ABSTRACTS

Oils and Fats

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

Melting points of solid animal fats and their mixtures. II. Adam Koss. *Przemysl Chem.* 19, 139-47 (147-8 in French) (1935); cf. *C. A.* 29, 6083^7.—Horse, pork, beef, goat and sheep fats were used individually and in combinations of 2 ranging by 10% steps in proportion from each pure fat to every other pure fat. The solidification points were detd. by the methods of Finkener (modified), Zukow, and Wolfbauer, the first of which gave the lowest values but is regarded as the most reliable. The methods are critically compared. For the fats listed in the above order the values according to the F. method were found to be: 35.32°, 41.01°, 43.63°, 47.31° and 50.13°. There is no regular relationship between percentage mixts. of any 2 fats and increase of the solidifying point. M. ps. of the acids of these fats cannot be used as the only basis for identifying their identity, but the Polenske method and other chem. analytical methods should be applied. Mixts. of horse fat with beef, goat, and sheep fats, and of pork with sheep fat show minima in solidification values which may be regarded as eutectic mixts. corresponding to $C_{18}H_{36}O_2.C_{16}H_{32}O_2$ or as solid solns. Mixts. of goat with sheep fats showed a max. in the solidification temps. A. C. ZACHLIN.

Changes in fat during storage. C. H. Lea. *Dept. Sci. Ind. Research, Rept. Food Investigation Board* 1934, 34-8 (1935); cf. *C. A.* 29, 367^2.—A no. of typical curves for the rates of oxidation of various natural oils and fats, detd. by the previously described method (*C. A.* 29, 1273^4), are given. The appearance of taint in the fat of chilled beef is usually to be attributed to the action of micro-organisms, and the free acid content of the fat may conveniently be used as an index of spoilage. The acidity of tainted fat is almost invariably higher than normal, although the actual values attained depend on the nature of the contamination. The typical data obtained from examn. of com. chilled beef fat are given and compared with the free acidity of freshly killed beef fat and with that of fat inoculated with a suspension of spores of *Mucor*. Bleached grayish, brownish or white patches have sometimes been observed on the external fat of quarters stored in an atm. contg. CO_2, usually appearing first in regions where the covering of fat is thin, or where contact beteween quarters or chafing has occurred. This discoloration is apparently due to the conversion of oxyhemoglobin to methemoglobin accompanied in more advanced cases by bleaching of the yellow pigment, and seems to be accompanied by oxidation of the fat. Deterioration in flavor of the fat of chilled beef may therefore be produced by the agency of micro-organisms, by the absorption of odors, or by oxidation, but the last may become significant only when the meat has been unduly exposed to light, or subjected to the long periods of storage made possible by the use of CO_2.
A. PAPINEAU-COUTURE.

Antioxidants and the preservation of edible fats. C. H. Lea. *Dept. Sci. Ind. Research, Rept. Food Investigation Board* 1934, 38-43 (1935).—A study of the possibility of utilizing alipathic amino and hydroxy compds. as antioxidants for the preservation of lard. The efficiency of the antioxidant can most conveniently be expressed in terms of a "protection" factor (*P. F.*), defined as the ratio of the lengths of the induction periods in the presence and absence of antioxidant. Curves are given, leading to the following conclusions: pro-oxidants (*P. F.* 0.05)—succinic, tartaric, citric and lactic acids; inactive (*P. F.* 1.0)—mannitol; weak antioxidants (*P. F.* 1.0-2.0)—glycerol, glucose, sucrose, fructose, Na maleate, Na succinate, moderate antioxidants (*P. F.* 2.0-3.0)—Na malate, NH_4 lactate, Na tartrate, Na glycolate, Na lactate; powerful anti-oxidants (*P. F.* 4.5)—glycine, asparagine, Na citrate, Na malonate. The rates of oxidation of films of lard stored in contact with a series of acetate, phosphate and borate buffers indicated a max. stability slightly to the acid side of the neutral pt., with a very rapid fall as the soln. became alk. Lard in contact with pickle also became less stable with increasing acidity, which is presumably due to a proöxidant effect of free HNO_2; the data for water, on the other hand, showed no evidence of more rapid oxidation in the acid solns. other than can be accounted for by change in the buffer system. Lard oxidizes much more rapidly in borate than in phosphate solns. of approx. the same *p*H, except at high alkalinities when the distinction vanishes; whence it is probable that phosphate possesses antioxidant properties. Na citrate, Na malonate and glycine all exerted a protective effect at 20° and at *p*H values of 5.8, 6.7 and 8.2.
A. PAPINEAU-COUTURE.

Adulteration of peanut oil with coconut oil. H. Reubenbauer. *Przemyst Chem.* 19, 9-10 (1935).—A 10% admixt. of coconut oil can be detected because it has a lower sp. gr., *n* and I value, but a higher sapon. value, Reichert and Meisl, and Polenske values. Polish laws prescribe labeling of mixed edible oils as "edible oils" to distinguish them from olive oil in native parlance. A. C. Z.

Waxes in the candle industry. L. W. Geller. *Oil and Soap* 12, 263-5 (1935).—Waxes in use for candles consist of paraffin and beeswax. Stearic acid is the only known hardening agent for paraffin. It raises the bending point, lowers the mp. p. and can be used in any quantity without impairing the burning quality of the candle. The hydrogenated oils and fats serve as hardening agents for paraffin and are used chiefly for candles which are consumed in glasses. Synthetic or natural resins can be used in the form of coatings only and are used chiefly for decorative candles. No known synthetic hardening agent for candle wax can be satisfactorily substituted for stearic acid even in such a mixt. as 95% paraffin, m. 135°, and 5% stearic acid. E. SCHERUBEL.

Analysis of national grape-seed oil. Rodolfo Rouzaut. *Rev. facultad quim. ind. agr.* (*Univ. nacl. litoral, Argentina*) 3, 192-6 (1934).—Oil from fresh grape seeds has the following charteristics: d_{15} 0.9255, m. —10.5°, n^{19}/D 1.47649, n^{24}/D 1.46828, η^{25} 0.2584, acid no. 2.084, oleic acid 1.046%, SO_3 0.148%, sapon. index (Köttstorfer) 189.57, I_2 no. (Hübl) 133.72, volatile acid no. (Reichert-Meissl) 0.537, thermosulfuric test (Tortelli) 77.2°, crit. temp. of soln.

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(Valenta) 85°, (Crismer) 60.5, butyrorefractometer reading at 25°, 73. It gives a neg. elaidin and Halphen tests, pos. Bellier, Heydenreich, Hauchecorne and resin (Morawski) tests. The value of this oil as a food has hitherto been largely disregarded.
W. F. BRUCE.

Sulfurization of oils [and sulfur tanning]. Ahmed Abbassi. *Cuir tech.* 24, 236-8, 251-3, 305-7 (1935); cf. *C. A.* 29, 7692^7.—An abridgment of a thesis, giving A.'s conclusions without data or exptl. details. *Conclusions*: Oils (drying, semidrying, and nondrying) dissolve 1-3% S and undergo slight darkening, increase in viscosity, and decrease in I value. Heated under pressure, the percentage of S dissolved may be increased to 10% and changes in properties are enhanced. Oxidized oils (especially cod liver) react more readily than unoxidized. When S-tanned leather is treated with oxidized cod oil, S reacts with the oil, but the product does not act as a tanning agent. H. B. MERRILL.

Gadusene, an unsaturated hydrocarbon occurring in animal and vegetable oils. Jiro Nakamiya. *Sci. Papers Inst. Phys. Chem. Research* (Tokyo) 28, 16-26 (1935).—*Gadusene* (I), $C_{18}H_{32}$, an unsatd. hydrocarbon, has been obtained from the nonsaponifiable fraction of fish-liver oils of *Gadus macrocephalus, Theragra chalcogramma, Stereolepis ischinogi,* and further from the same fraction of rice embryo and soy oils. Catalytic hydrogenation of I gives *gadusane,* $C_{18}H_{38}$, b. 85-6°, n^{20}/D 1.4632. I has 5 characteristic absorption bands, A (3333, 3273, 3210), B (3090, 3020), C (2865, 2785, 27121), D (2544), E (2407, total absorption). W. J. PETERSON.

Rate of formation of fully saturated glycerides during hydrogenation of different natural fats. T. P. Hilditch and H. Paul. *J. Soc. Chem. Ind.* 54, 336-8T (1935).—Rape, olive and cottonseed oils, 2 varieties of palm oil and pig back fat were hydrogenated progressively. The results show that the glyceride structure of a hydrogenated fat depends: on the glyceride structure of the original fat, the manner in which the fat acid radicals *per se* are affected during hydrogenation, and the manner in which mixed glycerides of different configurations behave differently toward catalytic hydrogenation (i. e., the apparent reluctance with which an unsatd. β-acyl group is hydrogenated in comparison with an unsatd. α-acyl group in the glyceride mol.). The proportions of fully satd. glyceride of the 6 fats when 50% of the original unsatd. acids have been hydrogenated are:

	50% hydrogenated fully satd. glycerides % (mol.)	Original Fat	
		Total satd. acids % (mol.)	Palmitic acid % (mol.)
Rapeseed oil	20	3	2
Olive oil	24	14	12
Cottonseed oil	29	27	25
Cape Palmas palm oil	32	41	36
Belgian Congo palm oil	37	50	45
Pig back fat	41	44	30

E. SCHERUBEL.

Selectivity of hydrogenation. M. Zaayer. *Chem. Weekblad* 32, 393 (1935).—The selectivity of more and less active catalyzers was studied by using peanut oil, at 120°, 3% catalyzer (usual Ni kieselguhr either freshly made or kept for 2 months). Whereas the activity difference was marked, the more selective hydrogenation results were obtained with the most active catalyzer as shown from a table and a graph of percentage of satd. acid, *vs.* I addn. no. of fatty acids.
B. J. C. v. d. H.

An innovation in the hydrogenation of oils. R. Heublyum. *Mat grasses* 27, 10589-90, 10618-9, (1935).—Attention is drawn to Bag's highly active Ni-Al catalyst (*C. A.* 26, 2075) and to its advantages, one of the most important of which is the possibility of working continuously instead of in batches.
A. PAPINEAU-COUTURE.

Detection of nickel in hydrogenated fats. M. Struszynski. *Przemyl Chem.* 19, 48-9 (1935).—From 2 to 10 g. of fat is melted and left on the hot bath to settle out such impurities as rust, and then the clear liquid is poured off for analysis. About an equal vol. of HCl, sp. gr. 1.12, together with a small quantity of HNO_3 or $KClO_3$ is added and the mixt. is shaken well and frequently, the flask being heated on a water bath. The two layers are then allowed to settle out. When solidified the fat is punctured and the acid ext. is poured off into an evapg. dish and brought to dryness. The residue is taken up with 2-3 drops concd. HCl and 1 drop HNO_3. The soln. is washed down into a small bottle with about 2 cc. H_2O. A bit of tartaric acid or K tartrate is added, then a few drops of dimethylglyoxime in alc. and finally a small excess of NH_4OH. The liquid is shaken with 1-1.5 cc. purest $CHCl_3$ which is then collected in a pipet and placed in an evapg. dish where it is dried out while blowing the liquid in order to collect the residue in the smallest possible area. The min. quantity of Ni detectable by this method is 2×10^{-5}. In case the residue is colored brown (presence of Fe+ or Co) the residue is washed with a few drops of H_2O whereupon the red color becomes clearer. Since Fe+ does not interfere with the test all Fe should be in the oxidized state. A. C. ZACHLIN.

Report on the (determination of) hydroxyl number and acetyl value of fats and oils. Willard L. Roberts. *J. Assoc. Official Agr. Chem.* 18, 434-9 (1935).—A collaborative study was made of (1) the André-Cook (Cook, *C. A.* 16, 1674), (2) the Roberts-Schuette (*C. A.* 26, 4491) and (3) the West-Hoagland-Curtis (*C. A.* 28, 3434^9) methods. With (1) the sapon. nos. of the unacetylated oils were in fair agreement, but those obtained from the acetylated oils varied considerably, showing either improper acetylation, improper washing of the acetylated products, or both. The results of (2) showed, with a few exceptions, good agreement; a few high results were doubtless due to some loss of Ac_2O, which should be obviated by greater experience of the analysts with the method. The results obtained by (3) were notably lower than those obtained by (1) and (2). In (3) the end point of the titration of the acetylated fat soln. faded in the cold, and faded again repeatedly after being restored; this

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would indicate that some hydrolysis of the acetylated sample takes place, which may account partly or wholly for the low results obtained as compared with those of (1) and (2). A. PAPINEAU-COUTURE.

Carr and Price reaction of the fat acids of cod-liver oil after vigorous saponification. A. Emmerie. *Nature* 136, 183-4 (1935); cf. Edisbury, Morton and Lovern, *C. A.* 29, 6086^3.—Cod-liver oil was sapond. for 10 min. with EtOH-KOH, and the fat acids were distd. (at 0.2 mm.). They gave a yellow color with $SbCl_3$ in $CHCl_3$. The acids were sapond. for 6 hrs. in N under reflux with an excess of AmOH-KOH. The regenerated acids gave with the Carr and Price reagent a relatively strong and rapidly decreasing violet color with absorption at 600-620 mμ and at 530-550 mμ. The substance responsible for the reaction was pptd. with light petroleum. The ppt. was dissolved with a small amt. of Me_2CO or $CHCl_3$ to remove an insol. impurity. After evapn. and drying *in vacuo* a yellow amorphous powder was obtained. From 15 g. of fat acids a few mg. of the yellow product was obtained. A dil. soln. in $CHCl_3$ was yellowish green. With the Carr and Price reagent a violet color developed with absorption bands at 525-535 mμ and at 590-620 mμ. The 525-535 mμ band rapidly decreased, the reaction mixt. turned blue to greenish blue and a band at 670-690 mμ became visible. The Lovibond value was 75,000 (Wolff) or blue value 15,000. E. D. WALTER.

Recommended standard procedure for measuring the color of oils. G. S. Fawcett. *Analyst* 60, 467-8 (1935). It is suggested that a 2-in. cell be used with the Lovibond tintometer, in place of the 5.25-in. cell so often used in America, and that when the color exceeds 20 units in yellow, the sample should be tested in a 0.25-in. cell. Agreement should also be made with respect to the source of light.

The color reaction of Morawski-Fachini given by expressed olive oils. G. Leoncini. *Boll. ist. super. agrar. Pisa* 10, 409-17 (1934).—Oils from Tuscany olives attacked by some microörganisms gave the reaction of Morawski-Fachini (cf. F., *C. A.* 21, 3474), but not the Bellier reaction. G. A. BRAVO.

The present position of refining edible oil by distillation and the synthetic-oil industry. F. Wittka. *Allgem. Oel-u. Fett-Ztg.* 32, 229-35, 282-6 (1935).—The economic possibility of prepg. synthetic oils (A) by esterifying glycerol with the fat acids obtained by distn. are discussed. The A made to resemble olive oil differ from the natural oil in that they have a greater viscosity; they lack taste and are less stable. Because A are of lower value than the natural products, they should not be sold as the natural products or used as adulterants of such. The A may be detected by detg. the I no. of the solid fat acids sepd. according to the Twitchell method. Natural oils give a very low I no. in this test; for olive oil it is 0.3; the A yield I nos. up to 14. M. M. PISKUR.

The partial hydrogenation of fish oil. III. The hydrogenation of unsaturated fat acids of the oleic series of sardine oil. Masakichi Takano. *J. Soc. Chem. Ind., Japan* 38, Suppl. binding 302-4 (1935); cf. *C. A.* 29, 6451^2.—A mixt. of Et esters of I no. 92.96 and sapon. no. 198.9, which consisted almost exclusively of esters of the oleic series, was sepd. from Hokkaido sardine oil. The mixt. was hydrogenated with a Ni catalyst at 200-10° and portions were tested at intervals till the I no. reached 17.48. The exptl. results indicated that hydrogenation proceeded selectively, with the lower mol. wt. acids being hydrogenated more easily, which would give the following order: zoömaric, oleic and unsatd. C_{20} or C_{22} acids. KARL KAMMERMEYER.

Complex method of refining fats. I. Shenderovich. *Masloboĭno Zhirovoe Delo* 11, 224 (1935).—A suggestion is made for refining (neutralizing, washing, decolorizing and deodorizing) fats in mixts., and for refining the mixt. forming the "base" of margarine. CHAS. BLANC.

Effect of drying temperature of nickel formate on its activity. I. Petryaev. *Masloboĭno Zhirovoe Delo* 11, 221-2 (1935).—$Ni(Co_2H)_2$ was dried at various temps. between 100° and 150° and used in the hydrogenation of oils. The products dried at higher temps. contain more reduced Ni and give fat mixts. of margarine with lower m. ps. The best results were obtained with $Ni(Co_2H)_2$ dried at 100° in a steam-heated drier. CHAS. BLANC.

Hydrogenation of olive oil. T. Christopoulos and A. Konsta. *Praktika* (*Akad. Athenon*) 9, 26-30 (1934).—Neutralized olive oil was hydrogenated at 200° for 5-6 hrs. with 3% of a diatomaceous earth catalyst (18% Ni). A fat of f. p. 61.5° and I value 2.9 was formed. Linoleic acid is first attacked, after which formation of stearic and isooleic acid begins. B. C. A.

PATENTS

Industrial oils and fats. Escher Wyss Maschinenfabriken A.-G. Swiss 177,269, Aug. 1, 1935 (Cl. 38*a*). App. is described for obtaining fats and oils from animal matter by evapg. off the water *in vacuo* at temps. below 100°.

Cashew nut shell oil extraction. Thomas M. Rector (to Baker-Bennett-Day, Inc.). U. S. 2,018,091, Oct. 22. For extg. oil from the shells of whole nuts, the nuts are immersed in a heated bath of the shell oil, at a temp. and for a time adjusted to effect discharge of a major portion of the contained shell oil without scorching of the nut kernels. App. is described.

Lecithin and oil mixtures from fresh soybean sludge. August Gehrke. U. S. 2,018,781, Oct. 29. A storable mixt. is obtained by treating soybean sludge with glycerol and then sepg. undissolved solids from the aq. glycerol mixt. The product is suitable for use in foods, etc.

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