h) The composition of fraction I-25, the residue freed from unsaponifiables, was calculated as a mixture of esters of the composition of fraction I-25 and methyl lignocerate.

Composition of the Oil

The compositions of the fatty acid fractions obtained by crystallization from acetone and the overall composition of the oil are shown in Table III. In contrast to most *Cruciferae* oils the present sample consists primarily of C_{18} acids. As might be expected in such oils, palmitic acid is the most abundant of the saturated acids.

Previous analyses of various *Cruciferae* oils (1, 4) have shown a minimum of 40% erucic acid and a maximum of 8% eicosenoic. In the weed seed oil under investigation however the content of eicosenoic exceeded that of erucic. The bulk of the present oil is derived from charlock, which makes up 53-77% by weight of the seeds in the mixture. Thus even if all the erucic acid found was from charlock, this species could contain not more than 17% erucic acid, a figure considerably lower than reported for other *Cruciferae* oils. Until recent years the presence of eicosenoic acid in these oils has been overlooked, but the work of Hopkins (3) on hare's ear mustard oil, of Baliga and Hilditch (1) on rapeseed oil, and of Kapur and Daubert (4) on various *Cruciferae* oils have shown its occurrence in appreciable quantities. Recently Youngs *et al.* (6) reported it to the extent of 11% in Western Canadian rapeseed oil. It would appear from the present investigation that the amount of eicosenoic acid in charlock may exceed that of erucic acid.

The indicated presence of docosadienoic acid in this oil is not surprising since the acid has been found in rapeseed oil by Baliga and Hilditch (1). Isolation and characterization of eicosadienoic, eicosatrienoic, and docosatrienoic acids are required to confirm the presence of small but appreciable amounts of these unsaturated acids. The detection and estimation of these acids were facilitated, it is felt, by combining the techniques of crystallization and analysis of highly unsaturated acids by ultraviolet absorption.

Summary

The oil from weed seed screenings from Western Canadian grain was found to consist of 31% oleic, 27% linoleic, 13% linolenic, 12% eicosenoic, 8.4% erucic, 6.3% saturated, and small amounts and traces of other acids. Eicosenoic acid was found in greater abundance than erucic acid, a result probably related to the fatty acid composition of charlock. The presence of eicosadienoic, eicosatrienoic, and docosatrienoic acids, hitherto unreported in vegetable oils, is strongly suggested.

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ABSTRACTS . . . . Don Whyte, Editor

• Oils and Fats

R. A. Reiners, Abstractor

Determination of acid number of oils and resins in aqueous medium. G. Narsimhan and S. A. Saletore (Nagpur Univ., Nagpur, India). *Anal. Chem.* 23, 1315(1951). A method for titrating fatty acids as an aqueous emulsion is presented. It is especially applicable to dark colored oils.

The saponification of α-monostearin in a monolayer. H. H. G. Jellinek and M. H. Roberts (The Lyons Labs., Hammersmith, W. 14). *J. Sci. Food Agr.* 2, 391(1951). The saponification of α-monostearin in a monolayer over a range of surface pressures and temperatures has been studied on a substrate of 0.1*N* NaOH. Pseudo-unimolecular constants have been found for the range 13.5° to 21°, but over 22° reaction rates cannot be evaluated in the same manner. Results at the lower temperature indicate that the soap remains in the monolayer and that the molecular areas of soap and monoglyceride are additive. Energy of activation of the monolayer reaction is similar to that of saponification in bulk.

Mango kernels. D. R. Dhingra, S. N. Kapoor and G. Chandra. *Proc. Ann. Convention Oil Technol. Assoc. India* 3, 39-44(1948). The kernels of mango contain (% d.b.) fat 10.7, starch 72.8, sugar 1.1, protein 9.5, tannins 0.11, ash 3.66. The fatty acid composition of the oil is capric 0.15, lauric 2.7; myristic 5.1, palmitic 11.2, stearic 31.1, arachidic 1.7, oleic 43.8, linoleic 4.1 and unsaponifiable matter 0.1%. The kernels and the oil meal are suitable for livestock feeding. (*Chem. Abs.* **45**, 8273)

Flavor stability of edible oils improved by addition of 0.01% phytic acid. Anon. *Food Proc.* 12(11), 35(1951). The presence of phytic acid increases the stability of corn, safflower and soybean oils.

Composition of oils from various fresh-water fish. M. N. Checkenkin (Pedagog. Inst., Pskov, U.S.S.R.). *Biokhimiya* **16**, 193-8 (1951). The presence of highly unsaturated acids is typical of oils from fresh-water fish. The chemical composition of oils of 2 closely phylogenetically related fish are almost the same in some cases and entirely different in others. (*Chem. Abs.* **45**, 8788)

Decomposition of tung oil by Ricinus lipase. P. L. Huang. *J. Chinese Chem. Soc.* **18**, 95-102(1951). The decomposition of tung oil by *Ricinus lipase* at 37° to glycerol and fatty acids has been studied. The optimum composition of the reaction mixture is (by weight): tung oil 100, ground castor bean 15-20, water 80-100, H_2SO_4 0.3-0.4, $MnSO_4$ 0.2. The initial rate of decomposition is directly proportional to the amount of *Ricinus lipase* present, and the length of the induction period of the decomposition is inversely proportional to it. On pyrolysis at 450° in the presence of 0.5% $AlCl_3$, 180 g. crude fatty acids obtained by the decomposition of tung oil yield: gasoline (60-200°) 20 cc., kerosene (200-275°) 40 cc., gas oil (275-350°) 33 cc., lubricating oil (>350°) 20 cc. (*Chem. Abs.* **45**, 8788)

Chemical examination of the seeds of Emblica officinalis Gaertn. I. The fatty oil and its component fatty acids. D. C. Dhar, M. L. Dhar and D. L. Shrivastava (Central Drug Research Inst., Lucknow, India). *J. Sci. Ind. Research (India)* **10B**, 88-91(1951). The seeds of *Emblica officinalis* Gaertn. contain approximately 26% fixed oil containing 87% mixed acids, sitosterol, and a substance (m.p. 124-25°) giving the tests for phytosterols. The mixed fatty acids were separated by Twitchell's modified lead salt-alcohol method into 7.2% saturated acids of iodine value 6 and 92.8% unsaturated acids of iodine value 161.5. The percentage of component acids found in the oil were: linolenic 8.8, linoleic 44.0, oleic 28.4, stearic 2.2, palmitic 3.0, and myristic 1.0. (*Chem. Abs.* **45**, 8787)

Sunflower seed oil produced in North China. S. Ueno and P-H. Wan (Osaka Univ.). *J. Agr. Chem. Soc. Japan* **19**, 735-9(1943). The sunflower seeds (0.0695 g. average weight per seed) contained moisture 3.45 and ether-extractable material 42.0%. The oil had d_{20} 0.9228, iodine no. 135, saponification no. 194, acid no. 0.4, unsaponifiable matter 0.94%, Hehner value 96, acetyl no. 22.0, relative viscosity (Redwood) 6.9; the fatty acids had iodine no. 137, neutralization no. 196, n_{20} 1.4633, SCN no. 61.2. The fatty acids consisted of solid acids (neutralization no. 204, iodine no. 23, m. 49.6°) 10.8% and liquid acids (neutralization no. 193, iodine no. 143) 89.2%. They consisted of myristic 0.4, palmitic 4.1, stearic 4.2, arachidic 0.4, oleic 37.4, and linoleic acid 53.6%. (*Chem. Abs.* **45**, 8787)

Refining of nageshwar oil. A. C. Gupta (H. B. Technol. Inst., Kanpur). *J. Sci. Ind. Research (India)* **10B**, 24-5(1951). The seed of *Mesua ferrea* (nageshwar) yields a yellow, malodorous oil with saponification no. 196 and iodine no. 90. Its fatty acid content is: palmitic 8.2, stearic 15.8, arachidic 1.0, oleic 55.4, and linoleic 19.6%. The yellow color, which discolors soap made from the oil, can be removed by adding 100 ml. of concentrated HCl to 10 lb. of the oil previously treated with 47-56 g. of $KClO_3$. (*Chem. Abs.* **45**, 8787)

Soy oil. I. I. Nakatani and T. Nishiyasu. *J. Agr. Chem. Soc. Japan* **19**, 663-6(1943). Soy oil (by-product of soy sauce manufacture) had d_{15} 0.8959, acid no. 29-48, saponification no. 176-195, and iodine no. 130-155. Aging of the mash increased ethanol content of soy oil (from 6 to 10%) and decreased glyceride content; increased acid no. (from 23 to 52) and unsaponifiable matter content (from 1 to 2%). (*Chem. Abs.* **45**, 8787)

Scheme for the manufacture of margarine. H. Groninger. *Seifen, Ole, Fette, Wachse* **74**, 173-4(1948). A method of margarine manufacture is outlined with flow sheet and details of the composition of the margarine and of the fat mixture. (*Chem. Abs.* **45**, 8672)

Fat analysis: adulteration of butter by emulsified fats. A. Pierantoni (Lab. chim. provinciale, Naples, Italy). *Igiene e sanita pubbl.* **6**, 597-602(1950). To detect emulsified fats (mixtures of vegetable oils and hydrogenated vegetable fats, such as coconut oil) in butter, the most suitable tests proved to be the organoleptic test, the Wood's light test (different fluorescence according to the percent of added fats), and the Crismer index. The refractive index shows irregular behavior. (*Chem. Abs.* **45**, 8672)

Separation and identification of fatty acids. VII. Preparation of erucahydroxamic and brassidohydroxamic acids, and isolation of pure erucic acid. H. Yukawa and Y. Inoue (Kyoto Univ.). *J. Agr. Chem. Soc. Japan* **18**, 415-18(1942); *Bull. Agr. Chem. Soc. Japan* **18**, 33 (1942). Erucic acid from rapeseed oil was purified by preparing the hydroxamic acid from the ethyl ester. This was then recrystallized and erucic acid regenerated from it. Pure brassidic acid was similarly prepared from elaidinized erucic acid.

VIII. Preparation of ricinoleohydroxamic and ricinoelaidohydroxamic acids and pure ricinoleic acid. *Ibid.* (J.) 875-8; (Bull.) 72. Pure ricinoleic acid and ricinoelaidic acid were prepared by means of the hydroxamic acids.

IX. Paper partition chromatography of hydroxamic acids. Y. Inoue and M. Noda. *Ibid.* (J.) 294-8(1950). As the chromogenic reagent, 10% $FeCl_3$ in ethanol was used. Butanol, ethyl acetate, and butyrone were convenient solvents. R_f values for 13 hydroxamic acids derived from the C_2-C_{22} saturated aliphatic acids (among them valerohydroxamic acid, light yellow, noncrystallizable syrup, a new compound) are given (*Chem. Abs.* **45**, 8449)

The manufacture and uses of some products from menhaden oil. W. C. McLeod (W. C. Hardesty Co., Inc., Dover, O.). *Fish Meal and Oil Ind.* **3**, No. 6, 10-11, 17-18(1951). Cold clearing, alkali refining, bleaching, hydrogenation, the production of fatty acids, and the purification of fatty acids by distillation are described. The fatty acid composition of the fats and oils of menhaden, sardine, herring, linseed, cottonseed, soy bean, beef tallow, and lard and the specification of the saponified and the distilled grades of hydrogenated menhaden fatty acids are tabulated. (*Chem. Abs.* **45**, 8788)

Whaling. W. J. Granberg. *Fish Meal and Oil Ind.* **1**, No. 9, 8-9, 16-17 (1949). A British Columbia plant for processing whale into oil, vitamin A oil, meal, condensed solubles, and dog food is described. (*Chem. Abs.* **45**, 8788)

PATENTS

Coloration of margarine and butter with leuco form of dyes. E. F. Drew, H. G. Bissinger and J. Kamlet (E. F. Drew & Co., Inc.). *U. S. 2,559,411.* Edible dyes are dissolved in water or a volatile organic liquid. Then a small quantity of hydrogenation catalyst is added and the mixture is subjected to the action of H until the dye is reduced to the leuco form. The catalyst is then filtered out of the solution and the solvent removed under reduced pressure. The reduced dye material is then mixed with the fat emulsion in the absence of air and the finished product enclosed in air-tight containers. When the product is opened to the air and slightly mixed, the uniform color is developed. (*Chem. Abs.* **45**, 8675)

Epoxidized oils. D. Swern and T. W. Findley (U. S. D. A.). *U. S. 2,569,502.* Triglycerides are reacted with peracetic acid in acetic acid solution to form the epoxides. Epoxidized soybean and linseed oils are claimed.

Modified lard and process of producing same. R. J. Vander Wal and L. A. Van Akkeren. (Armour and Co.). *U. S. 2,571,315.* Lard is modified by heating it at 50-150° in the presence of a metal alcoholate.

Refining fatty acids. W. J. Bloomer (Lummus Co.). *U. S. 2,571,663.* A method of resolving soybean oil fatty acids is disclosed which consists of mixing the acids with non-toxic ethyl alcohol, reducing the temperature to below —10°F., continuously filtering the mixture, and washing the filter cake. The filtrate contains about 85% of the charge and the oil therein has an iodine number in excess of 160. The filter cake has an iodine number of less than 10.

Concentration and recovery of carotenoid pigments from palm oil. A. I. Gebhart (Colgate-Palmolive-Peet Co.). *U. S. 2,572,467.* A process is disclosed for recovering a carotenoid concentrate from palm oil which consists of saponifying palm oil at a temperature less than 150°, acidifying, dissolving the resulting fatty acid-carotenoid mixture in an inert organic solvent, lowering the temperature to crystallize a major portion of the fatty acids therefrom and recovering from the mother liquor a carotenoid concentrate.

Oxidation of oleic acid. D. Swern and H. B. Knight. (U. S. D. A.). *U. S. 2,572,892.* A process for producing 9,10-dihydroxystearic acid is disclosed which comprises contacting oleic acid dissolved in about twice its weight of acetic acid with a free oxygen-containing gas. The reaction is conducted at about 50-100° and in the presence of at least 0.25% cobalt based on the weight of oleic acid as cobalt acetate. The resulting product is a mixture of 9,10-dihydroxystearic acid and mono- and dicarboxylic acids containing on the average 9 carbon atoms.

Isolation of sterols. W. Lange and R. G. Folzenlogen (Procter & Gamble Co.). *U. S. 2,573,265.* A process is claimed for the separation of sterols containing a hydroxy group in the 3(β)-position and a double bond in the 5:6-position from sterol containing material, which comprises dissolving the unsaponifiable matter in a hydrocarbon or halogenated hydrocarbon and mixing therewith at a temperature of about 100°F. perchloric or hexafluorophosphoric acid.

Process of oxidizing fatty materials. H. O. Renner (J. R. Short Milling Co.). *U. S. 2,573,358.* A process is disclosed for increasing the stability of peanut oil by reacting peanut oil with a free oxygen-containing gas in the presence of an enzymatic extract previously prepared from the same raw material as the oil.

Treatment of fatty oils. R. J. Taylor (Lever Bros. Co.). *U. S. 2,573,509.* A process is claimed for removing undesirable flavor-imparting materials from an oil containing vitamin A without reducing appreciably the vitamin A content of the oil which comprises dissolving the oil in a saturated hydrocarbon solvent and passing the resultant solution through gamma alumina.

Lead salts of fatty acids. L. M. Kebrich (National Lead Co.). *British 650,164.* Normal Pb salts of fatty acids containing 6-30 C atoms are formed by grinding a slurry of 1 mole PbO, 2 moles fatty acid, and 3-16 parts H_2O/part PbO, and a catalyst amounting to 2-15%, preferably 2-5%, of the weight of H_2O. Basic salts are formed from 3 moles PbO, 2 moles fatty acid, and preferably 5-15% catalyst. The catalyst is a saturated alcohol or ether containing 2-8 C atoms; e.g. the butanols or glycol butyl ethers. The grinding time is 12-20 hrs. at room temperature, 10 hrs, or less at 40°. The product is filtered and dried at 80°. (*Chem. Abs.* **45**, 8031)

Reaction products from saturated higher molecular aliphatic or alicyclic carboxylic acids. Badische Anilin- & Soda-Fabrik. *German 803,355.* Saturated higher molecular weight aliphatic or alicyclic carboxylic acids or their esters, anhydrides, or amides such as lauric, palmitic, stearic acids or their mixtures, tallow, palmitic anhydride, or stearamide are oxidized with air, O, O_3, peroxides, permanganates, etc., sometimes in the presence of catalysts, and then treated with H_2SO_3, or its salts. The products are soluble or dispersible in water and useful as wetting and dispersing agents for textiles, etc. (*Chem. Abs.* **45,** 8550)

Deodorization of chrysalis oil. S. Takama. *Japan 178,834.* Odorous N compounds in the oil are removed as the acid amide by the reaction of the oil and ketene gas. (*Chem. Abs.* **45,** 8276)

• Biology and Nutrition

R. A. Reiners, Abstractor

Pantothenic acid involvement in fatty acid oxidation. V. H. Cheldelin, A. P. Nygaard, O. M. Hale and T. E. King (Oregon State College, Corvallis). *J. Am. Chem. Soc.* **73,** 5004(1951). Liver homogenates from rats fed a pantothenic acid rich diet for 3-5 weeks were found to oxidize caproate at 12-40% of the efficiency of liver homogenates from the control rats.

Effect of processing variants on the nutritative value of cottonseed meal for chicks. J. L. Milligan and H. R. Bird (U. S. Dept. Agr., Beltsville, Md.). *Poultry Sci.* 30, 651(1951). To obtain cottonseed meal of maximum nutritional value it should not be cooked above 200°F. Duration of cooking below this temperature had no effect. Cottonseed meal containing 0.1% free gossypol-like material was fed safely to young chicks as 39% of the diet. At the 70% level 0.1% gossypol-like material was harmful but 0.02% was not. Meals pressed at lower pressures were better nutritionally than those pressed at higher pressures.

Utilization by the chick of vitamin A from different sources. I. Crystalline carotene, crystalline vitamin A acetate, and "black cod" liver oil. F. F. Costano, R. V. Boucher and E. W. Callenbach (Penna. State Coll., State College). *J. Nutrition* **45,** 131(1951). The efficiency of utilization was judged by gain in body weight and by liver storage of vitamin A. A high storage of vitamin A in the liver was not essential for satisfactory growth, provided sufficient vitamin A was supplied in the daily diet. Crystalline vitamin A acetate was most effective and crystalline carotene least effective in promoting concentration of the vitamin in blood plasma and in the liver.

Yellow fat in the mink. R. J. Lalor, W. L. Leoschke and C. A. Elvehjem (Univ. Wis., Madison). *J. Nutrition* **45,** 183(1951). Yellow fat, a disease in mink characterized by brownish yellow coloration of the depot fat, may be the result of feeding relatively large amounts of horse meat, the fat of which contains about 16% trienoic acids. Feeding minks 3% linolenic as raw linseed oil produced yellow fat. α-Tocopherol seems to exert a protective action.

The calcium balance of adult human subjects and high- and low-fat (butter) diets. F. R. Steggerda and H. H. Mitchell (Univ. Illinois, Urbana). *J. Nutrition* **45,** 201(1951). Results of studies of calcium metabolism on 13 adult men involving 50 experimental periods of 12-20 days indicate that butter has no effect on calcium metabolism.

Fatty acids in nutrition. R. T. Holman (Texas Agr. Expt. Sta., College Station). *Proc. 3rd Conf. on Research, Council on Research, Am. Meat Inst. Chicago,* **1951,** 1-10. Linoleic acid is probably the dietary essential fatty acid, for it serves all the functions of essential fatty acids. Most of the numerous fatty acids occurring in nature serve no known specific function except the storage of energy. The essential fatty acids are the only known substrates for a highly specific enzyme system in the plant kingdom and have specific nutritive properties.

Fat in human nutrition. M. I. Grossman (Univ. of Illinois Coll. Med., Chicago). *Proc. 2nd Conf. on Research, Council on Research, Am. Meat Inst. Chicago,* **1950,** 28-32. Fats heated above 350° when included in the diet of the rat were noncarcinogenic, even after several years of feeding. Rats grew as well on heated fats as on unheated ones, except when the level of fat was high which caused decreased food intakes in the animals on heated fat diets. Theories of fat absorption are discussed. (*Chem. Abs.* **45,** 8607)

Soybeans and soybean products in dairy cattle feeding. N. L. Jacobson (Iowa State Coll., Ames). *Soybean Digest* **11**(11), 68(1951). Soybean oil meal is a particularly useful supplement in the diet of young dairy calves.

Research increases soybean oil meal utilization in poultry feeds. E. L. Johnson (Iowa State Coll., Ames). *Soybean Digest* **11** (11), 69(1951). The use of additional nutritive factors to supplement a properly prepared meal will eventually lead to the widespread use of soybean oil meal as the sole protein concentrate in poultry feeds. Two methods which show promise as ways of rapidly determining the effectiveness of heat treatment of soybean oil meal are mentioned.

New developments in beef feeding. W. Burroughs (Iowa State Coll., Ames). *Soybean Digest* 11(11), 64(1951). The need for protein supplements in beef feeding is emphasized. Where good quality roughages are not fed to fattening cattle, it may be advisable to make additions to a simple protein supplement such as soybean oil meal for cattle.

Influence of the lipids of peanut oil on utilization by rats of crystalline carotene and of the axerophthol of a mixed ration. Lucie Randoin, Denise Hugot and J. Causeret (Ecole hautes-etudes, Paris). *Compt. rend. soc. biol.* **145,** 65-8(1951). Utilization of carotene and axerophthol was substantially the same whether the ration was fat-free or contained 10% of peanut oil.

Influence of the manner and timing of administration of carotene on the regain of weight of rats deprived of vitamin A. *Ibid.* 68-80. After rats were deprived of all forms of vitamin A for 50 days, regain of weight was more rapid if carotene was mixed into the ration than when it was given separately in oil solution. (*Chem. Abs.* **45,** 8097)

Trichloroethylene intoxication. A Masoero (S. Giovanni Battista Hosp., Turin, Italy). *Minerva med.* **41,** II, 1355-7(1950). A study of one case, with the conclusion that the high apparent toxicity of trichloroethylene is due to oxidation to phosgene and HCl on standing in light and air. (*Chem. Abs.* **45,** 8133)

Colorimetric determination of the efficiency of removal of the cuticles from peanut oil cakes. A. Dangoumau, H. Debruyne, R. Cluzan (Lab. municipal, Bordeaux, France). *Bull. mens. ITERG* 5, 297-8(1951). It is proposed to replace the uncertain microscopic determination of the cuticles present in the oil cake of peanuts by a colorimetric test based on the formation of a red, water-soluble pigment upon boiling the cake with a solution of 1.25 parts of HCl in 95% ethanol for 30 minutes. The optical absorption observed in the red solution with the aid of different photometers, is graphically shown. (*Chem. Abs.* **45,** 8274)

• Waxes

E. H. McMullen, Abstractor

Effect of treatment of coal on yield of crude montan wax. H. Thieberger and V. Vŏelak. *Paliva* **30,** 262-268(1950). The highest yields of wax are obtained from brown coal of grain, size 8-10 mm., containing 10-18% of water, and heated at 230-240°. Previous extraction of the coal with acids raises, and with alkalis lowers, the yields. (*Brit. Abs. B,* **1951,** I, 34).

Petroleum waxes; their use and evaluation for paper packaging. T. C. G. Thorpe. *J. Inst. Petroleum* **37,** 275-315(1951). Petroleum waxes are extensively used for waterproofing paper and cardboard for packaging and also for imparting a surface gloss to paper. The important characteristics of petroleum wax for this purpose are discussed. Methods of determining oil content, viscosity, m.p., color, and moisture-vapor-permeability are discussed. Important characteristics are hardness, flexibility, strength (tensile or rupture), sealing or bonding strength, blocking tendency, gloss, color, odor and taste stability, waterproofness, and grease and oil resistance. Available test methods for each of these are discussed. There is an oxidation stability problem in connection with the use of microcrystalline waxes, due in part to the high temperature of application. Inhibitors have been used with these waxes, but these introduce the problem of possible toxicity with food products. Flexibility at frozen food temperatures was also discussed. (*Chem. Abs.* **45,** 8752)

Lanolin, I, II, III. E. S. Lower. *Industr. Parfum.* **5,** 354-358, 407-410, 455-458(1950). I. Ten different qualities of lanolin, their physical and chemical properties, and applications are described. The solubilities of lanolin and constituent alcohols, acids, and cholesterol in 48 solvents, and the analyses of 3 commercial samples and of a sample of neutral wool fat are given.

II. The applications of lanolin for the preparation of cosmetic emulsions, protective colloids, impregnating agents, inks, and cements, are discussed. Formulae for the preparation of anti-dermatitis ointments are given.

III. Applications of lanolin in the manufacture of lubricants, artificial leather, wax products, plasticisers, pigments, antirust agents, resins, soaps, sulphonates, ski wax, veterinary products, textile emulsions, and vitaminized chocolate, are described. (*Brit. Abs. B*, **1951**, D, 104, 223)

• Drying Oils

Stuart A. Harrison, Abstractor

Alkyd resins — correlation between properties of alkyds and composition of modifying fatty acids. D. T. Moore. *Ind. Eng. Chem.* **43**, 2348(1951). The effect of oil type and polyenoic acid content on three properties of enamels prepared from medium oil length alkyds are discussed. The three properties considered are drying time, hardness, and after-yellowing of the dry film. A series of 16 alkyds was prepared, having the same oil length (medium) but different proportions of non-conjugated mono-, di-, and trienoic acids. Enamels were prepared from these alkyds and the films examined. The following conclusions were reached: (1) The rate of drying is a function of polyenoic acid content. This rate increases rapidly up to a polyenoic acid content of about 50%, above that figure a limiting value is gradually approached. (2) The hardness of the film is proportional to the polyenoic acid content. At constant polyenoic acid content a change in the linoleic-linolenic ratio produces no appreciable change in hardness. (3) Color development in white alkyd enamels is a logarithmic function of the viscosity of the vehicle and can be expressed by the following formula $Y = A - B \log V$ where Y = degree of yellowing, V = viscosity, A and B are constants. It can also be expressed in terms of the polyenoic acid content. $Y = A (L_1 + 5L_2) + B$ where L_1 = per cent linoleic acid and L_2 = per cent linolenic acid. (4) Color development after an initial period of 2 to 3 weeks fits the formula $\log Y = A + BT$ where T = time. In another series of alkyds of the same oil length the effect of conjugated unsaturation was studied. The following conclusions were reached on enamels from these alkyds: (1) The drying time is related to the content of polyenoic acids by an equation of the form: $T P (1 - P/K) = K^1$ where T = drying time, P = % polyenoic acid, K and K^1 are constants. (2) The presence of increasing amounts of conjugated unsaturation has a beneficial effect on drying time up to a limit in the neighborhood of one-half of the total unsaturation. (3) The hardness is not appreciably affected by the ratio between conjugated and non-conjugated unsaturation. (4) The degree of after-yellowing after a particular interval of time is related to the composition by the equation: $Y = K (D + a T + bC) + K^1$ where D = % dienoic acids, T = % trienoic acids and C = % conjugated acids.

Reflections of the paint industry at mid-century. P. Heiberger and S. Morris. *Paint Varnish Production* **41** No. 10, 14(1951). Historical review of the development of the paint industry in the U. S. A.

Polymerization of styrene with drying oils in aqueous emulsion. I. D. Bezman and D. D. Browning. *Paint, Oil Chem. Rev.* **114** No. 20, 10B(1951). Styrene was emulsion polymerized in 1/1 and 3/7 ratio with linseed and soybean oils before and after treatment in numerous ways. The polymerizations were carried out at 50 and 75° using potassium persulfate catalyst in a normal emulsion polymerization system. The polymer was coagulated then taken up in solvents and precipitated with low boiling mineral spirits, methanol or ethanol. In this manner the uncombined oils were separated from the polystyrene and copolymerized styrene. The purified polymerized portions were examined by infrared spectrophotometry. The oil molecules contain a carbonyl group which gives a band at 5.8 microns. By use of calibration curves a rough quantitative measure of the oil present was possible. Their conclusions were: (1) No appreciable copolymerization occurred between styrene and untreated oils or oils which had conjugated unsaturation. (2) There was copolymerization with blown oils, though there was no direct relationship between peroxide value and degree of copolymerization. (3) Increased amounts of oil can be introduced into the copolymer by thermally polymerizing the oil before blowing it with air. (4) The combination of oil with polystyrene may be the result of chain transfer rather than copolymerization.

Oiticica oils. W. A. Bush. *Paint, Oil Chem. Rev.* **114** No. 22, 14(1951). Reviews the history of the development and use of oiticica oils. The oil comes from the nuts of the tree, *Licania rigida*. The oil as it comes from the nut stiffens to a lardy-gummy mass. By carefully controlled heat polymerization it is converted to a viscous fluid known as "Liquid Oiticica Oil." The principal constituent of oiticica oil is licanic glyceride. Licanic acid has three conjugated double bonds in the 9, 11, and 13 positions and a carbonyl group in the 4 position of the 18-carbon acid. The following precautions are listed in handling the oil: 1. Low cooking temperatures (450-475°F.) for flexibility. 2. Gas proofing requires a cooking temperature of 500°F. 3. The dilemma resulting from 1 and 2 is avoided by using flexing oils in conjunction with the oiticica oil. 4. Lead must be avoided except in low concentration after cooking. Oiticica oil is a replacement for tung oil in many respects but has less water and much less alkali resistance.

Modification of alkyds with semi-drying oils. S. L. Kapur and K. K. Sarin, *J. Sci. Ind. Research* **10B**, 94(1951). The preparation and properties of oil-modified alkyd resins containing not more than 35% phthalic anhydride from linseed, tobacco seed, safflower, and coconut oils are described. The viscosities of linseed, safflower, and coconut oil-modified alkyds are of the same order; those of tobacco seed are higher. The drying and baking times of modified linseed oil alkyds are shortest and increase in the following order: tobacco-seed oil, safflower oil, coconut oil. The drying and baking properties (except color) of tobacco-seed oil alkyds are better than those of the safflower-oil alkyds. Tobacco-seed oil alkyd films are flexible and resistant to salt solutions. (*Chem. Abs.* **45**, 8783)

The characteristics and applications of modern coating resins. W. H. Patrick. *Official Digest Federation Paint & Varnish Production Clubs* **No. 321**, 615(1951). The properties of different oil length alkyds and their uses are discussed in some detail. Specific types of finishes such as architectural enamels, trim and trellis paints, four-hour enamels, porch and deck paints, and baking enamels are discussed.

The use of drying oils in oleo resinous varnishes. J. M. Hafeli. *Canadian Paint Varnish Magazine* **25** No. 9, 34(1951). Discusses the use of linseed, tung, perilla, soybean, fish, oiticica, and dehydrated castor oils in the manufacture of varnishes. The results used in conjunction with these oils are: rosins, natural resins, ester gums, pure phenolics, modified phenolics, alkyds, and coumarone-indenes. The properties achieved with different combinations of these oils and resins are outlined.

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Interpolymerization of styrene and frosting drying oil in presence of monocyclic alpha-terpene. L. E. Wakeford and D. H. Hewitt. *U. S. 2,567,137.* Non-frosting drying oils are prepared from frosting drying oils by copolymerization with styrene in presence of an alpha-terpene. This has been done with Chinawood oil, Japanese wood oil and oiticica oil. Oiticica oil (100), which has been isomerized by heating to 210° for 30 minutes, styrene (150), dipentene (75), and mineral spirits (175) are mixed and then heated under reflux while blowing air through it for 17 hours. The viscosity in a Ford No. 4 cup at 25° is 92 seconds. After stripping the styrene off, diluting with mineral spirits, and adding drier, a film of the solution will dry smooth and touch dry in 90 minutes.

Removing inhibitors from drying oils. H. A. Vogel. *U. S. 2,569,206.* This is similar to *U. S. 2,569,136* except that no adsorbent or filtration is used. The drying rate is greatly improved on all oils described because of destruction of natural antioxidants.

Method of improving color and drying characteristics and similar properties of drying glyceride oils. H. A. Vogel. *U. S. 2,569,136.* Soybean oil which was the extract product of a furfural fractionation was charged (200 parts) to a kettle and "Special Filtrol" (40 parts) added. The mixture was heated to 212-230°F. and blown with live steam for 45 minutes. When the color and break was low enough the oil was dried by blowing with an inert gas. The antioxidants were then oxidized by controlled oxidation, in presence of 0.0015% cobalt naphthenate, by blowing with air and maintaining the temperature at 260-

265°F. After 45 minutes of air blowing, the oil was blown with steam to eliminate odor. It was then filtered and cooled. The oil had improved in color from a Gardner value of 14 to 9. The drying time on a standard pigmented test film was reduced from over 24 hours to 6.5 hours.

Synthetic hard resins prepared from α, β unsaturated polycarboxylic acids. A. E. Rheineck. *U. S. 2,569,495.* A resin is made from wood rosin (1,000), maleic anhydride (160), pentaerythritol (250) with calcium acetate (3) as catalyst by heating to 200° over a period of two hours. The resulting resin has a hydroxyl value of 6 and a softening point of 123° (Hercules drop method). This maleic modified resin can be used to make varnishes with semi-drying oils, i.e. soybean oil (463) and modified resin (420) are heated to 300-305° in a closed kettle under CO_2 for six hours. The batch when cooled and thinned to 50% solids with mineral spirits has a viscosity of 6 on the Gardner scale. Films dry dust-free in 3.5 hours and tack-free in 5-6 hours.

Preparation of drying oils from clay polymers. L. M. Adams, P. L. Brandt, R. J. Lee, and F. T. Wadsworth. *U. S. 2,569,595.* The dark colored highly unsaturated fractions which are removed from cracked gasoline by passing through active clays can be washed out with hydrocarbons such as gasoline. Though the unsaturated polymers dry well they are not useful because of the dark color. It was found that the color bodies could be removed without destroying the drying properties of the oil by treating with acidic polymerization catalysts which convert the color bodies to a sludge which can be separated from the oil by decantation. The oil is then filtered through a decolorizing clay such as Florex to give an oil with an ASTM color of 7. This oil can be distilled to give an oil of ASTM color of 2, and an iodine no. of 183.

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• Detergents

Lenore Petchaft, Abstractor

Studies in the corrosion of metals occasioned by aqueous solutions of some surface-active agents. I. Copper. H. Holness and T. K. Ross (S. W. Essex Tech. Coll. Walthamstow.). *J. Applied Chem.* (London) **1**, 158-69(1951). The action of dilute aqueous solutions of representative anionic, cationic, and nonionic wetting agents on sheet copper has been studied. Rise of temperature was found to increase corrosion but variation of pH from 2 to 12 was without marked effect. (*Chem. Abs.* **45**, 7507)

Detergency(I). Low temperature scouring of greasy wool. W. W. Mansfield. *Austral. J. Appl. Sci.* **1**, 330-47(1950). Soap-soda scouring of greasy wool is difficult below 40° as the removal of wool wax from the fibers is hindered by the high viscosity of the wax. The addition of a small amount of an emulsified solvent to the detergent solution enables scouring to be accomplished at room temperatures. The influence of each of a number of factors on the detergent efficiency of such an emulsion has been determined, and the mechanism of the detergent action is discussed.

Modern wool scouring. C. R. Wilkinson (Shell Chemicals Ltd., London). *Dyer* **105**, 627-9, 691-2(1951). Optimum results are obtained with Na secondary-alkyl sulfates pH 7-8 and 20-60° with carboxymethylcellulose or tetrasodium pyrophosphate added to assist in dirt suspension. (*Chem. Abs.* **45**, 8271)

Hexachlorophene soaps. R. E. Casely (Armour & Co., Chicago, Ill.). *Quartermaster Rev.* **31**, No. 2, 31, 89(1951). Review of development of germicidal soaps including literature survey. The many applications of these soaps for use in surgical scrub, for food handlers, and generally in sanitary maintenance are reviewed.

Aqueous solutions of sodium benzene-sulfonate and monosubstituted derivatives—some physicochemical properties. P. W. Renich and R. Taft (U. of Kansas, Lawrence, Kan.). *Ind. Eng. Chem.* **43**, 2376-84(1951). Derivatives of sodium benzenesulfonate are commercially available and are used as surface active and hydrotropic agents. Data on the physical properties of these compounds are lacking. This study was made to supply this lack of information. Properties measured included density, viscosity, surface tension, refractive index, solubility, and conductance over a range of concentrations which in general varied from 0.005 molal up to and including 1.0 molal at 0°, 25°, 45°, and 60°. Freezing point depressions were also determined. The physical properties determined do not in general deviate from those usually found for organic salts in water. No evidence was found of micelle formation in solutions of any of the salts.

Detergents for use in the aluminum industry. P. G. Clements. *Light Metals* **14**, 104-8(1951). A review is given of possible detergents for cleaning Al alloys. Particular reference is made to the use of Na_2CO_3 solutions inhibited with a small percentage of Na_2SiO_3. Equipment layouts are described for detergent installations. (*Chem. Abs.* **45**, 8276)

Substitution of coconut oil in soap. S. C. Gupta, J. S. Phadnis and J. S. Aggarwal (National Chemical Laboratory, Poona, India). *Soap* (India) **4**, No. 5, 11-15(1951). It has been found that coconut oil can be substituted in soaps by suitable mixtures of lauric acid-rich fats, castor oil, groundnut oil and hydrogenated rosin.

Molecular interaction and its relation to the formation of sodium dodecylsulfate-cetyltrimethylammonium bromide complex. R. Matalon, M. R. J. Salton, and M. Cohen (Dept. of Colloid Sci., Free School Lane, Cambridge Univ., Eng.). *Nature* **167**, 241(1951). If the reagents are not well purified, traces of polar compounds, such as long-chain alcohols will interfere with precipitation methods of determining anionic detergents by cationic and the reverse. Relatively high amounts of C_6 and C_7 alcohols are needed, but C_8 and C_9 will inhibit the complex formation in equimolar concentration. The alcohol-Na dodecylsulfate complex competes with the Na dodecyl-sulfate-cetyltrimethylammonium bromide complex. The results corroborate previous work postulating a 1:1 association of octyl alcohol-Na dodecylsulfate. (*Chem. Abs.* **45**, 8276)

New and expanded uses of industrial soaps and detergents. J. W. Perry (Mass. Inst. Technology, Cambridge, Mass.). *Soap Sanit. Chemicals* **27**, No. 10, 39-41(1951). Review of new uses for synthetic detergents and methods of synthesizing products for special applications.

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Alkyl aryl sulfonate-carboxymethylcellulose-alkaline salt detergent composition. C. E. Smith and T. H. Vaughn (Wyandotte Chemicals Corp.). *U. S. 2,566,501.* A detergent composition consisting of a sodium alkyl benzenesulfonate derived from a high boiling petroleum distillation fraction, sodium carboxymethylcellulose, and an alkaline compound from the group consisting of sodium carbonate, modified soda, sodium metasilicate and the reaction product of sodium carbonate and sodium silicate. This three-component system has such detergent properties that it is suitable for use in laundering cotton fabrics.

Process for making a detergent composition. Juan M. Guastavino. *U. S. 2,567,999.* Process for making a detergent composition for use on the human skin without the use of water by reacting ammonium hydroxide and oleic acid with continuous agitation in the presence of a petroleum hydrocarbon fraction, adding aqueous sodium hydroxide solution, water and glycerine, and continuing agitation until the composition acquires a gel-like consistency.

Method of making glassy phosphate detergent compositions. I. Beiley and A. H. Razee.(Hulman & Co., Inc.). *U. S. 2,568,110.* The process of making a detergent product comprising a mixture of uniformly dispersed glassy phosphate and detergent salt, which comprises bringing the glassy phosphate, while in water solution of about from 20% to 65% concentration, into intimate admixture with substantially hydratable, finely divided, sodium carbonate.

Method of making a synthetic detergent composition. E. F. Hill, C. E. Smith, A. Park and T. H. Vaughn (Wyandotte Chemicals Corp.). *U. S. 2,568,334.* The method of making a synthetic detergent by preparing a 1-10% by weight water solution of sodium carboxymethylcellulose, adding sodium alkyl benzene sulfonate, whose alkyl group is derived from a petroleum hydrocarbon fraction boiling in the range of 150-300°, heating and agitating, and then drying the resultant solution to solid form.

Improvements in or relating to continuously lathering detergent compositions. Ladislav Zakarias. *British 656,544.* A detergent compound containing both a saponified detergent and a saponifiable compound plus alkali. Theory behind patent is that after the saponified detergent has absorbed or combined with the dirt, the saponifiable material will be treated with the alkali, become saponified and provide continuous lathering and washing after the original detergent has become exhausted.