that exact value glasses of strictly additive properties according to the N″ scale are available, the troublesome fractional values previously existing can be avoided, and color readings greatly simplified.

One of the major advantages of this instrument is the employment of the whole color glasses. Existing sets can be inserted in the disks without cutting or changing in any manner. The glasses can be as readily removed for checking, inspection, or replacement.

The use of an instrument of this type obviates the continual breakage of the color glasses inherent in any instrument where the glasses are placed by hand. Accuracy and the reliability of results are increased, as the glasses are always clean. In spite of every precaution it is impossible to keep the glasses absolutely clean when they are handled with oily fingers. Frequent cleaning cannot help but abrade the thin flashing on the glasses, and change their values.

The best way to read the color of an oil is to approach the true match from both sides; that is, to bracket the color. This is time consuming and laborious with hand manipulation, and is all too frequently neglected. With a mechanically operated colorimeter of the type described, bracketing of the color is the simplest and easiest way to match the sample.

The construction of the magazine as a separate unit enables it to be used with almost any existing light box with very slight alterations.

The original instrument has been in daily use for over eight years, during which time many thousand samples have been read. Hundreds of comparisons have been made with a number of the present official instruments. The results have been concurrent in every way. No trend toward lighter or darker colors has been noticed.

In the design and construction of this instrument the writer is indebted to Mr. Elmer Aichele of the Ivorydale Engineering Division, and to Mr. Fred Phillips of the W. H. Simmons Manufacturing Company, who so ably assisted in working out the many mechanical details of construction.

ABSTRACTS

Oils and Fats

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

The emulsification capacity of edible fats. G. Mészáros. *Z. Untersuch. Lebensm.* 69, 318-30 (1935).—The biol. value of an edible fat does not depend alone on its m. p., but also on other phys. and chem. properties (taste, no. of double bonds, capacity for emulsification, length of the C chain, condition at the time, etc.) on impurities and whether one is accustomed to the use of the fat. The size of the fat drops in an emulsion depends more on the method of prepn. than on the properties of the fat. M. expresses the emulsification capacity in units which is called the emulsification capacity no. (*E* no.). This *E* no. represents the mg. of fat which can be emulsified under certain conditions in 100 g. of H_2O, but without the aid of emulsifying agents. Tests of the emulsification capacity of fats show that the fats fall into 4 groups. (1) Fats which show a very good emulsification capacity (*E* no. over 50): goose fat, horse fat, lard, crude rapeseed oil (crude sunflower oil?). (2) Good emulsifying fats (*E* no. 20-50): butter, butter fat, peanut oil, sesame oil. (3) Poor emulsifying fats (*E* no. about 10): coconut oil, palm-kernel oil, soybean oil, beef tallow. (4) Very poor emulsifying fats (*E* no. under 10): illipe fat, hardened train oil. Thirty-two references. F. L. DUNLAP.

Behavior of fats and oils with air, light and plant enzymes. L. M. Horovitz-Vlasova, E. E. Kachanova and A. D. Tkachev. *Z. Untersuch. Lebensm.* 69, 409-21 (1935).—The O of the air, moisture and light cause oxidation processes in fats and oils without a trace of lipolysis, even in the absence of microörganisms. The oxidative action of the O of the air is rather weak, in any case much weaker than that of pure O and particularly O *in statu nascendi* (O of peroxides). The action of diffused daylight is also weak, while that of direct sunlight and especially of ultraviolet light is much more intense and rapid. Parts of plants such as the soybean contain oxidase having the power of oxidizing fats and oils (lipoxidase). Pure oxidative processes without the action of lipase and in sterile fats and oils are recognized by the following characteristics: organoleptic changes, such as a rancid or tallow-like taste and odor, increase in refraction, pos. reactions which are recognized by a labile O, formation of hydroxy acids, peroxides and aldehydes, lowering of the I no., pos. value for the caprylic acid no. and the Issoglio no. There is no principal distinction to be made between rancid and tallow-like odor and taste, as they are both assocd. with the formation of various oxidation products such as hydroxystearic acid and epihydrinaldehyde. Although oxidative processes proceed more rapidly in split fats, a preliminary lipolysis is not necessary for the oxidative effects. Plant lipases such as ricinase produce an energetic splitting of fats without a trace of oxidation. Lipolysis in these cases is characterized as follows: high acid nos., pos. Nile blue reaction, presence of free glycerol; if it is a question of microbial lipase, the glycerol characteristic may be lacking because of its more rapid fermentation. Fats and oils should be carefully protected not only from bacteria but also from the action of light, air and moisture. It is recommended with large amts. of fats and oils, for lengthy cold storage, that they be tested for beginning oxidation and lipolysis. If these tests are pos., precaution must be taken to keep the fats and oils at —10° or lower, with careful protection from light and air. Twenty references. F. L. DUNLAP.

Comparative study and evaluation of methods for determining saturated compounds in fats and oils. D. Nikitin. *Trudui VNIIZh* 1934, No. 2, 35-59.—The Bertram (I), Holde-Selim-Bleyberg (II), Twitchell (III), Kaufmann (IV) and Grossfeld (V) methods for fat analysis are critically compared, by analyses of stearic and palmitic acids, cacao butter, grapeseed, sesame and soybean oils and mutton fat. The best method is IV in absence of linolenic acids or I in absence of unsatd. acids of high mol. wt., cyclic acids and oleic acid or its isomers or homologs; III gave lower results than either, and II is still less accurate.

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For ordinary analysis V is not recommended, but it is useful in sepg. binary mixts.
JULIAN F. SMITH.

Determining the fat content of oil seeds and cake by the shaking method. P. Zauchenko, L. Krupitzkaya and K. Kokhova. *Trudui VNIIZh* 1934, No. 2, 2-8.—A new procedure for detg. fat was applied to seeds and press cake from flax, sunflower, hemp and other seeds. The weighed sample (seeds 1 g., press cake 2 g.) is wrapped in filter paper and covered with petr. ether in an Erlenmeyer flask which is shaken constantly (seeds 1 hr., press cake 2 hrs.). Fat is detd. in an aliquot portion of the ext. The method is faster and simpler than the Soxhlet detn., with equal accuracy. JULIAN F. SMITH.

The preparation of pure elaidic acid and the elaidination reaction. A. Lyutenberg. *Fettchem. Umschau* 42, 89-91 (1935).—Methods for prepg. elaidic acid were reviewed and studied. The following procedure is recommended: A layer of liquid fat acids, sepd. from peanut oil or, better, from olive oil by Twitchell's method, is floated on 30% HNO_3 and 1.0-1.5 g. $NaNO_2$ (amt. independent of the quantity of fat acids used) stirred in gradually in the course of 5 min. It is cooled with a mixt. of salt and ice while the stirring is continued. The solidified mass of fat acid dissolved in Et_2O is next washed with cold water until free of HNO_3, the Et_2O soln. dried over dehydrated Na_2SO_4, the Et_2O removed preferably by distg. at room temp. under a vacuum and the raw elaidic acid recrystd. 2 or 3 times from abs. alc. or Et_2O. HCN was detected among the gases escaping during elaidination. J. W. PERRY.

Hydrogenation tests in presence of nickel formate. V. Yashchenko. *Masloboĭno Zhirovoe Delo* 10, No. 11, 22-3 (1934); *Chimie & industrie* 34, 404.—Ni $(HCO_2)_2$ is prepd. from $NiSO_4$ and $NaHCO_2$. The filtered and dried product is mixed with oil in the proportion of 50 kg. per 500 kg. of oil previously raised to 80-120°. The mixt. is heated to 170-80°; H is passed through the retort, and the temp. is raised progressively to 220° in 2 hrs., to 420° in a further 2 hrs., and is held for 1 hr.; during these 5 hrs. of heating the $Ni(HCO_2)_2$ is reduced and hydrogenates the oil. Through the reduction, which takes place according to the equation $Ni(HCO_2)_2 = Ni + CO + CO_2 + H_2O$, theoretically does not require any H, it was found that the catalyst obtained in absence of H is inactive. Before reduction the $Ni(HCO_2)_2$ must be triturated with a well-refined oil of low acidity. Drying should be carried out at 70-100°. The catalyst obtained under these conditions is superior to the usual catalyst. A. P.-C.

A rapid method for the determination of crude fiber in oil seeds and their press cakes. A. Lyutenberg and E. Mirer. *Z. Untersuch. Lebensm.* 69, 331-6 (1935).—The method of Kürschner-Hanak (*C. A.* 25, 1601) must be considered the most suitable for the detn. of crude fiber in oil seeds and press cake of sunflowers, hemp, cotton and castor-oil plant. Of all methods investigated by L. and M., the Kürschner-Hanak method possesses the following advantages: the removal of the oil from the material being investigated is unnecessary; the residues obtained are distinguished by their purity and constancy of values; the amt. of reagents and the time necessary for the detn. are small. The results of crude-fiber detns. by the method of Kürschner-Hanak and that of Henneberg-Stohmann differ widely from each other. L. and M. believe the latter method should be abandoned. Also in *Trudui VNIIZh* 1934, No. 2, 82-96.
F. L. DUNLAP.

Nickel formate as a catalyst in hydrogenating fats. A. Zinov'ev, M. Vinogradova and V. Ivanova. *Trudui VNIIZh* 1934, No. 3, 16-23.—High potency in Ni catalysts prepd. from Ni formate is attained only when decompn. of the formate is effected in the liquid phase, e.g., in an oil medium; decompn. in an atm. of H_2 is not effective. Catalysts prepd. from NiC_2O_4 were also studied. JULIAN F. SMITH.

Separation in refining (of fats). A. Schmidt and O. Mikhaĭlovskaya. *Masloboĭno Zhirovoe Delo* 11, 255-8 (1935).—Preliminary expts. showed the possibility of a continuous process of neutralization of fats with the aid of De Laval centrifugal app. by const. feeding of fat and alk. soln. into the neutralizer and sepn. of the soap stock from the oil. The best results in sepn. were obtained at 85-90° with the addn. of H_2O or NaCl soln. C. B.

Soap stock as a bleaching agent in refining fats. A. Strel'tzov. *Masloboĭno Zhirovoe Delo* 1935, 151.—In refining fats and oils the color can be improved by adding 8-10% soap stock to the fat.
JULIAN F. SMITH.

The Bertram method for determining saturated acids. A. Lyutenberg and T. Dudkina. *Trudui VNIIZh* 1934, No. 2, 60-2; cf. C. A. 29, 7681[1].—The Bertram method (cf. C. A. 29, 6084[9]) for detg. satd. acids was tested with satd. acids from peanut oil, alone and with elaidic acid (50:50 and 25:75) and with the satd. acids from cottonseed oil. Oxidation should be at room temp. rather than at 35-50°. The aq. filtrate need not be extd. with petr. ether; the satd. acids can be easily filtered off after cooling the aq. liquid. The Bertram method gives ppts. having a considerable I no., whereas in the modified method the I nos. of the ppts. are approx. O. JULIAN F. SMITH.

Comparison of methods for determining iodine number of vegetable and animal fats. S. Yushkevich. *Trudui VNIIZh* 1934, No. 2, 9-34; cf. *C. A.* 27, 5997.—The Wijs, Margosches and Steipel (calorimetric) methods for detg. I no. are compared by tests with various oils and fats and oleic acid; $CHCl_3$, CS_2, gasoline and EtOH:C_6H_6 (1:2) are used as solvents instead of CCl_4. Results were approx. the same as those with CCl_4 and agree with the standard methods of Hübl and Hanus. The best solvent is CCl_4, followed closely by $CHCl_3$ and CS_2; gasoline gives the poorest results. The Wijs method gives higher I nos. than the Hanus and Hübl methods and is not recommended for routine work. I nos. tend to increase with reaction time (up to 24 hrs.) and with increasing excess of reagent. Margosche I nos. agree well with the Hübl and Hanus detns. Stiepel's calorimetric method also gives good agreement with the standard methods and is rapid, requiring only 15-20 min. for a liquid fat; it is recommended for routine work when analyzing single oils, as in hydrogenation. As the solvent, CCl_4 may be replaced by $CHCl_3$, or by CS_2 if the ventilation is adequate. J. F. S.

Determination of the rate of melting of animal fats. B. Vasil'ev. *Masloboĭno Zhirovoe Delo* 10, No. 11, 52-4 (1934); *Chimie & industrie* 34, 642.—Nat-

ural animal fat which has been liquefied under definite conditions, placed in a narrow glass vessel of given dimensions and then cooled to 0° for a given time, solidifies. When the vessel contg. the solid fat is placed in hot water the rate at which the fat melts is higher according as it contains more easy melting fat acids (e. g., oleic) and lower according as it contains more high-melting fatty acids (e. g., stearic and palmitic). To det. the rate of melting a ball of given diam. and wt. is placed on the surface of the solidified fat, the vessel is rapidly transferred from the cooling medium to a heated medium and the time required for the ball to reach the bottom of the glass vessel is noted with a stop watch; this time is a const. characteristic of the fat. A 1-g., 6.5-mm. ball is used on a layer of fat 50 mm. thick in a vessel having an inside diam. of 7.5 mm.

A. PAPINEAU-COUTURE.

Catalytic hydrogenation of fats. A. Zinov'ev. *Trudui VNIIŽh* 1934, No. 3, 3-15.—In expts. with linseed oil fatty acids, with Ni formate catalysts, it was found that as hydrogenation proceeds the content of oleic acid isomers, having reached a max., gradually drops practically to 0. Apparently these acids are formed, not by double bond shifts, but by gradual and perhaps selective satn. of double bonds. In the initial stages hydrogenation is selective, acids with 2 or more double bonds reacting first.

JULIAN F. SMITH.

Hydrogenation of fats in presence of nickel carbonate reduced in the oil. E. Etinburg. *Masloboĭno Zhirovoe Delo* 10, No. 9-10, 45-7 (1934); *Chimie & industrie* 34, 641.—The lower the pptn. and drying temp. of $NiCO_3$, the higher the CO_2 content. The reduction temp. increases as the CO_2 content of the carbonate decreases. The activity of the catalyst increases as the pptn., drying and reduction temps. are lowered, and also with decrease in the time of pptn. and drying. The catalyst is prepd. as follows: ppt. a soln. of 160-300 g. per l. $NiSO_4$ with a 15°Bé. Na_2CO_3 soln. at not over 32-65°, filter on a filter press, wash till free from sulfates with water at 30-50°, dry 4-5 hrs. at 100-5°, grind, sieve, mix with sunflower-seed oil and reduce by heating the oil in presence of H; time of reduction is 5 hrs.; the temp. is raised to 170-200° during the first hr., to 200-40° during the next 2 hrs. and to 240-5° during the last 2 hrs. Reduction of the catalyst can be carried out in the same autoclave as subsequent hydrogenation. The activity of the catalyst lasts over a prolonged period.

A. PAPINEAU-COUTURE.

Influence of gossypol on color of cottonseed oil. M. Podol'skaya. *Masloboĭno Zhirovoe Delo* 1935, 128-31.—Gossypol deepened the color of cottonseed oil in proportion to concn., in the range 0.2-0.8%. Heat brings out a max. color intensity between 90° and 120°, then a min. is traversed between 120° and 150°, while the gossypol concn. decreases. In storage the heated oil loses both in color intensity and in gossypol content, unless the concn. of unchanged gossypol after heating was very low. JULIAN F. SMITH.

Oil and protein studies of Oklahoma-grown soybeans. James E. Webster and Burton F. Kiltz. *Proc. Oklahoma Acad. Sci.* 15, 32-6(1935).—Analyses of 19 varieties of soybeans show that the oil content is low and the protein content high as compared with soybeans grown in other states. Since the I nos. are especially low Oklahoma-grown soybean oils should be classed as semi-drying types. J. R. NELLER.

Refractometric determination of moisture in seeds, pulp and oil cake. P. Zaĭchenko and B. Rekhin. *Masloboĭno Zhirovoe Delo* 10, No. 9-10, 60-2 (1934); *Chimie & industrie* 34, 641; cf. *C. A.* 29, 6085[5].—Grind the sample, weigh 2 g. into a heavy centrifuge tube, add 5 cc. of pure 92.5% glycerol (n 1.4630) using a pipet fitted into a stopper which fits tightly into the neck of the centrifuge tube so as to avoid absorption of atm. H_2O, triturate for 5 min. with a glass rod also passing through a stopper fitted into the neck of the tube, immediately measure the n of the glycerol without filtering. Calc. H_2O from the difference in n. The method is accurate to from —0.35 to +0.23%. A. PAPINEAU-COUTURE.

Recovery of vegetable oils by a biochemical process.—L. M. Horovitz-Vlasova and N. V. Novotelnov. *Allgem. Oel- u. Fett-Ztg.* 32, 315-21(1935).—The expts. were carried out as follows to test the Beckmann method of extg. oils: 20 g. of material was treated with 60 cc. of H_2O and 1 g. of $CaCO_3$ and the mass inoculated with *Lactobacillus delbrückii;* air was removed from the flask which was then allowed to stand 5 days at 55°. The oil seps. and rises to the top from which it can be removed. Of the oil present the following percentages were extd. from the seed: copra 88.2, walnut 79.8, cedar nut 78.2, pistachio nut 16.5, sunflower seed 16, hemp seed 0, linseed 0, mustard seed 0, castor bean 0, cottonseed 0, apricot kernel 0, cherry kernel 0 and corn germ 0. Similar expts. were conducted on the last 9 materials with the addn. of glucose; the results were the same except for sunflower seed and apricot kernel which yielded 55 and 25.9%, resp., of their total oil. Oil extd. by this method has a higher acid and lower I no. than the ether-extd. oil. M. M. PISKUR.

PATENTS

Hydrogenating oils. Matthew G. Barradas (to Best Foods, Inc.). U. S. 2,014,999, Sept. 17. An oil such as cottonseed oil contg. unsatd. fat compds. is heated to about 95-200° while agitating it with a catalyst such as a finely divided Ni catalyzer and maintaining an inert gas in the space above the oil and introducing H directly into the inert gas above the oil.

Treatment of hydrogenated oils. Dietrich Hildisch Ger. 588,001, Aug. 13, 1935 (Cl. 53*h*. 1.01). Hydrogenated alimentary fatty oils are improved in taste by treatment at a moderate temp., e. g., 70°, with a gas-evolving reagent, e. g., $(NH_4)_2CO_3$. A gas or vapor, e. g., CO_2, O or steam, may be passed through the oil at the same time.

Oils. I. G. Farbenind. A.-G. (Friedrich Kuhrmann, inventor). Ger. 614,605, June 14, 1935 (Cl. 23*b*. 1.05). Addn. to 612,717 (*C. A.* 29, 6416[8]). The method of 612,717 for improving animal, vegetable or mineral oils by adding 0.01-0.5% of perylene is modified by replacing the perylene by perylene derivs. such as dihydroxy-, dihalo-, dicyano- or dibenzyl-perylene, etc.

Oil extraction. William S. Butterfield (to The Farm Foods, Ltd.). Can. 353,348, Oct. 1, 1935. Animal or vegetable matter is pulped, air and moisture are removed by heating *in vacuo* and the residue is extd. with a solvent.

Courtesy "Chemical Abstracts"