tures play in the complex reactions in an oxidizing fat is still obscure.

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Summary

Experiments on the oxidation of purified methyl oleate support the view that its induction period, and probably that of natural oils, is due to the presence of inhibitors and that purified unsaturated compounds have no induction period, other than the time required for gaseous oxygen to diffuse into the liquid.

Experiments with antioxidants indicate that phenolic inhibitors and inhibitols cause no change subsequent to the end of the induction period, that they exert their effect solely by inhibiting the formation of the initial active moloxide, and that they are entirely destroyed before the start of rapid oxidation which characterizes the end of the induction period.

The mode of action of several different pro-oxidants is analyzed. Perbenzoic acid, and presumably other peracids, and copper oleate decrease the induction period by virtue of their destruction of natural inhibitors.

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ABSTRACTS

Oils and Fats

Edited by
W. F. BOLLENS and M. M. PISKUR

The problems of chemistry in the new Germany. XIII. Auto-oxidation and ketonic decomposition of fats as problems in the fat industry. K. Täufel. *Angew. Chem.* **49**, 48-53 (1936); cf. *C. A.* **30**, 775.—The following subjects are discussed: (1) synthesis of fats, (2) refining of fats, (3) research for fat substitutes, (4) steps to reduce fat losses by spoilage, (*a*) the chem. spoiling of fats and (*b*) the biol. spoiling of fats. Conclusions: Fats can be stabilized by keeping bacteria away in the mfg. process, by retardation of bacterial growth by cooling means, and by the application of bacteria-killing substances. Thirty-four references. (*C. A.* **30**, 1597.)

The determination of the oil content (of seeds) by the refractometer. A. Rasteryaev. *Masloboino-Zhirovoe Delo* **1934**, No. 3, 10-11.—Cover 2 g. of the ground seeds with 15 cc. $CHCl_3$ and allow to stand for 12 hrs. at room temp. Calc. the percentage oil content (*P*) from the difference (*D*) of the *ns* of $CHCl_3$ and the $CHCl_3$ soln. by the formula: $10 \times D = 55P \times 10 \times 15/2$. The method is exact within 0.5%. (*C. A.* **30**, 1597.)

What is the most economical process for extracting oil from decorticated cotton seed? J. de Raedt. *Mat. grasses* **27**, 10671-3 (1935).—From a comparison of the relative costs of (1) discontinuous hydraulic pressing, (2) continuous mech. pressing and (3) preliminary continuous pressing followed by solvent extn., it is concluded that (3) is the most economical, particularly under the conditions prevailing in the Argentine Chaco. (*C. A.* **30**, 2030.)

Characteristics of halibut-liver oils. R. T. M. Haines and J. C. Drummond. *Analyst* **61**, 2-7 (1936). Norman Evers, A. G. Jones and Wilfred Smith. *Ibid.* 7-11 (1936); cf. *C. A.* **29**, 4960.—The increasing use of this oil in medicine makes it important that the analyst should know the characteristics of a pure sample of oil to detect adulteration. In the first of these 2 independent papers, the values obtained in the analysis of 18 samples of West Greenland oils, 9 samples of Labrador oils and 3 samples of Iceland oils are given. In the second paper, the values obtained from 41 samples of Iceland, Faröes and West Greenland oils and of 5 samples of Norwegian oils are tabulated. The "blue values" of West Greenland oils, indicating the vitamin A content, varied from 625 to 12,930. The lowest blue value in any sample of pure oil was 495. The sp. gr. of all the oils was 0.928 or a little less. The I values ranged from 114.0 to 161.0. Apparently there is some relation between a high I value and a high content of vitamin A but it is not quite clear what this is. The refractive indices varied from 1.47 to 1.48, the unsaponifiable matter from 6.34 to 17.6%. (*C. A.* **30**, 2030.)

Chemical studies of cottonseed and its products. W. D. Gallup. Okla. Agr. Expt. Sta., *Rept.* **1932-4**, 177-80 (1934).—Cottonseed having a high oil content also had a high content of *gossypol*. For seeds of low oil content the oil: gossypol ratio was 55:1, and for oil-rich seeds the ratio was only 35:1. The presence of gossypol in the crude oil reduces the alkali refining loss of the oil. The nutritive values of cottonseed meal are discussed. (*C. A.* **30**, 2030.)

Composition of rape-seed oil. Riichiro Yamasaki and Kentaro Ichihara. *J. Chem. Soc. Japan* **56**, 1332-4 (1935).—Fat acids of the oil consisted of behenic 0.8, erucic 55, oleic 14, linolic 24, linolenic 2 and palmitic 3.5%; it contained also myristic, palmitoleic and stearic acids but the amt. was small. The presence of rape-seed oil in the other oils can be identified by the detection of erucic acid, and the presence of the other oils in rape-seed oil by estg. stearic acid. (*C. A.* **30**, 1598.)

Detection of rape oil in edible fat. J. Grossfeld. *Chem.-Ztg.* **59**, 935-6 (1935).—The method for detg. the amt. of rape oil in other oils depends on the estn. of the content of erucic acid by detg. the I absorption of the insol. fat acid Pb salts obtained from the sample. The method is similar to the Grossfeld and Peter procedure for estg. isoöleic acid in oils. The sensitivity is increased by adding palmitic acid to the test sample so that the insol. Pb salt of the erucic acid is absorbed by the Pb palmitate. As little as a 2%

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admixt. of rape oil to linseed oil can be detected. (*C. A.* **30**, 1598.)

The effect of drying castor beans on the oil. M. Zhdan-Pushkin and M. Sokolova. *Masloboĭno-Zhirovoe Delo* **1934**, No. 6, 15-17.—The drying of the castor beans at temps. of 156-178° for 1-10 min. decreases the acid no. (owing to volatilization of the free acids) and causes polymerization of both the free acids and oil. (*C. A.* **30**, 1597.)

Fats. Louise Stanley. *Rept. of the Chief of the Bureau of Home Economics for* 1935, pp. 5-6. Keeping tests on 3 kettle-render and 1 prime steam-lards, 2 hydrogenated vegetable fats and 3 vegetable oils are reported. After 1 yr. the lards, corn oil and peanut oil showed greatest deterioration. The hydrogenated fats showed the most consistent high score. At the end of 1½ years the fats were used as shortening in biscuits and judged for taste and odor. Two of the kettle-rendered lards made from fat of hogs fed resp. on a peanut and a corn ration were most frequently marked by judges as stale or rancid. Cottonseed oil also scored low in flavor. The prime steam lard ranked among the best. The corn oil gave the most desirable flavor although the peroxide value was the highest of all the fats.

Extent of change in saturated fats as compared to unsaturated fat. III. Heat and aldehyde formation. H. Werner, H. Schmalfuss, and A. Gehrke. *Margarin Ind.* **29**, 4-8 (1936); *Chem. Zentr.* **1936** (I) 2467-8. The observation that lauric acid on heating apparently becomes aldehydic easier than unsatd. oils; whereas, the reverse is expected, prompted the authors to investigate whether or not some of the aldehyde formed is decomposed by heating. Tests were made by treating the oils at 120, 150 and 180° and periodically determining the aldehydes by modified von Fellenberg and Kreis tests. The tests were modified to give some quantitative aspects. Coco fat, palm kernel fat, glycerin, paraffin oil gave good von Fellenberg test which first increased and then decreased. Soybean oil, peanut oil, lauric acid, and methyl esters of lauric and caprylic acted similarly but in a lesser degree. Kreis test was positive only in coco fat, palm kernel fat, soybean oil and peanut oil. This also rose to a max. in intensity and then decreased. In both cases (von Fellenberg and Kreis test) the speed of development of products giving positive reactions was most rapid at the higher temps. The decrease is about 100 times slower than the ascent of the positive reaction.

The bactericidal effect of peroxides in irradiated cod liver oil. F. A. Stevens. *J. Infect. Diseases* **58**, 185-9 (1936).—The bactericidal effect of peroxides formed in cod liver oil during irradiation with ultraviolet light has been demonstrated. These peroxides are either soluble in or miscible with salt soln. and by adding reducing agents such as cysteine or thioglycolic acid the bactericidal effect on hemolytic streptococcus is overcome. Peroxides are taken out of salt solution by the bacteria so that they eventually die, or the effect of the peroxides adherent to the cells continues over several hours, because the introduction of reducing agents into the environment of streptococcus previously exposed to the peroxides fails to overcome the bactericidal effect.

A simple method for water content in filled oil tanks. *Seifensieder-Ztg.* **62**, 861 (1935). A paper is satd. with a sugar soln. containing a water sol. food dye and dried. The paper is then attached to a measuring stick. The depth of the water is noted by the discoloration produced on the paper. (*Chem. Zentr.* **1936**, (I), 1991.)

PATENTS

Rendering Process. J. P. Harris (Industrial Chemical Sales Co., Inc.). U. S. 2,035,126. Mar. 24, 1936. This is a combined rendering, deodorizing and decolorizing process. Between 0.05 to 1.0% activated carbon is added to the animal tissues before subjecting to rendering temps. The process yields products of a good grade, free from objectionable odor, of good color and taste, and of better keeping qualities.

Refining Vegetable and Animal Oils and Fats. O. Brucke (American Lurgi Corp.). U. S. 2,035,589, Mar. 31, 1936. The soap and other impurities in alkali neutralized fats or oils are removed by treatment with alc. and a concd. salt soln. by a process in which the mixts. stratify in two layers on standing; the lower layer containing the soap soln. is then separated from the layer of neutral oil or fat.

Comminuted Shortening. G. H. Kraft (Kraft-Phenix Cheese Corp.). U. S. 2,035,899, Mar. 31, 1936. Shortening can be prepd. in powdered form by homogenizing fat with liquid whey so as to obtain an emulsion and then drying with a spray process. The final product contains 70 to 80% shortening material.

Emulsifying Apparatus. Charles F. Chapman (Kraft-Phenix Cheese Corp.). U. S. 2,033,412-3, Mar. 10, 1936. Structural features of apparatus and a method for emulsification for mayonnaise manufacturer are described.

Sunflower-seed fat of definite melting point and consistency. D. A. Nechaev, A. D. Lebedev and I. A. Oberhard. Russ. 37,787, July 31, 1934. Hydrogenated sunflower-seed oil is melted at 60-75° and then crystallized. The nonsolid part is pressed out at 75 atm., the solid part melted again at 60-75°, recrystd. and pressed. The fraction obtained by pressing at 300 atm. and 37° is finally left at 15° until solidified. (*C. A.* **30**, 2032.)

Purifying fish oil. Weaver L. Marston (to Sharples Specialty Co.). Can. 354,307, Nov. 19, 1935. The impure oil obtained by expression from fish is heated directly by steam and part of the steam is condensed. Nearly all the remainder of the steam is evapd. The oil is then continuously sepd. from impurities by centrifuging. (*C. A.* **30**, 2032.)

Varnish Basis. C. Ellis (Ellis-Foster Co.). U. S. 2,033,131, Mar. 10, 1936. A coating compn. is prepd. by reacting a drying oil and/or drying oil acid with an acid such as maleic, fumaric, cinnamic or like acid, or their anhydrides. U. S. 2,033,132 pertains to making the above soluble in aqueous ammonia by treatment of the reaction product with NH_3.

Protective Coating Composition. C. A. Thomas (Monsanto Petroleum Chemicals, Inc.). U. S. 2,035,250-1, Mar. 24, 1936. Beta-Naphthol (1-10%) prevents the tendency of tung oil coatings to crystallize during drying.