oil can be similarly improved. The equilibrium data for the system: Liquid Propane-oleic acid-refined cottonseed oil as detd. by this investigation will be useful as an analytical tool in the detn. of the performance characteristics of refinery equipment which uses liquid propane; and they form the basis of a new process for the refining of crude long chain fatty acids such as are formed in the "splitting" of fatty oils.

FAT CHEMISTRY COURSE AND ITS ECONOMIC STATUS. II. FREEING THE FATS, FAT ACIDS OR SOAPS OF THE UNSAPONIFIABLE CONTENTS AS AN INDUSTRIAL PROCESS. Kurt Lindner. *Fette u. Seifen, 49,* 179-83 (1942). The problem of removing unsaponifiable is met in fat acid synthesis by oxidation, felting fat, wool wash water, tanning fats, sewage fats, and fecal fats. The literature and patents on process for these purposes are reviewed.

10-11-OLEIC ACID. A. Bömer and J. Stather. *Fette u. Seifen, 49,* 243-53 (1942). An acid, m. p. 35.5° and I no. 88.8 was isolated from hydrogenated sunflower seed oil. On the basis of split products its double bond was identified at the 10-11 position. It crystallizes as colorless crystals from 80° alc. in the cold.

APPLICATION OF THE ELAIDIN REACTION FOR INVESTIGATION OF SOME OILS. A. Bömer and K. Kappeller. *Fette u. Seifen 49,* 353-9 (1942). Elaidinization together with fractional crystn. served for analysis of olive, peanut, and soybean oil. Olive yielded large amts. of trielaidin, also l-elaido-dipalmitin was isolated. Stearic acid glycerides were not found. Trielaidin and stearo-dielaidin were isolated from the peanut oil. Elaido-dipalmitin was isolated from the soybean oil.

ACTION OF LIGHT ON PREMIER JUS AND BUTTER FAT. Th. Hinko. *Fette u. Seifen 49,* 19-27 (1942). The bleaching out of carotene color was similar to autoxidation of fat (*i.e.,* chain reaction) and is difficult to stop after a short induction period. Tallowiness is believed to arise from the carotinoid constituents of butter and tallow. Carotinoids seem to have antioxygenic action only as long as they show color. The carotinoid colors protect fats and other substances against the damaging light rays.

EFFECT OF CARBON TREATMENT ON FISH LIVER OILS. L. O. Buxton. *Ind. Eng. Chem. 34,* 1486-9 (1942). Studies on the stability of vitamin A in fish liver oils treated with activated C have demonstrated that, irrespective of the rate of oxidation, the per cent destruction of vitamin A is proportionally related to the peroxide content. In all instances the C treatment shortened the induction period and increased the ultimate rate of peroxide formation. The per cent vitamin A oxidized in the fish liver oils exhibited no induction period, is directly proportional to the peroxide content and to the time of exposure at 34.5°C. until at least 60% of the vitamin A is destroyed. Furthermore, the increase in peroxide content of such oils is directly proportional to the time. The fact that the C-treated fish liver oils had essentially the same vitamin A value and a slightly lower peroxide content than the respective crude oils suggests that the instability is due primarily to a loss in antioxidant content. The quantity of antioxidants removed is related to the per cent C used. Upon oxidation, the oils treated with 20% C gave evidence of the complete absence of antioxidants.

STABILITY OF THIOCYANOGEN AND ITS REACTIVITY WITH FAT IN VARIOUS SOLUTIONS. H. P. Kaufmann and H. Grosse-Oetringhaus. *Fette u. Seifen 49,* 194-200 (1942). The work of Hansen-Schmidt who investigated CS_2, $CHCl_3$ ethylene chloride, CCl_4, ether and CH_3OH as solvents for the test, was supplemented by the present authors with tabulated information on application of toluol, benzol, hexahydrotoluol, nitrobenzene, pentachloroethane, acetylene tetrachloride, and formic acid. No improvement was obtained with the new solvents. A stabilization of the (SCN) soln. was obtained with a small amt. of $I_2(SCN:I_2::50:1)$. Such a soln. gave constant titrations in acetic acid for 10 days and remained fully clear for 1½ months. However, the use of I, did not appear to be without objections; for it can isomerize unsatd. fat acids, especially conjugated unsatd. Further I_2 unites with (SCN) to form [(SCN)I].

MOLECULAR GROWTH WITH UNSATURATED FAT ACIDS AND THEIR ESTERS AS A BASIS FOR THE DRYING COURSE AND THE PREPARATION OF COATING MATERIALS. I. THE TRUE POLYMERIZATION AND THE OXIDATIVE MOLECULAR GROWTH. H. P. Kaufmann. *Fette u. Seifen 49,* 102-14, 321-33 (1942). Review contains 168 references.

THE MICROSCOPICAL OBSERVATION OF THE MELTING COURSE OF TRIMYRISTIN AND TRISTEARIN. H. P. Kaufmann and W. O. Schubert. *Fette u. Seifen 49,* 16-19 (1942). Pure crystals of trimyristin and tristearin were prepd. and the course of melting was followed photomicroscopically. Trimyristin first melted at 57°. On cooling slowly to about 40° it solidified into radiating crystals. On rewarming the crystals remelted at 48° and then quickly solidified at 49°. These crystals then melted at 57°. Heretofore the 2 m.p.s. were said to be at 55 and 49. With tristearin the m.p. first appeared at 73°. After solidification and reheating it melted at 55°, resolidified at 56°, and remelted at 73° These m.p.s. are listed in the literature as 55 and 72°.

JOJOBA, AN OIL THAT'S DIFFERENT. L. N. Markwood. Chemurgic Digest *1,* 174-5 (1942). The greatest promise of jojoba oil resides in its marked stability on being heated. This one property alone sets it apart from many vegetable oils. Jojoba can be heated any number of times to the relatively high temp. of 550° (that is, high for an oil), and is apparently just as fresh as ever. This stability has already suggested a practical use to chemists in a laboratory instrument known as a m.p. app. Arrangements are being made for a supply of jojoba seeds for the 1943 Test Planting Program.

APPLICATION OF TRIGLYCERIDES AS LUBRICANTS FOR CLOCKS (AND WATCHES). Paul Cuypers. *Fette u. Seifen, 49,* 27-34 (1942). The advantages and disadvantages of beef neatsfoot, mutton neatsfoot, olive, tsubaki, and dolphin head oils as watch lubricants are discussed. The phys. and chem. characteristics of the oils are tabulated.

LIPID OXIDASE STUDIES. III. THE RELATION BETWEEN CAROTENE OXIDATION AND THE ENZYMIC PEROXIDATION OF UNSATD. FATS. Robert J. Sumner. *J. Biol. Chem. 146,* 215-8 (1942). Evidence has been submitted that carotene is not oxidized by the peroxides formed from unsatd. fat either directly or indirectly. It has been shown that the oxidation of carotene requires that the peroxidation of unsatd. fat be actually in progress. Since fat peroxidation is diminished by the coupled oxidation of carotene, it appears possible that the O which reacts with carotene is derived from some intermediate which is produced during the peroxidation of the unsatd. fat.

MECHANISM OF ENZYMIC HYDROLYSIS OF OILS AND FATS. I. CLEAVAGE OF FAT ACID RESIDUES FROM NATURAL OILS BY RICINUS LIPASE. Y. Inoue and G. Sintani. *J. Agr. Chem. Soc. Japan 17,* 559-65 (1941). During enzymic hydrolysis of coconut oil, higher fat acids are more readily liberated from glycerides than are the lower fat acids, while with cottonseed oil, the satd. are more readily liberated than the unsatd. acids. *(Chem. Abs.)*

ADAPTABILITY OF THE RAT FOR STUDIES OF THE CHEMICAL RELATIONSHIPS BETWEEN THE FOOD INGESTED AND THE SOFTNESS OF BODY FAT. John A. Schulz, B. H. Thomas, C. C. Culbertson, and F. J. Beard. *Iowa Agr. Expt. Sta., Ann. Rept. 1939,* 85. When rats were fed a satd. fat, the fat deposited in the tissues was more unsatd. than the fat fed. Ibid. *1940,* 110. Certain of the adjuvants fed altered the nature of the body fat deposited. The feeding of only 0.0139 g. of carotene weekly to rats resulted in the deposition of fat of av. I no. of 94.6, while rats receiving methionine in their diet to the extent of 0.5% deposited fat with an av. I value of 110.5. Rats receiving no adjuvants deposited fat with an I value of 107.5. It was believed that the I values of the fats extd. from the blood and liver might offer addnl. clues as to the mechanisms involved in any changes in fat deposition. Significant differences are shown only in the liver fat acids and liver unsaponifiable fractions from the rats which received carotene in their diet. *(Chem. Abs.)*

FAT METABOLISM IN THE LUNGS. P. L. MacLachlan. *J. Biol. Chem. 146,* 45-8 (1942). Male, 3-month old, albino mice showed no significant changes from normal in the lipid content of the lungs, either during active absorption of fat from the intestine accompanied by a marked lipemia or during fasting for 1- and 2-day periods, when their are rapid mobilization and utilization of stored fat. These observations do not support the conclusion that the lungs actively participate in fat metabolism.

PATENTS

WATER SOLUBLE DISPERSIBLE PHOSPHATIDE DERIVATIVE. K. Dziengel. *Ger. 721,002 Cl. 12o.* The phosphatides are heated with neutral or acid sulfides *(Fette u. Seifen).*

PHOSPHATIDE CONTAINING BAKING CONSTITUENT. M. F. Niescher. *Ger. 719,268 Cl. 2c.* Soybean phosphatides are mixed with 10% finely powdered $NaHCO_3$ or other alkali reacting salt to form a homogenous paste. *(Fette u. Seifen).*

Abstracts

Soaps

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VEGETABLE SUBSTITUTES FOR FATS IN THE MANUFACTURE OF SOAP. Guido Rovesti. *Riv. ital. essenze, profumi piante offic., olii vegetali, saponi 22,* 346-8. A report on plants and their parts which have detergent properties. The plants tested were: Sambucus ebulus L., Pteris aquilina L., Saponaria officinalis L., Gypsophila arrestii Guss., Aesculus hippocastanum L., Arum maculatum, Sal-sola kali L., Salsola soda L., Salicornia herbacea, and Chenopodium album L. "Tergina," a product from lemon waste consisting mainly of pectin and cellulose is utilized commercially. *(Chem. Abs.)*

SALT WATER SOAP. Blanche Naylor. *Soap 18,* No. 11, 21-24, 74 (1942). Changes in Navy spec. 51D7 (INT) issued by the Bureau of Ships allows synthetic detergents, up to 20% by weight, to substitute for imported tropical oils of high lauric acid content that are no longer available. The active ingredient of the detergent should preferably be a member of the class represented by the formula $A\text{-}R\text{-}SO_3Na$ in which A is an alkyl radical (10 or more C atoms) and R is an aromatic or aliphatic grouping. Tallow is the chief fat charge although 10% of the fats may be other domestic fats or oils, or rosin. Rosin soaps are particularly suitable for salt water use as they aid lathering. Many soaps take advantage of this fact and use the maximum amount allowable by the Navy which is 4% by weight of the finished soap. Glycerine content of the revised spec. is limited to 0.7%. The principal tests to which the soap is subjected include its ability to remove soil, its ability to lather or foam, its stability, and its freedom from any tendency toward dermatitis. Advantages claimed for the new formulae are usability in cold as well as hot water; greater efficiency in washing: and insecticidal properties. Extracts from Interim Spec. 51D7 (TNT), Bureau of Ships. U. S. Navy Dept., April 15, 1942, are given.

SOAP IN THE RUBBER CRISIS. Anon. *Soap 18,* No. 11, 28-31 (1942). Synthetic rubber calls for the use of 100,000,000 pounds of tallow chip soap yearly in butadiene manufacture for use as wetting, dispersing, stabilizing, and lubricating agents. Specifications as given by the Rubber Reserve Company are listed.

X-RAY INVESTIGATION OF THE STRUCTURE OF SOAP SOLUTIONS. H. Kiessig. *Kolloid-Z. 96,* 252-5 (1941). In solid sodium oleate the soap molecules are arranged in double layers with the polar groups turned toward one another. The molecules are in an inclined position relative to the layer plane. In an 18.7% soln. the interplaner distance equals 78 A. Since the length of the molecule is 48.5 A. it must be assumed that the molecules are in an erect position in soln. and that the hydrocarbon ends are turned toward one another. In the micelles, oleate layers follow water layers in an alternate fashion and 19.4 water mols. per double mol. are found. In a 6% soln. the interplanar distance is increased to 99 A. Both water and oleate layer have the same thickness. C_6H_6 is sol. in aq. oleate soln. In a 15% aq. soln. the interplanar distance equals 84 A.; addn. of 0.4 g. C_6H_6 per g. of the oleate increases this value to 900 A. A regular sequence results: simple Na oleate mol., C_6H_6, simple oleate mol., water. The hydrocarbon ends are turned toward the C_6H_6, the polar groups toward the water. The C_6H_6 enters longitudinally between the oleate layers. In spite of the amt. of included solvent, the order is distinct. A 42% soln. of laurylpyridinium chloride in H_2O exhibits a good micellar order with an interplanar distance of 38.1 A. A 60% soln. in EtOH shows less order and gives a distance of 22 A. Polyethylene oxide in an 80% aq. soln. (20 ethylene oxide groups) gives a distance of 59 A., whereas the solid polymer gives an interference ring of 80.3 A. In this case an interpretation of the micellar structure is not possible as yet. It can be concluded from x-ray data that the micelles have a foil-like shape and are oriented by a flow gradient. *(Chem. Abs.)*

THP STRUCTURE OF SOAP SOLS. J. Stauff. *Kolloid-Z. 96,* 244-51 (1941). The structure and the properties of a soap sol can be correlated with the structure of the macromol., its interaction with the surroundings and the presence of a thermodynamic equil. The lattice energy of a crystd. soap is composed of the energy of the paraffin chain (approx. 20 kg.-cal. per mol. for 16 atoms) and the electrostatic energy of 70 kg.-cal./mol. for the double layer. From the lattice energy and the heat of soln. of Na palmitate (22 kg.-cal./mol.) the surface energy between H_2O and the paraffin (11 kg.-cal./mol.) and the hydration energy of the Na ion (99 kg.-cal./mol.) a heat of hydration for the paraffin ion of—20 kg.-cal./mol. is calcd. The