The contents of the pipette are washed directly into an iodine value flask by connecting it to a dispensing burette by means of a short piece of neoprene tubing and delivering 10 ml. of carbon tetrachloride through it. The pipette is then dried by aspiration, when it is ready for the next oil sample.

The remainder of the method follows the usual procedure for the Wijs iodine value determination except for the Hoffman and Green (5) modification employing 250 mg. of mercuric acetate as a catalyst which permits titration within three minutes. With two pipettes one may be dried while the other is in use. Care must be taken, however, in noting oil weights if the pipettes are not exact duplicates. The dropping pipette is cleaned by removing the rubber bulb, rinsing in carbon tetrachloride and drying by aspiration.

Following are a few typical results using the above technique:

Sample	Wt. Oil g.	Iodine Value	
		Wijs	Refractometric
1	.0915	176.0	175.6
	.0916	176.6	175.9
2	.0914	161.2	161.2
	.0914	161.2	160.7
3	.0914	161.7	161.5
	.0914	161.8	161.5

Discussion

The point may be raised as to the safety of introducing highly inflammable petroleum ether into the moving Wiley mill. These mills are equipped with induction motors so that sparking occurs only upon starting or stopping. Consequently there is less hazard in continuous, than intermittent, operation, even if the few ml. of solvent involved could be considered a hazard. The present mill has been used for two years, grinding several thousand samples without an incident.

Insufficient data have been obtained on pipetting technique as to the possible range of oil weights due to differences in specific gravity. However, Jamieson (6) gives extreme figures for raw oil of .931 and .938, which would be reflected in a possible deviation of approximately 0.7 iodine value from the mean if the oil samples are pipetted without checking the weight. Of course, the exact weight of oil can be readily obtained by weighing the pipette before and after filling if greater accuracy is desired.

Summary

1. One-gram samples of flaxseed, such as are obtained from single plants in breeding work, may be prepared rapidly in quantity for iodine value estimation of oil quality by grinding in an intermediate Wiley mill and partially extracting immediately on a filter with petroleum ether.

2. The oils obtained after evaporating and drying the extract are sufficient in quantity to permit the determination of iodine value either refractometrically or by a modified Wijs method in which the oil sample is measured by a precision pipette involving a special technique.

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Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

Emulsions and their applications to textiles. H. A. Neville. *Am. Dyestuff Reptr. 34,* 534-6 (1945).

Use of enzymes in open kettle lard rendering. Anon. *Natl. Provisioner 114,* No. 1, 15, 31 (1946). A test of the enzyme method showed a 3% gain in lard yield, but was not considered worth the extra effort. The thorough hashing given the materials treated with the enzyme preparation may account, in part, for the increase in lard yield.

Laboratory study of continuous vegetable oil extraction. Countercurrent extractor, rising-film evaporator, and oil stripper. A. C. Beckel, P. A. Belter, and A. K. Smith. *Ind. Eng. Chem., Anal. Ed. 18,* 56-8 (1946). Apparatus useful for studies of continuous vegetable oil extraction in the laboratory are described. A continuous countercurrent extractor was capable of supplying essential data, such as completeness of oil extraction, contact time, solvent-to-solid ratio, miscella composition, and solvent carry-over; a rising-film evaporator of the natural circulation type provided with a separator for continuous oil removal; and a new and efficient oil stripper providing turbulence and thin films by operating against gravity and against surface tension.

Industrial determination of the composition of fats. E. Baum. *Industries Corps Gras 1,* 40-5 (1945). The indices most frequently used for characterizing fats are defined and discussed. 59 references.

X-ray investigation of glycerides. II. Diffraction analyses of synthetic triacid triglycerides. L. J. Filer, Jr., S. S. Sidhu, C. Chen and B. F. Daubert. *J. Am. Chem. Soc. 67,* 2085-9 (1945). The polymorphism of solvent-crystallized synthetic triacid triglycerides has been established by x-ray diffraction data. Crystallization of the triacid triglycerides from solvent in either the β or β' phase seems to be dependent upon the rate of crystal growth. Correlations between molecular weights and melting points and molecular weights and long-spacing values have been indicated.

Spectrophotometric method for estimating gossypol in crude cottonseed oil. F. H. Smith. *Ind. Eng. Chem., Anal. Ed. 18,* 41-3 (1946). Spectral absorption curves of the dianilino derivative of pure gossypol and that of the gossypol in an expeller and hydraulic crude cottonseed oil are given. A rapid spectrophotometric method having the accuracy and precision of the gravimetric method for estimating the gossypol content of crude cottonseed oil is presented. The time required for the analysis is less than 2 hours.

NATURAL ANTIOXYGENS OF OILS. Pierre Dubouloz. *Industries Corps Gras 1,* 68-71 (1945). Review from 22 references.

PROBLEMS WITH THE CONSERVATION OF FATS. II. BIOCHEMICAL RANCIDITY. M. Loury. *Industries Corps Gras 1,* 14-19 (1945). The field is reviewed under the subjects: biochemical rancidity, yeasts, hydrolysis, lipases, butter, margarine, packaging, soap, and miscellaneous products.

HOW TO RETARD RANCIDITY IN SALT CURED FISH. R. E. Silver. *Food Industries 17,* 1454-6, 1596, 1598, 1600 (1945). Fatty fish are given additional storage stability of 5-6 months by coating with edible oil that contains an antioxidant and a benzoate preservative. The treatment is applicable to other fat-containing foods.

ANOMALOUS BEHAVIOR OF METHYL 12-HYDROXY-9,10-OCTADECENOATES IN RAPID IODINE NUMBER DETERMINATIONS. P. S. Skell and S. B. Radlove. *Ind. Eng. Chem., Anal. Ed. 18,* 67-8 (1946). The Me esters of ricinoleic, ricinelaidic, and *o*-propionyl-ricinoleic acids quantitatively add ICl from Wijs reagent in less than 1 minute. However, if $Hg(OAc)_2$ is present, Me ricinoleate and ricinelaidate react with additional halogen, thus giving high I values, whereas the Me *o*-proprinyl-ricinoleate behaves normally. This anomalous effect is due to the presence of the free hydroxyl group.

SEASONAL VARIATION OF CAROTENE AND VITAMIN A IN BUTTER-FAT AND IN SERUM. J. W. LORD. *Biochem. J. 39,* 372-44 (1945). Data are presented showing the seasonal variation over a period of 2 years of the vitamin A activity of butter-fat of Ayrshire cows. The average values for pasture- and stall-feeding were respectively 31 I.U. and 15 I.U./g. of fat. The contribution made by carotene to the vitamin A activity of butter-fat ranged from 28% during pasture-feeding to 20% or less while the animals were in stalls. Carotene made its maximum contribution during May and June, accounting for 34% of the total vitamin A activity. The results indicate that pasture-feeding even for only a few hours a day maintains high levels of carotene and vitamin A in both butter-fat and serum.

DISAPPEARANCE OF GLYCEROL IN THE COURSE OF STORAGE. P. Desnuelle. *Industries Corps Gras 1,* 4-6 (1945). The specificity of the periodate method for determination of glycerol was demonstrated by analyses in presence of materials associated with crude glycerol; i.e. salt, PrOOH, BuOOH, lactic acid, pyruvic acid, EtOH, BuOH, ethylene glycol, propylene glycol, and trimethylene glycol. Data on dilute glycerol waters, 40% and 80% glycerol, stored for various periods of time, comparing the periodate, bichromate, and acetin methods indicate that the former method gave the lower results. This is interpreted as an indication of greater specificity for the method.

THE EFFECT OF GROWTH ON THE LIPID COMPOSITION OF RAT TISSUES. H. H. Williams, H. Galbraith, M. Kaucher, E. Z. Moyer, A. J. Richards and I. G. Macy. *J. Biol. Chem. 161,* 475-84 (1945). The fundamental change, quantitatively, in lipid composition during growth, common to all the tissues studied, appears to be an increase in cephalin concentration. Specific changes in the various organs during growth are an increase in cerebrosides in testes and skeletal muscle and a decrease in cardiac muscle; a decrease in free cholesterol and sphingomyelin in both skeletal and cardiac muscle; and an increase in sphingomyelin in kidney, lung, and spleen. All essential liquid components except lecithin and cholesterol esters show a marked increase in the brain during growth.

THE EFFECT OF TOCOPHEROL AND OF FAT ON THE RESISTANCE OF RATS TO ANOXIC ANOXIA. E. L. Hove, K. Hickman, and P. L. Harris. *Arch. Biochem. 8,* 395-404 (1945). Fat in the diet decreases survival time of rats under conditions of anoxia, possibly by decreasing the animals' R. Q. Injection of large single doses of *d*-α-tocopheryl phosphate greatly increases the time of survival to anoxia of guinea pigs on a rabbit chow diet, but has no effect on rats.

THE EFFECT OF PROTEIN AND FAT CONTENT OF THE DIET UPON THE TOXICITY OF BENZENE FOR RATS. T. W. Li and S. Freeman. *Am. J. Physiol. 145,* 158-65 (1945). Rats exposed to benzene and maintained on a high-fat diet manifested a greater incidence of leucopenia than do control groups, irrespective of the protein content of the diet. THE INCREASED SUSCEPTIBILITY OF PROTEIN-DEFICIENT DOGS TO BENZENE POISONING. T. W. Li, S. Freeman, V. H. Hough, and F. D. Gunn. *Ibid.* 166-76. A high-fat-low protein diet caused the highest mortality and shortest survival period when dogs were exposed to 600 p.p.m. by volume of benzene for 42 hours per week.

PATENTS

TEXTILE FINISHING AND COMPOSITION THEREFOR. W. N. Oldham (American Cyanamid Co.). *U. S. 2,378,724.* A textile finishing composition comprises an aqueous dispersion containing a fat acid guanadine with a curable melamine-formaldehyde resin.

EXTRACTION OF PHOSPHATIDES, FREE FATTY ACIDS, AND THE LIKE FROM GLYCERIDE OILS. S. E. Freeman (Pittsburgh Plate Glass Co.). *U. S. 2,390,528.* The process of obtaining a fraction rich in phosphatides and a fraction rich in free fatty acids from glyceride oil comprises intimately contacting the oil with furfural approximately saturated with water to obtain a plurality of liquid phases, one consisting of furfural and water containing the free fatty acids and the other consisting primarily of oil with the phosphatides precipitated as a suspension therein, then separating off the phases and separating the phosphatides from the oil.

PHOSPHATIDE COMPOSITION. P. L. Julian and E. W. Meyer (American Lecithin Co.). *U. S. 2,391,462.* The process of decreasing the viscosity of a mixture consisting essentially of a major amount of phosphatide in a fatty carrier comprises treating said composition with water to form an emulsion, thoroughly incorporating a small amount of a water-soluble mineral acid to lower the pH value of the emulsion not below about 1.8, separating the bulk of the water from the resulting phosphatide-oil composition and recovering the dried phosphatide-oil composition.

LOW TEMPERATURE LUBRICANT. J. D. Morgan (Cities Service Oil Co.). *U. S. 2,383,917.* The lubricant comprises Bu lactate 93%, Na stearate 6%, and tricresyl phosphite 1%.

LUBRICATING COMPOSITION. J. C. Zimmer and A. J. Morway (Standard Oil Development Co.). *U. S. 2,391,113.* A water-resistant, high temperature, extreme pressure lubricant of the grease type, consists of about 78% asphaltic base lubricating oil and the remainder being a mixture of Li, Pb, Zn, and Al soaps and chlorinated wax.

LITHIUM BASE GREASES. J. D. Morgan (Cities Service Oil Co.). *U. S. 2,390,450.* A grease adapted for use at extremely low temperatures comprises mineral oil with small amounts of Li and Al soaps.

POLYMERIZABLE UNSATURATED ESTER-AMIDES. I. E. Muskat and F. Strain (Pittsburgh Plate Glass Co.). *U. S. 2,390,551.* The new compounds are ester amides derived by the reaction of amino alcohols or other amino-hydroxy substituted hydrocarbons with unsaturated chloroformates.

OIL SOLUBILIZING COMPOSITIONS. T. R. Donlan and A. Gathman (Standard Oil Development Co.). *U. S. 2,391,087.* The composition comprises an oil soluble Na sulfonate 74, oleic acid 4, Na-alkyl-naphthalene-sulfonate 2, and secondary Bu alcohol 20% by weight.

Abstracts

Drying Oils

Edited by
HOWARD M. TEETER

DRYING OIL POLYMERIZATION SINCE 1930. E. Sunderland. *J. Oil Colour Chem. Assoc. 28,* 137-67 (1945). A critical review of work accomplished in this field since 1930.

CARBON DIOXIDE PROTECTION OF PAINT MANUFACTURING PROCESSES. D. A. Diehl. *Am. Paint J. 30* (No. 20), 26-30 (1945). A discussion of the use of CO_2 fire extinguishing systems and their application to paint and varnish factories.

EMULSIFYING DRYING OILS. A. J. Rosental, Z. I. Bodyazhina, and E. O. Bukan. *Pishchevaya Prom. 1944,* No. 5/6, 39-41. Formulas. (*Chem. Abs. 40,* 474.)

CATALYTIC CONJUGATION OF LINSEED AND SOYBEAN OILS. S. B. Radlove, H. M. Teeter and J. C. Cowan. *Pub. AIC-101, 1945. U. S. Dept. Agr., Bur. Agr. Ind. Chem., Nor. Reg. Res. Lab.* A process is described for the conjugation of linseed and soybean oils by heating them at 160-200° with a catalyst composed of Ni and C black, activated under the proper conditions. The resulting products contain up to 35% conjugation, and show correspondingly high rates of polymerization and drying. Extensive experimental data are given concerning factors influencing the process and studies for evaluation of the products. The principal advantage of the process is that splitting of the glyceride is avoided, thus enabling the production of oils of excellent color, viscosity, and acidity.

AUTOXIDATION OF LINOLEIC ACID. S. Bergstrom. *Nature 156,* 717 (1945). Me linoleate was oxidized by shaking with O_2 at 30° in diffuse daylight until 0.3 mole of O_2 per mole of ester had been absorbed. Selective ultraviolet absorption at 2320 Å appeared and increased parallel to the O_2 absorption. Chromatography on alumina gave 3 fractions: (1) A peroxide mixture having an extinction coefficient of 10,000 at 2327 Å; (2) a peroxide mixture having negligible absorption above 2200 Å; and (3) a non-peroxide ketone absorbing at 2720 Å. Fraction 1 was reduced by H_2 to monohydroxystearic acids from which 9- and 13-hydroxystearic acids were isolated and identified. The second fraction gave, after reduction with H_2, dihydroxy stearic acids which could be split with Pb tetra-acetate. K linoleate gave similar products when treated with lipoxidase.

THE COURSE OF AUTOXIDATION REACTIONS IN POLYISOPRENES AND ALLIED COMPOUNDS. PART IX. THE PRIMARY THERMAL OXIDATION PRODUCT OF ETHYL LINOLEATE. J. L. Bolland and H. P. Koch. *J. Chem. Soc. 1945,* 445-7. Et linoleate was oxidized by shaking under an O_2 pressure of 100 mm. in the dark at 45° until from 0.431 to 5.4% of O_2 was absorbed. The most characteristic feature of the ultraviolet absorption of the oxidized samples, apart from weak selective absorption at 2750 Å, was an intense band at 2315 Å. Since the material responsible for this absorption was removed by adsorption on alumina, it must be associated with the peroxido-ester present in the samples. Up to an O_2 absorption of about 2%, the average extinction coefficient of the oxidation product is 22,700. At higher O_2 absorptions, the coefficient declines, probably due to secondary or peroxide decay reactions. The value 22,700 corresponds to a content of 70-85% of conjugated isomers, if the extinction coefficients of previously studied dienes are considered. The production of conjugation during oxidation is believed to occur through formation of a free radical at C atom 11 at the moment of attack by O_2. The free radical can rearrange to positions 9 or 13 with concomitant formation of 10,12 or 9,11 conjugation. The selective absorption near 2750 Å is believed to be due to a conjugated diene ketone formed by decomposition of the hydroperoxides from the 10,12 or 9,11 conjugated free radicals.

TALL OIL IN SURFACE COATINGS. Golden Gate Club. *Official Digest Fed. Paint Varnish Production Clubs 251,* 490-2 (1945). Pentaerythritol esters of the tall oil acids were employed as the linseed oil substitute, and the alkyd resins were prepared from maleic anhydride and either a tall oil glyceryl ester with addition of pentaerythritol or a tall oil pentaerythritol ester. The substitute oils were made into paints and the alkyd resins were made into a blue striping compound. Color was satisfactory, and brushing and leveling were equal to or better than that obtained with the standard paints. Gloss and drying time were lower for the paints made with the substitute oils, but the alkyd resins were equivalent to commercial alkyd vehicles in this respect. The tall oil alkyds dried as rapidly as the standards but gave slightly softer films. After 325 hours' exposure in the accelerated weathering unit, all panels were chalking but no failures had occurred. Reflectance of the tall oil alkyds indicated that chalking was occurring somewhat more slowly than the standard.