Test Series No. 33

SOYA BEAN OIL REFINING

	Expeller Oil		Hydraulic Oil		————Extracted Oil————				——Extracted Clarified Oil——			
	—12 Beaumé—		—20 Beaumé—		—12 Beaume—		—14 Beaumé—		—12 Beaumé—		—14 Beaumé—	
		2/3		2/3		7/8		7/8		7/8		7/8
	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil	Max. Amt. Lye used for CS Oil
Per cent lye used	8.0	5.9	4.8	3.2	8.0	7.0	6.7	5.9	8.0	7.0	6.7	5.9
Grams lye used for 500 grams of oil	40.0	29.5	24.0	16.0	40.0	35.0	33.5	29.5	40.0	35.0	33.5	29.5
Grams dry NaOH used for 500 grams of oil	3.200	2.300	3.446	2.298	3.200	2.800	3.180	2.800	3.200	2.800	3.180	2.800
Grams H_2O used for 500 grams of oil	36.800	27.140	20.554	13.702	36.800	32.200	30.320	26.700	36.800	32.200	30.320	26.700
Grams oil first pour off	479.2	477.9	472.8	471.5	453.8	450.1	463.7	463.1	462.9	459.1	460.0	465.8
Grams oil recovered by remelting foots	0.1	0.2	0.4	4.4	0.5	5.1	0.3	1.4	0.8	0.5	0.4	0.4
Total grams oil	479.3	478.1	473.2	475.9	454.3	455.2	464.0	464.5	463.7	459.6	460.4	466.2
Number times foots were remelted	one	one	one	two	one	two	one	one	one	one	one	one
Loss (per cent)	4.1	4.4	5.6	4.8	9.1	9.0	7.2	7.1	7.3	8.1	7.9	6.8
Color of oil (red)	5.3	5.4	5.3	5.4	9.8	9.9	9.8	10.1	9.9	10.1	10.0	10.3
Condition of foots	hard	hard	hard	hard	hard	soft	hard	hard	hard	hard	hard	hard
Break at end of fast agitation	slight	slight	good	good	slight	slight	slight	slight	slight	slight	slight	slight
Break at end of slow agitation	very good	very good	very good	very good	very good	good	very good	very good	very good	medium	very good	very good
Color taken on by oil upon addition of lye	creamy	creamy	creamy	creamy	creamy	creamy	creamy	creamy	creamy	creamy	creamy	creamy
Oil set overnight before pouring off.	90 min. fast agitation— Temp. 20-24° C. 12 min. slow agitation— Temp. 65° C.		45 min. fast agitation— Temp. 20-24° C. 12 min. slow agitation— Temp. 65° C.		90 min. fast agitation— Temp. 20-24° C. 25 min. slow agitation— Temp. 65° C.				90 min. fast agitation— Temp. 20-24° C. 25 min. slow agitation— Temp. 65° C.			

ABSTRACTS

Oils and Fats

Edited by

M. M. PISKUR and Ruth LINDAHL

Fat chemistry in the battle against food spoilage. K. Taufel. *Fette u. Seifen* **44**, 179-87 (1937). A review on spoilage of fats.

Antioxidants and stabilizers for fats. F. Wittka. *Chem.-Ztg.* **61**, 386-9 (1937). Review of patents and literature on antioxidants.

Vegetable oils as defoaming agents. *Chem.-Ztg.* **61**, 397-8 (1937). Review.

Society work of the D. G. F. 4. The hydroxyl number. H. P. Kaufmann. *Fette u. Seifen* **44**, 150-3 (1937). A review of methods.

Committee report of D. G. F. 5. Whale oil standards. H. P. Kaufmann. *Fette u. Seifen* **44**, 196-201 (1937).

Antioxidants and the autoxidation of fats. IX. The antioxidant properties of the tocopherols. H. S. Olcott and O. H. Emerson. *J. Amer. Chem. Soc.* **59**, 1008-9 (1937). α, β and γ tocopherols and their allophanates are effective antioxidants in lard. The degree of protection afforded by the tocopherols is not proportional to their vitamin E activity.

Action of microorganisms on fats. L. B. Jensen and D. P. Grettie. *Food Res.* **2**, 97-116 (1937). Methods are indicated for study of hydrolyzing bacteria on emulsified and continuous fat substrates. Certain strains of bacteria producing two kinds of enzymes—lipases and oxidases—appear to be responsible for rapid development both of free fatty acid and of oxidation products. The phenomenon parallels oxidative rancidity of so-called chemical or oxygen-light origin. Numerous determinations of bacteria and stability tests on bacon fats indicate a connection with numbers of bacteria on the original fat and tendency towards rancidity when held at —17.8° C. Moisture-free fats do not support growth of the microorganisms tested, whereas .3 per cent moisture or more in an animal fat aids in promoting growth of the same microbes. Fat-soluble pigments of various microorganisms cause "pink" fats and purple "stamping ink" discolorations by oxidation-reduction mechanisms.

Color reactions of vegetable oils. Fosco Provvedi. *Olii minerali, olii e grassi, colori vernici* **16**, 103-4 (1936).—Carr and Price's reagent (1-2 cc. oil and 4-5 cc. reagent) gave in 5 min. with cottonseed oil dark red-brown, olive oil light green, sesame oil very light pink-yellow, peanut oil very light pink, colza oil blue-green, rape-seed oil very light green, poppy-seed oil yellow, apricot oil very light sky blue with slight opalescence, sunflower oil brown-yellow (turbid), grape-seed oil green-brown (turbid), corn oil yellow, soybean oil violet-gray with slight opalescence, raw linseed oil green (turbid), boiled linseed oil black-green (turbid), sweet-almond oil violet-blue with slight opalescence. Rancid colza oil reacts similarly to cottonseed oil. Rancid olive oil behaves differently from the neutral, and the chloroform soln. of $SbCl_3$ can be used to detect rancidity by development of a visible opalescence. In nonrancid oils the reagent identifies cottonseed oil. (*Chem. Abs.*)

The catalytic interchange of esters of fatty oils by alcoholic-potassium hydroxide. H. Kurz. *Fette u. Seifen* **44**, 144-5 (1937). In test on treatment of oils with various amts. of alc.-KOH soln. it was found that considerable splitting of the glycerides takes place before any free glycerin is apparent. The splitting was evaluated by detg. the sapon. and Ac values of the reaction products. The data are presented in 12 tables.

The fatty acids associated with banana starch. L. Lehrman and E. A. Kabat. *J. Amer. Chem. Soc.* **59**, 1050-1 (1937). The amt. of fatty acids liberated

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by the hydrolysis of banana starch free from extraneous fatty material has been determined to be 0.2%. The fatty acids have been found to consist of a mixture of palmitic, oleic, linoleic (linolic) and linolenic acids together with a very small amt. of phytosterol. The detection of small amts. of linolenic acid in the presence of oleic and linoleic (linolic) by bromination has again been shown to be a more sensitive method than oxidation. This is the first time that phytosterol has been found combined in a starch.

The fluorescence of olive oil. Walter Ciusa. *Olii minerali olii e grassi, colori vernici* **16,** 97-103 (1936). Fluorescence varies with quality, conditions of preservation and refining. Crude sulfur oils have blue fluorescence masked by chlorophyll and other products. Decolorizing unmasks the blue fluorescence; this is intensified by deodorization and concd. by demargarination. Pure pressure oils treated with hydrosilicates show blue fluorescence at a much lower temp. than that of deodorization. Blue fluorescence can result from aging or from warming with hydrosilicates, as a result of formation of sterols. (*Chem. Abs.*)

Coconut oil. I. Pyrolysis. Julian Banzon. *Philippine Agr.* **25,** 817-32 (1937).—Decompn. occurred readily at the b. p. and yielded free fat acids, acrolein and a considerable amt. of unsaponifiable matter which was mostly solid. Decreases in sp. gr. and viscosity of the oil accompanied the decompn. Catalysts such as NaOH, $AlCl_3$, $ZnCl_2$, $CaCl_2$ and Fe hastened and produced greater changes. The liquid products exhibited fluorescent effects, had low viscosity, low flash and burning points and contained a large proportion of liquid which was unsaponifiable. Fe_2O_3, NaOH and $AlCl_3$, in the order named, were the best catalysts for the production of fluid. The distn. range of the treated oil is too high to give a high yield of liquids of the motor-fuel range but about 20-50% is within the kerosene range. Seventeen references. (*Chem. Abs.*)

Utilization of Indian acorns. S. V. Puntambekar and B. S. Varma. *Indian Forester* **60,** 752-5 (1934); cf. *C. A.* **29,** 2007^6.—The acorn kernels of *Quercus incana* contained H_2O 12.2, oil 16.0, ash 1.4, proteins 3.0, cellulose 1.4, tannins 4.2, carbohydrates 59.5% and S compds. zero. The acorn cups contained H_2O 12.4, ash 3.0, H_2O-sol. solids 13.3 and tannins 8.7%. The oil was thin and yellow and had d_{25} 0.9081, n^{20} 1.4576, sapon. value 192.2, I value (Hanus) 81.5, Ac value 14.8, Hehner value 96.1, acid value 13.0, unsaponifiable matter 0.8%, satd. acids (mostly palmitic) 18.0% and unsatd. acids (mostly oleic) 82.0%. The meal remaining after extn. of the oil appears to be a good *cattle and poultry feed* except for the deficiency in protein. (*Chem. Abs.*)

Camphor-seed oil. Hao Chen. *Ind. Research* (China) **6,** 92-3 (1937).—The usual method of obtaining camphor from the camphor tree by subjecting the wood to steam distn. is very wasteful, as the tree is permanently destroyed. The high price of camphor has caused rapid depletion of the forests, while camphor-seed is largely discarded as waste. C. recovered camphor-seed oil either by cold-pressing or by extn. with solvents. With petroleum etheras solvent, as much as 40% of the seed wt. can be extd. as oil. This oil is similar to coconut oil in properties and is suitable for soap making. The development of this industry should therefore supplement the camphor industry. (*Chem. Abs.*)

Fat metabolism in fishes. XI. Specific peculiarities in depot fat composition. J. A. Lovern. *Biochem. J.* **31,** 755-763 (1937).—It has been demonstrated that the fats of fresh-water and marine species as a whole form two distinct types. The differences between these types have now been expressed graphically. These graphs also give a clue to the probable average composition of the fat ingested by most species of fish.

Nutritive value of hydrogenated fats. S. Baglioni and V. Formiani. *Olii vegetal e saponi* **3,** 33 (1937).—Feeding expts. on rats indicated that hydrogenated lard and hydrogenated whale oil are superior to the unhydrogenated fats in respect to growth, general nutrition and survival. (*Chem. Abs.*)

Study on the preparation of drying oils for oiled cloth and oiled silk. Han-Liang Tchang and Yao-Chiu Wang. *Contrib. Inst. Chem., Natl. Acad. Peiping* **2,** 57-72 (1936).—The oil film formed after drying is always stiff and nonsticky, irrespective of the temp. and time of drying or of the nature and amt. of driers, if boiled oil consists of tung oil only. A mixt. of driers is always more active than an equal wt. of any of its constituents. The quantities of driers required for hastening the drying of tung oil and imparting transparency to silk or glassy surface to cotton cloths vary considerably with the nature of the driers. Mixts. of tung oil with other oils generally require less drier than tung oil alone for boiling to impart the same degree of transparency to silk. Oiled cloths made from linseed oil or bean oil dry more slowly than tung-oil products and remain sticky after drying. Oiled products made from tung oil are nonsticky, but stiff. (*Chem. Abs.*)

The preparation and cracking of high molecular weight nitriles. A. W. Ralston, H. J. Harwood and W. O. Pool. *J. Amer. Chem. Soc.* **59,** 986-992 (1937).—The decomposition of high molecular wt. amides by heat has been shown to cause a simultaneous hydration and dehydration which leads to the formation of almost equal amounts of acids and nitriles. A non-catalytic method has been developed for prepn. of high molecular wt. nitriles from fatty acids and ammonia. High molecular wt. nitriles have been cracked in the liquid and vapor phases to yield straight chain hydrocarbons and nitriles. Methods have been described which permit the separation of nitriles from hydrocarbons.

PATENTS

Process of producing emulsions. H. Schrader (to the firm Th. Goldschmidt A.-G.). U. S. Reissue 20,361. Polyhydric alcs. partially esterified with fat acids are used as emulsifiers.

Extracting fatty oils. Gesellschaft zur Verwertung Fauth'scher Patente m. b. H. Brit. 459,763, Jan. 14, 1937. In extg. fats and fatty oils from vegetable seeds or kernels, the seeds are comminuted in the presence of a solvent or solvent vapor and simultaneously or subsequently the fat is extd. therefrom. Seeds, e.g., linseed,

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rape seed, are fed through a hopper to grinding mills or grooved rollers submerged in the solvent, e.g., benzine, CCl_4, the ground material is then fed into a horizontal chamber contg. solvent through which it passes by a screw conveyor into a 2nd comminuting stage and then to a 2nd extg. chamber. The mass may then be pressed between smooth rollers to express the oil and solvent. The ext. is then distd. with steam to recover the oil. (*Chem. Abs.*)

Hydrolysis of fat. Victor Mills (to Proctor & Gamble Co. of Canada, Ltd.). Can. 365,544, Apr. 20, 1937. Fat and water are separately heated to 365-600° F., kept under pressure of 150-1600 lbs./sq. in., and passed counter-currently and continuously in contact with each other. An app. is described. (*Chem. Abs.*)

Preparing aldehydes. Armour and Company. Brit. 458,391. A "higher" (satd. or unsatd.) fatty acid or its aliphatic esters is reacted with formaldehyde vapor in the presence of an oxidizing catalyst.

Artificial resin. H. Honel. U. S. 2,074,509. An artificial resin is prepd. by heating phthalic anhydride, glycerine and castor oil up to temps. not substantially below 26° C. nor substantially above 270° C. and maintaining the temp. within this range for a sufficiently prolonged period to obtain a reaction product which is readily sol. in benzene hydrocarbons and which has a distinct drying capacity.

Drying oil product and process of making same. F. B. Root. U. S. 2,082,515. A drying oil product is prepd. by heating under reaction conditions a mixture consisting essentially of 2 components. a glyceride drying oil and formaldehyde.

Method of producing substituted aliphatic acids. J. B. Niederl. U. S. 2,082,459. A method of producing phenolic aliphatic acids by reacting an unsatd. aliphatic acid with phenol in the presence of a mixt. of glacial HAc and concd. H_2SO_4. The compds. obtained or in the form of their salts or esters may be used as constituents of soap prepns. or they may be used in treatment of diseases as for instance the products obtained from chaulmoogric acid for the treatment of leprosy and the like.

Miscible gum from drying oils. E. M. Williams. U. S. 2,082,371. A process for the production of a miscible gum which comprises heating a quantity of China-wood oil with a greater quantity of menhaden oil at a temp. of approx. 400° F. adding a quantity of PbAc and CoAc at said temp. and aerating the mixt. to produce a thickened oil mixt., adding a quantity of linseed oil and China-wood oil, to said heavy bodied oil, heating the same at a temp. of approx. 400° F. adding up to 5% by wt. of PbAc, CoAc and calcined MgO at such temp. and processing the same to a gum.

ABSTRACTS

Soaps

Edited by M. L. SHEELY

Medicated Soaps. *Soap Perfumery Cosmetics* **10,** 400 (1937).—Carbolic acid exercises a powerful antiseptic action. This is considerably weakened, however, when combined with caustic alkalies to form sodium phenate. It has been demonstrated that optimum disinfecting power of phenol soap mixes resides in the ratio of one part soap to one part carbolic acid.

Salicylic acid is not a powerful disinfectant but when used in soap prevents perspiration. Salicylic acids, like carbolic soaps, only keep when in the anhydrous or nearly anhydrous form.

Mercuric iodide and oxycyanide are used as disinfectants in soap. An increase in the absorptive powers of soap for mercury salts is said to be effected by addition of a proportion of cresol.

Sulphur is incorporated into soap by dissolving potassium sulphide in hot water and adding to the hot soap in a proportion not exceeding 30%. Polysulphides may also be added.

German patent 166,975 covers isolation of pure therapeutic constituents of tar for incorporation into soap. The patented product "Anthrasol" has a powerful odor but is pale in color.

Addition of lecithin in soap cannot usually be readily effected because both animal and vegetable lecithin contain 40-60% of oil for stabilizing purposes, which would cause rancidity when blended with soap. Saponified lecithin is inactive as a skin food. Only by means of preservatives can the rancidity be effectively retarded (e.g., in the case of soap containing 5% of oleaginous vegetable lecithin by means of 0.2% methyl p.-hydroxybenzoate and 0.1% hexamethylene tetramine).

Soap Flake Manufacture. *Oil Colour Trades J.* **91,** 1654 (1937).—An essential property of soap flakes is that they should be readily soluble in water. Such solubility depends on the m.p. of the fatty acids of the oil used and also the degree of saturation of the fatty acids. Ready lathering is also an advantage. For this reason cocoanut oil is taken as the base.

A writer in *Les Matieres Grasses* (1937, p. 118) says that groundnut oil is a useful addition and can be incorporated to the extent of 30-40 per cent. The soap formed from this mixture may be too friable in flakes, and modifications can be made by the addition of some potash soap, castor oil, sugar, glycerol, etc. With such a mixture discoloration may occur, and to avoid this only the best raw materials should be employed and some antioxidant added. The soap may also be dyed. It is an advantage to leave a little free alkali in the soap, e.g., below 0.1 per cent, as NaOH.

The Displacement of Fats and Oils (by Fatless Detergents). L. Zakarias. *Chimie & Industrie* **36,**