Grades: According to country of origin and method of preparation for the market—color, acidity and impurities—the better grades of good bright color, low in acidity and relatively free from dirt and other insoluble impurities: Lagos and Red Sherbro (among the best), Bonny Old Clabar, Opobo are soft oils. Harder Oils: Congo, Niger, Old River, Gold Coast, and Liberia (poorest grade).

M. F. LAURO, *Chairman*
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A Test for Color Readers

PROCTER THOMSON
Procter & Gamble Co., Ivorydale, Ohio

To secure concordant results between laboratories reading colors, the following three factors must be standard:

The background
The illumination
The observer

There has been some discussion as to the amount of abnormality which a color reader can possess and still read Lovibond colors in an acceptable fashion. This question is far from settled.

The writer thought it would be interesting to determine the variation in color vision among the members of the American Oil Chemists' Society in attendance at the New Orleans meeting. Accordingly, there were prepared a number of Kodachrome slides of various color blindness tests. The plates in the tests consist of numbers outlined in dots of one color against a background of other colors. The slides are not exact reproductions of the original plates. Although three sets of color photographs were taken and the best selected, the slides were not quite equal to the original plates.

The members were grouped within 40 feet of the screen (to minimize the effect of distance) and shown the slides, about ten seconds being allowed for viewing. After a suitable interval for recording the impression, the next slide was shown, and so on. Eighty-two members turned in test cards filled out. The results were as follows:

Slide Designation	Correct Figure	Number of Correct Answers	Penalty for Incorrect Answers
A	8	79	16
B	5	80	16
C	6	75	14
D	7	65	13
E	42	82	16
F	052	1	.2
G	86	46	9
H	56	79	16

The penalty values were set up to be proportional to the ease of answering (number answering correctly) and to yield approximately a zero grade if all were missed. There was only one card with the correct value for F, but the member who filled it out only graded 77 on the whole test, so there is an inference that he put the number on the card for his own information after the correct value was announced.

The grades group as follows:

99.8%—40 members
90.8%—19 members
86.8%— 6 members
77.8%— 6 members
77. %— 1 member
76.8%—2 members
74.8%—3 members
73.8%—1 member
63.8%—3 members
61.8%—1 member

It is evident that the color acuity of the members varies over a fairly wide range.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

ANALYSIS OF A SPOTTED COW SHARK LIVER. Prog. Repts. Pacific Coast Stas. No. 55, 9 (1943). Iodine number of liver oil—97.8, unsaponifiable matter in liver oil—12.2%.

THE DETERMINATION OF FREE AND BOUND FAT IN FOOD, ESPECIALLY IN DRIED EGG YOLK. J. Grossfeld. *Z. Untersuch. Lebensm, 83,* 322-34 (1942). Foods contain both free and "bound" fats. Difficultly extractable bound fats are retained in the samples mechanically, colloidally, or chemically. To ext. the total fat from egg yolks hydrolysis with HCl is necessary. The Grossfeld method is recommended for total fat. This has been modified by the addn. of 10 cc. CCl_4 before acid hydrolysis, 40 cc. of benzine solvent are used and the fat is detd. on a 25 cc. aliquot. Total fat could also be separated after hydrolysis, by extn. with a 1:1 alc.:C_6H_6 mixt. in an extn. app. After detn. of P_2O_5 in the ext., corrections are made for the lecithin extd.

CHARACTERISTICS OF GOAT MILK FAT. A. Zeisset and J. Grossfeld. *Z. Untersuch. Lebensm. 83,* 385-99 (1942). Analysis of 169 goat butter samples obtained in different parts of Germany showed: n^{40} (Butyro) 40-42.2 (av. 41.3), total no. of low mol. wt. fat acids 34.5-45.5 (40.1), butyric acid no. 12.2-16.2 (14.1) and residue no. 21.2-31.3 (26). There was no significant differences in samples from different breeds. There was a weak negative correlation ($r = -0.46 \pm 0.05$) between n and residue no.; and a weaker neg. relationship ($r = -0.30 \pm 0.07$) between n and butyric acid no. When the av. residue and butyric acid nos. are used in the equation that was developed for detg. coco fat in cow butter fat it showed an apparent coconut oil content of 43%. Analysis of 18 goat milk fat samples gave sapon. no. 231-240 (av. 235) and lauric acid no. 26-43 (37). The apparent coconut oil calcd. from the lauric acid no. (L) and butyric acid no. (B) was 21% (coconut oil = 0.79 [L-0.6 B]). During the detn. of the total no. the Mg. salts of the fat acids and the filtrate therefrom exhibited the characteristic goat milk fat "buck" odor.

DRYING OILS FROM LIQUID FATS. A. W. Kleinsmith and H. R. Kraybill. *Ind. & Eng. Chem. 35,* 674-6 (1943). Corn, cottonseed, soybean, and linseed oils have been separated into fractions of widely different degrees of unsatn. by liquid-liquid extn. with methanol. The more unsatd. fractions of soybean oil are better suited for use as drying oils than the original oils. No evidence could be found for the presence of any completely satd. glycerides in soy bean oil. The fractionation of fats by solvent extn. is a valuable tool in the study of glyceride compn. of fats. Fat acids of soybean oil are not distributed in true random fashion or in true max. even distribution.

THE SPOILAGE AND SPOILAGE REACTIONS OF VARIOUS FATS AND OILS. K. Ebach. *Z. Untersuch. Lebensm. 83,* 399-414 (1942). The spoilage reactions on low fats were investigated during a four-month period. The change in acidity was only an insignificant slow rise. The Lea no., Stamm degree and epihydrin aldehyde content increased, and the original rise was especially high for lard and tallow. The free aldehydes and ketones varied. The results on hardened soybean oil showed that in fats with only small amts. of unsatd. fat acids, the spoilage is postponed. It was impossible to select a limiting value for oxy fat acids according to Stamm over which oils and fats should be judged rancid. The chemical methods for testing spoilage of fats yielded no sure criterium for spoilage but yielded useful supplements to organoleptic tests. Thirty-four references.

ANTIOXIDATION OF OXYGEN-ACTIVE ACIDS. I. W. Treibs. *Ber. 75B,* 203-10 (1942). That films are of relatively low mol. wt. is indicated by the fact that while they are insol. in ether and petr. ether, to be sure, they dissolve easily in MeOH and acetone to form solns. of low viscosity. They are hydrophilic in character; their solns. can be dild. very highly with water without pptn. The formation of water may result from (1) the production of an oxide group from 2 HO groups, (2) the oxidation of an OH to a CO group, or (3) cleavage of an HO group with formation of a double bond. The first two possibilities are limited to a single mol. and do not alter the mol. wt. The third may be a monomol. reaction or in part a bimol. condensation. Of fundamental significance in the autoxidation of linoleic acid or 0.5 mol. of water per mol, linoleic acid may be eliminated, depending on the conditions. *(Chem. Abs.)*

ANTIOXIDATION OF OXYGEN-ACTIVE ACIDS. II. VISCOMETRIC ANALYSIS OF THE ADDITION OF OXYGEN TO METHYL ESTERS. W. Briebs. *Ber. 75B,* 331-5 (1942). As the basis for the viscometric study of the autoxidation process the *n* of the following Me esters were detd. at 14° ($H_2O = 1$): linolenic acid 6.9, oleic acid 10.2, ricinoleic acid 13.5, isoelostearic acid 15.8 and the *a*-isomer 20.3; glyceryl dilinolenate linoleate diminution with increasing no. of isolated and an increase with increasing no, of conjugated double bonds. The course of the autoxidation of the esters is viscometrically analyzed by observing the rate of rise of the ester in a row strip of filter paper. Me *a*-eleostearate is shown to be converted immediately by O into a polymeric monoperoxide, whereas Me linolenate and linoleate give monomeric monoperoxides; polymerization and loss of H_2O accompany further addn. of O. *(Chem. Abs.)*

CHEMISTRY OF FAT SPOILAGE. XIV. IRON AS AN ACTIVE CONSTITUENT OF THE ANTIOXYGEN COMPLEX OF OATMEAL. K. Täufel and R. Müller. *Biochem. Z. 310,* 152-9 (1941). *Fette u. Seifen 48,* 669 (1941). Although the catalase activity of oatmeal is small, when it was shaken with oxidized olive oil the peroxide value of the oil was reduced markedly. This effect was reversibly inhibited or at least reduced by cyanide. This result speaks for the participation of catalase or a catalaselike substance in the antioxidant system of oatmeal. The Fe content of active exts. of oatmeal made with lipoid solvents was 0.02-0.12%. The exts. with the largest amts. of Fe were most effective in lowering the peroxide value of oxidized oils. A phosphatide and protein are also concerned in the antioxidant system.

CHANGES IN MUTTON SUET AND GOOSE FAT DURING STORAGE. E. I. Novikova. *Kholodil'naya Prom. 19,* No. 1, 21-3 (1941). Chem. Zentr. 1942, I, 3269. No important changes were observed during the first 3 months in the mutton suet stored at —10°, but after that they became more and more noticeable. After 6 months they were considerable, and after 15 months the suet was unfit for food. At —18° the color, odor and taste remained practically unchanged for 15 months. The peroxide no. increased in 15 months from 0.35 to 0.96 at —10°, and to 0.58 at —18°. The amt. of hydroxy acids increased correspondingly 33- and 15-fold, and the acid no, from 1.65 to 12.2. Goose fat does not keep as well. In 9 months at —10° the peroxide no. rose from 0.39 to 8.51, but at —18° it increased only 3-fold. Similar changes were observed in the other chem. criteria. Judging from odor and taste, geese can be kept not longer than 2 months at —10°, but considerably longer at —18° or better at —25°. Covering with cellophane slows up fat oxidation and permits longer storage. *(Chem. Abs.)*

OXIDATION OF BUTTER OIL AS INFLUENCED BY PREVIOUS HEAT TREATMENT OF THE OIL BUTTER OR CREAM. F. C. Ewbank and I. A. Gould. *J. Dairy Science 26,* 409-18 (1943). Heating either butter or butter oil to 127°C. for 30 min. hastens the oxidation of the butter oil. A temp. of 109.8°C. did not appreciably influence the subsequent oxidation of the butter oil. When cream was heated to 62.8°C. 30 min., 90.6°C. flash, and 109.8°C. or 127°C. 15 min., the two higher processing temp. shortened the induction period of the resulting butter oil. Butter oil secured from cream pasteurized at 90.6°C. for 0, 15, and 30 min. was not adversely affected by the longer heating periods but instead appeared to be stabilized to a slight degree. Cream containing 5 ppm. of added Cu and pasteurized at 85°C. flash and 90.6°C. flash, produced butter oil of stability equal to that of a control pasteurized at 62.8°C. 30 min. and contg. no added Cu. Cream pasteurized at 62.8°C. 30 min. and containing added Cu oxidized extremely rapidly in comparison to the other lots.

The effect of choline deficiency on the fat content of regenerated liver. P. Handler and F. Bernheim. *J. Biol. Chem. 148,* 649-54 (1943). It is suggested that the development of fatty livers in choline deficiency can proceed only when all other dietary factors will permit the growth of the whole rat rather than merely growth of the liver. The effect of deficiencies of members of the vitamin B complex in preventing the appearance of fatty livers due to choline deficiency is the result of an impairment of the over-all metabolism of the rat rather than some specific defect in the metabolism of the liver.

The action of bromo-substituted fatty acids on liver fat. C. Artom and M. Swanson. *J. Biol. Chem. 148,* 633-9 (1943). Fasting rats were given single doses of the ethyl ester of fatty acids in which 2 bromine atoms had been substituted at various positions on the carbon chain, and the total fatty acids in the liver and their bromine content determined. The highest degrees of fat infiltration were obtained after giving 9, 10-dibromostearic ester, followed in order by 13, 14-dibromobehenic, 6, 7-dibromostearic, and 2, 3-dibromostearic esters. Most of the fatty acids accumulated in the liver already lost their bromine. The 10, 11-dibromoundecylic ester was highly toxic. A hypothetical interpretation of these results is suggested.

The rates of replacement of depot and liver fatty acids in mice. D. Stetten, Jr., and G. F. Grail. *J. Biol. Chem. 148,* 509-15 (1943). After a preliminary enrichment of the body fat of mice with istopic fatty acids, the rate of disappearance of isotope has been studied while the animals were on high carbohydrate diets and supplied with all the known essential vitamin B supplements, with and without choline. The half life of deuterium in the depot and liver fatty acids has been calculated as 5 to 6 days in the depot fat and 2.6 to 2.8 in the liver. It has been pointed out that this latter figure is certainly larger than the half life of liver fatty acids. The presence or absence of choline had no significant effect on the rates of disappearance of deuterium from depot and liver fatty acids.

PATENTS

Oiticica oil product. H. A. Gardner, Jr. *U. S. 2,318,304.*

Cooking oleaginous material. F. W. Weigel. *U. S. 2,288,662.* A method of preparing oil seeds for the separation of oil comprises transferring heat to said material from a heating surface at a rate of at least 5 B.T.U. per lb. of material per minute through a substantial portion of the period for which heat is transferred to the material, subjecting the material adjacent to the heating surface to agitation such that the movement of substantially all of said material is in the order of at least 200 ft. per minute, and maintaining the material in direct contact with steam when the material is at temp. above the temp. for condensation of steam on the material.

Countercurrent extraction apparatus for oil seed. A. A. Levine and R. Jackson Dent (E. I. du Pont de Nemours & Co.) *U. S. 2,321,923.*

Refining of cottonseed oil. W. J. Bloomer (The Lummus Company). *U. S. 2,319,970.* An improved method for continuously removing the gums and resins in a crude oil comprises the steps of mixing the oil with approximately 1% of water, passing said mixed materials to a rotary disk mixing device, rotating said disk at a relatively high peripheral speed to cause said materials to flow across the disk in a continuous thin film under substantial centrifugal force, removing the thin film continuously and passing it into a liquid receiving zone without forming an emulsion of the oil, and continuously separating the oil and hydrated matter by centrifugal force, the movement of the oil being continuous and confined from the air.

Process for centrifugally separating solids from liquids. A. U. Ayres (The Sharples Corporation). *U. S. 2,321,887.*

Fractionation of mixtures of fatty oils and free acids derived therefrom. J. D. Jenkins (Pittsburgh Plate Glass Company). *U. S. 2,320,738.* A scheme and arrangement of app. for removing fat acids or fractionating fats or fat acids with selective polar solvents is described.

Hydrogenation treatment of oils and fats. D. J. Hennessy (Vitamoil Laboratory, Inc.). *U. S. 2,321,913.* The flavor and odor of marine medicinal oils is reduced by hydrogenation at 95°C. and 50 lbs. sq. in. press followed by a lower temp. hydrogenation in the presence of active carbon.

Refining and concentrating the vitamin and unsaponifiable fraction of fats and oils. L. O. Buxton and E. J. Simons (National Oil Products Company). *U. S. 2,318,748.* In a process of producing a fat-soluble vitamin concentrate the steps comprise admixing, in the presence of an alcoholic saponifying catalyst, a fish liver oil having a lesser quantity of a hydrocarbon solvent dissolved therein with at least the stoichimetrical quantity of alkali required to react completely with the saponifiable portion of said oil, stirring the mass to form a heavy super-solvented emulsion which will not break upon cessation of stirring and breaking the emulsion by means of heat to flocculate the soap thus formed.

Production of fat-soluble vitamin concentrates. L. O. Buxton, and H. B. Colman (National Oil Products Company). *U. S. 2,318,749.* In a process of producing fat-soluble vitamin concentrates a step comprises admixing a fish liver oil soap containing 12% to 19% moisture with ethylene dichloride, heating the mixture to dissolve a major portion of the soap and adding sufficient water to the mass to raise the moisture content of the soap to about 22% to 26% to cause precipitation thereof.

Preparation of organic acid esters. H. C. Black (Industrial Patents Corporation). *U. S. 2,320,844.* The process comprises esterifying a polyhydric alc. with a fatty compd. of the class consisting of carboxylic acids, carboxylic acid esters, carboxylic acids anhydrides, and carboxylic acid halides in the presence of 0.05% to 10% of activated carbon and at a temp. of between 200° to 300° C.

Clear lecithin solutions. H. Christlieb (C. H. Boehringer Sohn). *Ger. 708,805, (Cl. 2c. 2.02).* Com. lecithin is dissolved in a highly concd. lactic acid with a total acid content of over 90%. The lecithin-lactic acid soln. dild. with H_2O makes a suitable emulsion for baking. *(Chem. Abs.)*

Hydrolyzing and distilling natural oils and fats. H. D. Hoffman and A. H. Zeigler (Armour and Company). *U. S. 2,319,929.* In a process for treating low grade fats of a class consisting of cotton seed and soybean oil foots there are the steps of completely saponifying the fats with caustic soda and at atm. press. graining the resulting soap with an aq. soln. of a substance of the class consisting of salts and alkalies, withdrawing said soln. recovering the settled soap and acidulating it to liberate the fatty acids, and distg. the fatty acids.

FRACTIONALLY DISTILLING FATTY ACID-CONTAINING STOCK. R. H. Potts (Armour & Co.). *U. S. 2,322,056.*

AMINO CARBOXYLIC ACID ESTERS. B. R. Harris. *U. S. 2,321,595.* Hydrochlorides of aliphatic primary aminocarboxylic acid esters of higher molecular weight fatty acid partial esters of sugar alcohols are prepd. for use as antiseptics and disinfectants.

AMINO CARBOXYLIC ACID ESTERS OF HIGHER MOLECULAR WEIGHT CARBOXYLIC MONOESTERS OF GLYCOLS. B. R. Harris. *U. S. 2,321,594.* H Cl salts of amino aliphatic acid monoester of lauric acid, monoesters of fat acid, monoester of glycol are used as antiseptic and disinfectants.

SOLUBLE CUTTING OIL. E. W. Carlson and E. B. Cyphers. *U. S. 2,320,263.* An improved alkaline-sol. oil compn. comprises a base oil, an emulsifying agent selected from the class of phenols which are characterized by having at least two alkyl groups attached directly to the phenolic ring.

FROTH FLOTATION OF ACIDIC MINERALS. L. J. Christmann, D. W. Jayne, Jr., and S. E. Erickson (American Cyanamid Company). *U. S. 2,321,186.* Froth flotation process of separating phosphate ore values from acidic siliceous gangue, a step comprises subjecting the ore to froth flotation in the presence of a reagent comprising the diacidyl reaction products of a polyalkylene polyamine with fatty acids.

WAX COMPOSITION. E. A. Nill (The H. A. Montgomery Co.). *U. S. 2,320,644-5.* A wax composition having improved properties comprises about 2% to about 10% of a higher fatty acid anilide, about 2% to about 10% of a water-insol. metallic fatty acid soap, and the balance mineral wax, said compn. being characterized by its fine grain, increased tensile strength, increased me. p. and high water-repellency.

INORGANIC PLASTIC PRODUCT AND PROCESS OF PREPARING THE SAME. A. W. Ralston and E. J. Hoffman (Armour and Company). *U. S. 2,320,009.* The process of improving the plasticity of aq. mixtures prepd. from clay which includes the step of incorporating therewith small amts. of a primary aliphatic amine compd. chosen from the group consisting of primary aliphatic amines and salts thereof having at least 10 carbon atoms in the alkyl radical.

LIME AND PLASTER PRODUCT AND PROCESS OF PREPARING THE SAME. A. W. Ralston and E. J. Hoffman (Armour and Company). *U. S. 2,320,010.* The process of improving the plascity of aq. mixtures prepd. from inorg. solids chosen from the group consisting of lime and plaster of Paris, and like cementitious materials includes the steps of incorporating therewith small amts. of a primary aliphatic amine compd. chosen from the group consisting of primary aliphatic amines and salts thereof having at least 10 carbon atoms in the alkyl radical.

PROCESS OF MAKING 12-KETOSTEARAMIDE. W. E. Hanford and R. H. Wiley (E. I. du Pont de Nemours & Company). *U. S. 2,320,232.* The process comprises bringing a compd. selected from the class consisting of the acid, the anhydride, the ester, and the halide of 12-ketostearic acid in admix. with a compd. selected from the group consisting of amonia and primary and secondary amines at a temp. between 30 and 160° C.

PROCESS FOR MAKING AN OIL MODIFIED ALKYD RESIN. W. A. Waldie (New Wrinkle, Inc.). *U. S. 2,319,022.*

Abstracts

Soaps

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SOAP FROM SOUTHERN PINES. Norman G. Farquhar. *Chem. & Met. Eng. 50,* No. 4, 108 (1943). In an effort to determine the true place of rosin in soap, the chemists of the Hercules Powder Co. conducted extensive tests on rosin soaps. The development of polymerized and hydrogenated rosin derivatives have further helped the use of rosin in soap manufacture. Various soaps were made using different percentages and grades of wood, and gum rosins and rosin derivatives in white stock (white tallow, 75%, and Cochin coconut oil, 25%) and brown stock (brown tallow plus coconut oil). Yields of rosin soaps were comparable to yields of fatty soaps. Bar soap containing up to 20% of Staybelite (Hercules hydrogenated rosin) showed little increase in color over soap made without rosin. All other rosins used caused an appreciable increase in the color of soaps made from white stock, but caused only slight darkening of soaps made from brown stock. Hardness of white base soap was not appreciably changed by addition of Staybelite up to 15%. Rosin was most effective in increasing the solubility of soaps made from low titer fats. Sudsing was either increased or unaffected by addition of rosin up to 30%. Based on results obtained thus far, it is recommended that rosin in soap be limited to 3 to 30% of the total soap stocks used, depending on the type of product desired.

ANALYSIS OF WAR SOAP. R. Lucentini and A. Picozzi. *Ann. chim. applicata 32,* 163-8 (1942). The proposed methods are for soaps contg. a large amt. of insol. mineral constituents. I. Detn. of moisture and fat acids: Dry 10 g. of diced soap on 20 g. medium-grained quartz for 6 hrs. at 105° for the moisture detn. Ext. the residue with alc. for 6 hrs. in a Soxhlet extractor. After evapg. the alc. add 150 cc. of water and 25 cc. of 20% HCl. With the use of a separatory funnel ext. fat and rosin acids with ether. II. Detn. of fat acids and the free and total alkali: Titrate an alc. ext. as prepd. above with 0.5 *N* HCl using phenolphthalein as the indicator to det. free alky. Evap. alc., add 40 cc. of 0.5 *N* HCl and filter. The residue after evapn. is the chloride salt of the bound alkali hydroxide. The fat and rosin acids are dissolved off the filter paper with a 1:1 soln. of ether and Et alc. III. Detn. of the fat acids and the degree of sulfonation in the soap prepd. from sulfonated fats: Dry an alc. ext. as prepd. under I and take up with 100 cc. of water. Reflux with 100 cc. of concd. HCl for 1 hr. to split