# ABSTRACTS . . . . . . . . . . . . . . . Don Whyte, Editor

## • Oils and Fats

A. R. Baldwin, Abstractor

Composition and drying ability of cornelian cherry oil. G. Rankov and A. Popov. *Annuaire univ. Sofia, Faculte phys.-math. 43* (2), 119-46(1946-47). Cornelian cherry (Cornus mas) oil was chemically more similar to walnut oil than to linseed, pineseed, firseed, soybean, poppyseed, or sunflower-seed oil. The cherry stones contain only 6% oil which was obtained from finely ground stones by extraction with petroleum ether. The fatty acids present were linolenic 8.8, linoleic 49.6, oleic 32.3, and saturated acids 9.3%. The oil had film forming and drying properties. (*Chem. Abs. 44*, 351.)

The chemical composition of the oils from the seeds of *Cynara cardunculus* (cardo de castilla) from Argentina and Spain. J. C. Fernandez, P. Cattaneo, G. Karman, and I. J. Rodrigo. *Anales acoc. quim. argentina 37*, 139-51(1949). The ripe seeds of *Cynara cardunculus* from both Argentina and Spain upon extraction with petroleum ether yield between 20 and 22% of a semidrying oil. The crude oils have iodine values of 128.7 and 122.3, respectively, and give negative reactions to Bellier's test. Fatty acid compositions of the oils from the two seeds were determined. (*Chem. Abs. 44*, 351.)

Safflower, a new crop for the west. C. E. Classed and A. Hoffman. *Crops and Soils 1* (8), 5-7(1949). Safflower has been grown in the Middle East and North Africa for centuries. It was grown on about 25,000 acres in the U. S. in 1949. Yields vary from 400 to 4,000 pounds per acre and the seed contains 29-36% oil which can be used in the drying oil industry.

The constituents of the fruit of *Helianthus annuus*. Changes in sunflower oil during ripening of seeds. E. Theile. *Pharmaizie 4*, 428-31(1949). As the fruits ripen, there is a decrease in the percentage of fatty acids and an increase in oleic and linoleic acid content. (*Chem. Abs. 44*, 351.)

Operation olive. J. R. Webster. *Food Industries 21*, 1557-62(1949). This description of the olive industry, including the processing of the fruit for oil, shows a graphic picture-flow-sheet of the operations at the worlds largest olive processing plant.

Olive oil from Morocco. M. Rohr. *Ann fals. fraudes 42*, 176-84(1949). In distinction from French and Tunisian oil, the lead salts of the saturated acids of oil from Morocco show a marked change in solubility in ether with temperature changes above 10°. The solubility index expresses the percentage of solubility increase per degree of temperature increase. This index varies between 3 and 5, whereas the index of other oils is about 1. The iodine value of the oils and their fatty acids are also given. (*Chem. Abs. 44*, 351.)

World soybean production in 1948. M. Fletcher. *Scientific Monthly 70*, 116-21(1950). A general discussion of soybean production throughout the world is given. Soybeans are the worlds cheapest source of edible oil today. The U. S., China, and Manchuria grew over 90% of the 575 million bushels grown in 1948.

Production of tall oil in Finland. V. V. Juvonen (Suonii, Finland). *Paper Trade J. 130* (1), 27-9(1950). Approximately 22,000 tons of crude tall oil are produced annually in Finland, and used in the manufacture of a household soap after distillation. Compositions of various tall oils are given.

Tocopherol content of edible oils sold in the markets in the city of Buenos Aires. M. L. Herraiz and H. G. de Alvarez Herrero. *Ann. N. Y. Acad. Sci. 52*, 306-308(1949). A modified method of Emmerie and Engel was used to determine tocopherol contents (100-0 mg./100 g.) of oils purchased on the market. Oils such as wheat germ, cod-liver, olive, sunflower seed, peanut, cottonseed, turnip seed, grape seed, and various mixtures of these oils were examined.

Solid-liquid extraction calculations. J. A. Grosberg (Satmar, South Africa). *Ind. Eng. Chem. 42*, 154-62(1950). The standard equations for extracting soluble material from solids have been solved for the case of constant underflow. An explanation of the variation of underflow volume with increased solute concentration is offered, and equations are set up in accordance with that explanation. The theory has been verified by experimental work already published. The method applies to extraction of oil from thin flakes of oil-bearing materials.

A microanalytical method for the volatile fatty acids. S. Black (University of Chicago). *Arch. Biochem. 23*, 347-359 (1949). A microdiffusion method for determining volatile fatty acids is described. The acids are caused to diffuse in a closed system from an acidified solution to a small cup containing standard alkali. They are subsequently estimated in the cup by a suitable microtitration. The range for the experimental conditions outlined is 0.2-2.0 microequivalents.

X-ray diffraction analysis of vaccenic acid. J. H. Benedict and B. F. Daubert (University of Pittsburgh). *J. Am. Chem. Soc. 71*, 4113-4(1949). X-ray data are reported for natural vaccenic acid, synthetic vaccenic acid, and elaidic acid.

Chemurgic recommendations stressed in cotton committee's research report. Anon. (U.S.D.A.). *Chem. Dig. 8* (9), 16-7(1949). This report lists the recommendations for new work to be started or sponsored by the U.S.D.A. on cotton, cottonseed, cottonseed oil, and cottonseed meal during 1950 and 1951.

### PATENTS

Extracting olive and palm oils. Societe Industrielle d'equipements. *French 938,350.* After the fruit has had the kernels removed, a substance is added to the paste which reduces the interfacial surface tension between the oil and the water. The substance may be an alkali metal phosphate or silicate, bentonite or an alkali, which forms a soap with the oil. The time of extraction is reduced from 12 to 6 hours and the percentage extraction is raised to 10%. (*Chem. Abs. 44*, 356.)

Method of separating the fats, flavoring ingredients, and fibrous material in cellular substances. M. J. Stacom. *U. S. 2,492,668.* Special equipment is described for obtaining partial separation of various flowable materials from cellular structure. The method consists of heating the fat-containing substance (e.g. cocoa nibs) to a temperature at which the fats become plastic but not liquid and applying pressure on rolls to a blanket of the material in such a way that the fat will accumulate at the edges.

Sulfurization of fatty oils. J. S. Fawcett (Gulf Research and Development Co.). *U. S. 2,492,562.* Fatty oils are heated with elemental sulfur in the presence of catalytic amounts of boro-ethylene glycol complex and a long chain primary aliphatic amine.

Condensing fatty acid halides with aromatic acid halides. E. Lieber and A. F. Cashman (Standard Oil Development Company). *U. S. 2,470,504.* Fatty acid chlorides are condensed with aromatic acid chlorides at 400 to 700°F. to produce an oily condensation product which is very effective as a pour point depressant.

Treating fatty acid salts with albuminous material. P. J. Heitzmann. *French 936,632.* Alkali metal salts of the higher fatty acids are condensed at 130-220° with alkali metal salts of degraded albumin containing lysalbinic and protoalbinic acids to give a product useful as a dispersing agent. (*Chem. Abs. 44*, 355.)

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## • Biology and Nutrition

A. R. Baldwin, Abstractor

Lipolysis in doughs made from various cereal flours. T. Widhe and T. Onselius. *Cereal Chem. 26*, 393-8(1949). The relative lipase activities of wheat, rye, barley, corn, and oat flours were determined from the increase in fat acidity of the doughs made from the flour, margarine, sucrose, and $H_2O$. Oat flour had a much higher lipase activity than wheat, rye, barley, and corn flours. Mixtures of wheat flour and oat flour from commercial dry milling gave doughs which developed a soapy taste when their fat content was high. This phenomenon did not occur when commercial wet milled oat flour was used in the mixture. Thermal inactivation of oat lipase is much greater with heat-treatment at 20% moisture simulating wet-milling process than at 12% moisture similar to dry-milling process. The soapy taste in doughs containing certain oat flours is due to the high lipase activity and not to the nature of the shortening.

SERUM LIPIDES FOLLOWING NEPHRECTOMY AND IN MERCURIC CHLORIDE POISONING. D. M. Atlas, M. M. Cash, and M. M. Kirschen. *Am. J. Clin. Path. 19,* 962-5(1949). No alterations in total lipides, phospholipides, cholesterol, and cholesterol esters were observed in the serum of patients following nephrectomy, or during the course of fatal $HgCl_2$ poisoning. The increase in lipides reported in dogs apparently does not occur in the human. (*Chem. Abs. 44,* 213.)

ESTERIFIED FATTY ACID LEVELS OF NORMAL HUMAN SERA. F. C. Bauer, Jr., and E. F. Hirsch (University of Chicago). *Arch. Biochem. 23,* 137-140(1949). Serum esterified fatty acids were determined on 102 healthy fasting individuals. The maximum fatty acid level was 12.6, the minimum was 7.0, and the mean was 9.2 meq. per liter.

LIPOTROPIC AGENTS IN THE TREATMENT OF LIVER DYSFUNCTION OF DIABETES MELLITUS. J. Pomeranze and V. Levine. *Rev. Gastroenter 16,* 771-7(1949). The use of lipotropic agents is described.

VITAMIN E STUDIES ON MICE WITH SPECIALIZED REFERENCE TO THE DISTRIBUTION AND METABOLISM OF LIPIDS. Z. Menschik, M. K. Munk, T. Rogalaki, O. Rymaszewski, and T. J. Szczesniak. *Ann. N. Y. Acad. Sci. 52,* 94-104(1949). Mice in which the fat-rich vitamin E-deficient diet was supplemented for over a year with 2.5 mg. daily of synthetic tocopherol have shown an increased amount of adipose tissue and fatty changes in some organs. In vitamin E-deficient mice, with the disappearance of neutral fat and the development of extreme leanness, there developed acid-fast pigmented substances in many locations of the body. In the composition of these substances, unsaturated fatty acids, phospholipids, cholesterol, and proteins take part. These observers suggest an influence of vitamin E in enzymatic reactions during lipid metabolism.

LIPOTROPIC ACTIVITY OF CHOLINE, BETAINE, AND METHIONINE IN DUCKLINGS. R. Bernard and J. M. Demers (Laval University, Quebec, Que.). *Can. J. Res. 27E,* 281-9(1949). A purified diet, deficient in choline and containing 18 per cent casein, results in fatty infiltration of the liver in duckling at four weeks. Choline has a triple function in promoting growth, preventing hepatic fatty infiltration, and preventing perosis. Betaine has a slight lipotropic activity. *DL*-methionine increased the total lipids and the severity of fatty infiltration of the livers.

THE INFLUENCE OF GROWTH AND ADRENOCORTICOTROPIC HORMONES ON THE FAT CONTENT OF THE LIVER. C. H. Li, M. E. Simpson, and H. M. Evans (University of California). *Arch. Biochem. 23,* 51-54(1949). Both growth and adrenocorticotropic hormone cause increase in liver fat with less significant changes in the water and protein content.

VACCENIC ACID AND SUMMER BUTTER. Anon. *Nutrition Rev. 7,* 356-7(1949). The relationship between vaccenic ($\Delta^{11}$-octadecenoic) acid and a possible growth promoting factor in butter is reviewed.

STUDIES OF ACETOACETATE FORMATION WITH LABELED CARBON. D. I. Crandall and S. Gurin (University of Pennsylvania). *J. Biol. Chem. 181,* 829-43(1949). Carboxyl- and $\beta$-labeled octanoate both gave rise to acetoacetate containing more $C^{13}$ in the carboxyl than in the carbonyl position, thus eliminating multiple alternate oxidation as a significant process in this pathway. In both instances, simultaneous incubation of the monolabeled fatty acid with non-labeled pyruvate partially equalized the distribution of the isotope between the two positions. In the presence of octanoate, pyruvate and acetate showed a similar tendency to introduce their carbons preferentially into the carboxyl portion of acetoacetate and, in this respect, were similar to the 2-carbon fragments which arose from the first 4 carbons of octanoate.

STUDIES OF ACETOACETATE FORMATION WITH LABELED CARBON. D. I. Crandall, R. O. Brady, and S. Gurin (University of Pennsylvania). *J. Biol. Chem. 181,* 845-52(1949). The synthesis of $\zeta$-($C_7$)-labeled octanoic acid is described. The incubation of $\zeta$-labeled octanoate with the washed homogenate of rat liver resulted in the formation of predominantly carbonyl-labeled acetoacetate. These experiments, along with previously reported studies with carboxyl- and $\beta$-labeled octanoate, demonstrate that fatty acids upon oxidation by liver give rise to two species of 2-carbon units in the process of forming acetoacetate. One species which is not readily acetylated is derived from the $\zeta$- and $\omega$-carbons of octanoate, while the other species arise from the first 6 carbons of octanoate.

SELF-ABSORPTION CURVES OF $C^{14}$-LABELED BARIUM CARBONATE, GLUCOSE, AND FATTY ACIDS. A. N. Wick, H. N. Barnet, and N. Ackerman (Scripps Metabolic Clinic, La Jolla, Cal.). *Anal. Chem. 21,* 1511-13(1949). It is shown that these comparative self-absorption curves are dependent on the technique employed in the sample preparation. In counting solid samples the physical form and density should be comparable in order to obtain reproducible results.

ANTIOXIDANTS IN THE HEMOGLOBIN CATALYZED OXIDATION OF UNSATURATED FATS. I. Chang and B. M. Watts (Syracuse University). *Food Technol. 3,* 332-336(1949). Phenolic inhibitors retarded the hemoglobin catalyzed oxidation of lard. Synergistic antioxidants, with the exception of ascorbic acid, had no effect in the presence of hemoglobin except at very low concentrations or after coagulation of the hemoglobin. Ascorbic acid markedly retarded rancidity in the presence of hemoglobin or nitrosohemoglobin and small amounts of tocopherol. It caused fading and greening of hemoglobin but protected the red color of nitrosohemoglobin solutions and cured meat.

FATS IN HUMAN NUTRITION. Anon. *Nature 164,* 1036-7 (1949). A review of a symposium on triglyceride fat in human nutrition. The component acids, synthetic fats, methods for investigating fat absorption, fat absorption in human beings, and the use of fat in intravenous feeding are discussed.

VITAMIN A IN MILK. A. E. Sobel and A. A. Rosenberg (Jewish Hospital of Brooklyn). *Anal. Chem. 21,* 1540-3(1949). Activated 1,3-dichloro-2-propanol (glycerol $\alpha,\gamma$-dichlorohydrin) has been applied to the determination of vitamin A and carotene in milk. This reagent permitted the simultaneous reading of both vitamin A and carotene absorption at 455 and 800 m$\mu$, respectively. The results were close to those obtained when vitamin A was determined by antimony trichloride and carotene by light absorption at 440 m$\mu$.

SPECTROPHOTOMETRIC DETERMINATION OF VITAMIN A. P. Forjaz. *Anais Azevedos (Lisbon) 1,* 106-11(1949). A discussion of the spectrophotometric determination of vitamin A in fish oils. (*Chem Abs. 44,* 188.)

DETERMINATION OF FAT AND PROTEIN CONTENT OF MILK ON THE BASIS OF ITS CHANGES IN SPECIFIC GRAVITY. M. Molnar and J. Sos. *Magyar Kem Lapja 2,* 371-3(1947). The specific gravity of milk was determined. The milk centrifuged and the specific gravity of the aqueous layer determined. The protein removed from this aqueous layer by precipitation with sulfosalicylic acid and the specific gravity of the filtrate determined. The fat and protein content determined by comparing these specific gravities and the percentage of protein as determined by Kjeldahl. (*Chem. Abs. 44,* 239.)

THE DETERMINATION OF PHOSPHOLIPID PHOSPHORUS. J. M. R. Beveridge and S. E. Johnson (University of Western Ontario, London, Ont.). *Can. J. Res. 27E,* 159-63(1949). A simple accurate method for the determination of phospholipid phosphorus is described. A colorimetric procedure for inorganic phosphorus is used that is characterized by excellent color stability and strict adherence to Beer's law over a range of 0 to 65 micrograms of phosphorus.

RAPID ESTIMATION OF FAT IN SAUSAGES AND SAUSAGE MEAT. A. Talbot. Analyst *74,* 462-3(1949). Place 10 ml. of sulfuric acid (*d.* 1.820) in a butyrometer and add about 2 g. of minced sample and 1 ml. of amyl alcohol as in the Gerber estimation of fat in milk. Add water at 80° to fill the instrument to the shoulder, stopper and shake well. Immerse in water at 68° and then centrifuge at 1,000 revolutions per minute. Then read the volume of fat. (*Chem. Abs. 44,* 240.)

## • Waxes

E. H. McMullen, Abstractor

INVESTIGATION OF NIBREN-WAXES BY ULTRAVIOLET ABSORPTION ANALYSIS. Ludmilla Holik. *Osterr. Chem.-Ztg. 50,* 193-5 (1949). Ultraviolet absorption analysis has shown that the nibren-waxes of I. G. Farbenindustrie are similar to chlorinated naphthalenes of similar melting points prepared by other firms. Nibren-wax D 88 showed a broad maximum at 3000 Å and a minimum at 2650 Å. (*Chem. Abs. 44,* 353.)

CARNAUBA WAX: ADULTERED? A. G. Bowers (Hunt Mfg. Co., Cleveland). *Soap 25,* No. 7, 113, 129, 131(1949). The usefulness of the Cleveland open-cup flash point apparatus in detecting adulteration and variation in quality of carnauba wax is illustrated and also the relation between flash point and tackiness and shelf life of the emulsified wax. Waxes with a flash point $<572$°F. gave products which had a low shelf life and were tacky in use.

PERMEABILITY OF PECTINATE FILMS TO WATER VAPOR. T. H. Schultz, J. C. Miers, H. S. Owens, and W. D. Maclay (Western Regional Research Laboratory, Albany, Cal.). *J. Phys. & Colloid Chem. 53,* 1320-1329 (1949). A method for the determination of the vapor permeability of pectinate and coated (including wax) pectinate films is described.

## PATENTS

BLEACHING WOOL GREASE. Eric R. Woodward and Ivar Malmstrom (Mathieson Chemical Corp.). *U. S. 2,481,463.* Wool grease is bleached from an A.S.T.M. color No. 6 to No. 4 with a mixture of NaOCl and NaOCl$_2$ if the reaction mixture is kept at a pH of 7-11. (*Chem. Abs. 44,* 356.)

AQUEOUS DISPERSIONS CONTAINING POLYVINYL ACETATE AND WAX. G. O. Morrison and H. M. Collins (Shawinigan Chem. Ltd.). *U. S. 2,404,519.* To an aq. dispersion formed by emulsion-polymerization of vinyl acetate is added 12-40 wt.-% of a wax at a temperature above the melting point of the latter, after which the mixture is slowly cooled to form a dispersion, containing the wax in the form of small particles of 4-20 m$\mu$, and suitable for use on paper, cardboard, fabrics, and leather, to yield moisture-proof films. (*Brit. Abs.* BII, Dec., *1949,* 1200.)

MODIFIED WAXES FOR POLISHING COMPOSITIONS. "Solitairte" Produits d'Entfetein. *British 622,699.* Powdered alkaline-earth hydroxide is added (5-10%) to molten beeswax or other animal wax containing free acid and the mixture is heated with stirring at 200-225° for 2 hrs. to neutralize $\sim$ ¾ of the free acid. The product has melting point 85-95° according to the temperature of preparation. (*Brit Abs.* BII, Dec., *1949,* 1178.)

MANUFACTURE OF CARBON MONOXIDE-MODIFIED POLYMERS OF ETHYLENE. E. I. duPont de Nemours & Co. *British 620,963.* Products useful as wax substitutes in the preparation of paste and liquid polishes are obtained by polymerization of ethylene in the presence of 0.5-5 parts of carbon monoxide to give a waxy solid melting at 112°. (*Brit Abs.* BII, Dec., *1949,* 1112.)

LUSTERLESS WAX EMULSIONS. Anton E. Budner, Alfred F. Buckman, Jr., and Edward Spurgat (S. C. Johnson & Son, Inc.). *U. S. 2,483,259.* Methods for the preparation of lusterless aqueous wax emulsions for treating rubber stock and preserving bananas are described. The emulsions contain from 1 to 40% by weight of the emulsifiable solids of a delustering agent selected from the group consisting of stearyl alcohol and hydrogenated castor oil.

WATER-REPELLENT COATING MATERIAL FOR METAL TRAYS. R. Canter and H. D. Geyer (General Motors Corp.). *U. S. 2,404,431.* A urea-formaldehyde resin (2-30%) and an alkyd resin (70-98%) of the thermosetting or thermoplastic type are compounded (90) in a coal-tar solvent (410), with a mixture of carnauba (5) and Stanolind wax (15) dissolved in a coal-tar solvent (300), to form a composition suitable for use in coating ice trays by dipping and then heating or for finishing automobile bodies.

RECOVERY OF STEROLS AND CYCLOPENTAPHENANTHRENE COMPOUNDS. American Cholesterol Products, Inc. *British 622,725.* The sterol-containing material such as wool grease or similar fats, oils, or waxes is saponified with barium hydroxide, and the unsaponifiable material is separated by solvent extraction or distillation. The recovery of a vitamin-D concentrate from fish-liver oils is claimed.

SCRATCH-RESISTANT SURFACE COATING FOR FLUORESCENT SCREENS. E. I. duPont de Nemours & Co. *British 623,386.* A screen with a fluorescent surface composed, *e.g.,* of CaWO$_4$ dispersed in cellulose nitrate, is coated with a water-insoluble resinous material, *e.g.,* cellulose acetate or nitrate in dioxan, in which are dispersed fine, discrete particles of a wax (*e.g.,* carnauba, candelilla, raphia, or a hard synthetic wax) having a melting point $\nless 65$°, to form a film 0.01-0.02 in. thick. The wax forms 2-15% of the film. (*Brit. Abs.* BII, Dec., *1949,* 1202.)

N-ACYL DERIVATIVES OF MONOAMINODIPHENYL IN POLISHING WAX COMPOSITIONS. D. Aelony (Monsanto Chem. Co.). *U. S. 2,404,896.* N-Acyl derivatives of monoaminodiphenyl, containing $\nless 12$ C, are suitable for use as substitutes for carnauba wax in formulating polishing compositions; thus, a wax-gel shoe polish comprises candelilla wax 14, beeswax 2, paraffin 4, turpentine 74, and *o*-stearamidodiphenyl (I) 6 pts. In place of I, the *m*- and *p*-isomers can be used, also N-hexacosyl-*m*-(or -*p*-)-aminodiphenyl, etc. (*Brit. Abs.* II, Dec., *1949,* 1178.)

# • Drying Oils

Robert E. Beal, Abstractor

HIGHLY UNSATURATED ACID IN OIL. IV. SEPARATION OF EQUIVALENT MIXTURES OF LINOLEIC ACID AND LINOLENIC ACID AND OF LINOLENIC ACID AND HIGHLY UNSATURATED FISH-OIL FATTY ACID BY THE SODIUM SALT ACETONE AND LITHIUM SALT ACETONE METHODS. F. Ono and N. Toyama. *J. Chem. Soc. Japan 65,* 741-3 (1944). Iodine value determinations on the fractions of these mixtures which are soluble in hydrated acetone show that the solubilities of the Na and Li salts of the fatty acids separately taken are greatly different from their solubilities when they are in solution together. (*Chem. Abs. 43,* 7721.)

VARIATION OF CHEMICAL REACTIONS WITH TEMPERATURE DURING THE OXIDATION AND POLYMERIZATION OF FATTY OILS. N. W. Gillam. *Australian Chem. Inst. J. & Proc. 16,* 19-36 (1949). The theory for oxidation reactions is reviewed and data are given for changes in iodine, peroxide, saponification, and acid values, and viscosity during the blowing of rapeseed oil under various conditions. The data is used to illustrate the four types of oxidation reactions generally considered to occur: the formation of hydroperoxides with no change in unsaturation at room temperature; the development of peroxides at double bonds and molecular growth by esterification at 100-120°; the formation of viscous oils at 150-200° through O-activated reactions and the formation of unstable reaction products; and polymerization by conjugation and ring formation above 200°. The transition from one type of reaction to another as temperature increases, is gradual. (*Chem. Abs. 43,* 6840.)

COMPARATIVE STUDY OF THE METHODS FOR DETERMINING UNSATURATION IN DRYING OILS. L. L. Carrick, S. M. Das Gupta, and R. C. Das Gupta. *Am. Paint J. 32,* No. 11, 72-6 (1947). The iodine values of both conjugated and nonconjugated drying oils have been measured by the Wijs, Hoffman-Green, Kaufmann, and Wolburn methods. The difference between the Wolburn and Wijs values gives an approximate measure of the diene value of the oil. (*Chem. Abs. 43,* 7718.)

ALLYLSUCROSE: A POTENTIAL UPGRADER FOR DRYING OILS. M. Zief. *Official Digest Federation Paint & Varnish Production Clubs 297,* 711-15 (1949). Allyl ethers prepared from sucrose or starch are pale yellow oils which form oxidizable films having high gloss, extreme hardness, and good resistance to solvents, oils, and heat when dry. Films dry slowly unless the oil is partially polymerized by blowing. Allylsucrose yields cloudy solutions with drying and semi-drying oils but when co-blown with them at 100° clear solutions are obtained. Allylsucrose reduces the gelation time of soybean oil to about the same extent as tung or oiticica oils. Allylsucrose possesses no advantage over Co drier, tung, or oiticica oils in lowering the drying time, however, it increases the Sward hardness of soybean and linseed oil films up to 12-14 and also increases their resistance to water and various organic solvents.

INFLUENCE OF TIME AND TEMPERATURE OF COOKING ON THE PROPERTIES OF 1:2 VARNISHES, CONTAINING AN OIL-REACTIVE PHENOLIC RESIN AND TUNG OIL. F. J. Hermann. *Centraal Inst. Materiaal Onderzoek, Afdel. Verf., Circ. No. 55,* 11 pp. (1949). A solution made by heating 1 part phenolic resin and 2 parts tung oil at 180° for 18 minutes gelled in 100 minutes at 230° and in 70 minutes at 240° (under CO$_2$). Both the viscosity and dimethyl ether insoluble material of samples removed during the heating periods increased with increasing temperature and reaction time and the latter indicates the extent of reaction. Refractive index varies slightly during heating and color increases with time but not with temperatures. Varnishes show increase in skinning, gelatinization, and drying rate (variable) with increase in cooking time. Water resistance and outdoor performance of varnish films do not vary but alkali resistance increases with reaction time. (*Chem. Abs. 43,* 7238.)

DRIER REQUIREMENTS FOR TALL OIL VEHICLES. E. R. Mueller and E. E. McSweeney. *Am. Paint J. 34,* No. 11, 26, 28, 66-8 (1949). A cobalt-lead drier combination was the most effective for tall oil esters from glycerol and pentaerythritol and for tung oil-modified varnishes from these esters.

THE SEED FAT OF *Oenothera biennis L.* J. P. Riley (Univ. of Liverpool, Liverpool, Eng.). *J. Chem. Soc. 1949,* 2728-31. The dried seeds analyzed 11.1% oil (I value 154.8, saponification equivalent 287.8, unsaponifiable matter 3.5%, $n_{25^\circ}$ 1.4782). The trienoic acids were concentrated by solvent crystallization and ozonized to obtain adipic acid, thus confirming the previously reported presence of octadeca-6:9:12-trienoic acid. By using the bromination and debromination technique on the concentrate a pure sample of the acid was obtained whose methyl ester, after fractional distillation and alkali isomerization, had an absorption spectra similar to that of the isomerized esters of the 9:12:15 acid but with slightly greater maxima at 234 $m\mu$ and 268 $m\mu$. The oil contained 71.7% linoleic and 10.2% of the octadeca-6:9:12-trienoic acid.

PROPERTIES OF HUNGARIAN PERILLA OIL. L. Haskó. *Mezögazdaság és Ipar 2,* No. 6, 9(1948). Two types of perilla seeds, one a light gray color, the other tobacco-brown, were investigated. The respective oil contents were 38.8-45.2% and 45.5% and the respective oil characteristics were specific gravity 0.9296 and 0.9310, *n* 1.4873 and 1.4833, acid number 2.0 and 0.26, saponification number 196.3 and 190.4, iodine number 183.7 and 207.1, hexabromide number 50.8 and 59.2, unsaponifiable 1.42 and 1.28%, and drying time 72 hours and 72 hours. (*Chem. Abs. 43,* 8178.)

APPLICATION OF A THEORY OF CATALYSIS BY MOLECULES OF PERMANENT ELECTRIC MOMENT TO PAINT CHEMISTRY. R. Jacquemain and J. Berger. *Congr. Tech. intern. ind. peintures inds. assoc. 1,* 454-6(1947). The oxidation product of a drying oil is proposed as the polar body which catalyzes air-drying of the oil to produce mainly C-C linked polymers. The function of metallic driers is to supply such polar bodies. The theory explains the initial induction period in drying during which the polar bodies are largely absent, the fast drying of blown oils, and the drop in drying rate after a maximum has been reached when an excess of these polar bodies is present. (*Chem. Abs. 43,* 8694.)

THE ROLE OF PEROXIDES IN POLYMERIZATION. L. Williamson (Paint Research Station, Teddington, Middlesex, England). *J. Oil & Colour Chemists' Assoc. 32,* 579-89(1949). The chemistry of relatively simple vinyl polymerization systems is reviewed and their relation to the reactions of peroxidized drying oils is discussed. It is suggested that the thermal breakdown of di-tertiary butyl peroxide in which ketones are produced may be similar to the reaction of oxidized methyl oleate from which aldehyde products have been identified.

ALIPHATS IN ALKYDS. S. A. Harrison (General Mills, Inc.). *Prog. thru Res. 4* (2), 3, 9-10(1950). Fractionally distilled soybean oil fatty acids and fractionally distilled tall oil fatty acids are compared for the modification of glyceryl phthalate and pentaerythrityl phthalate alkyds. Properties studied in particular were solution viscosities of finished resins, solubilities, film drying rates, and general properties of dried films.

LONG OIL ALKYDS. H. Wittcoff and D. Terry (General Mills, Inc.). *Prog. thru Res. 4* (2), 8-9(1950). Three ways to make long oil length alkyd resins of high viscosity are described.

PREPARATION OF THICKENED OIL FOR PRINTING INK FROM PERILLA OIL. Fa-Ki Chow and Shou-ling Li. *J. Chem. Eng. China 16,* 7-8(1949). Chinese perilla oil on air blowing at 150-280° gives a thickened oil suitable for use in printing inks. (*Chem. Abs. 44,* 353.)

THE AUTOXIDATION OF METHYL LINOLEATE. Anon. *Farbe u. Lack 56,* 11-3(1950). A review with 27 references.

## PATENTS

COMPLEXES OF FATTY ACID COMPOUNDS. H. M. Ullmann. *U. S. 2,488,999.* The product made by reacting a nonconjugated unsaturated fatty acid of 10-24 C atoms with an acyclic olefinic acid of less than 10 C is heated at 70-130° with ricinoleic acid or its esters to form a complex.

PROCESS FOR MAKING BODIED OILS. W. Lange, R. G. Folzenlogen (Procter & Gamble Co.). *U. S. 2,480,485.* An unsaturated fatty oil is heated to 250-350° in the absence of a polymerization catalyst for a brief period insufficient to effect substantial heat bodying or reduction in I value of the oil but sufficient to inactivate substances in the oil which react with $BF_3$ to form salts which in secondary reactions yield water-stable compounds with pigmentary value. The oil is thereafter bodied at a lower temperature in the presence of a small amount of $BF_3$ to the desired viscosity. The product is characterized by rapid drying rate and improved color and freedom from crystallization at room temperature over the usual $BF_3$ bodied oil.

METHOD OF PREPARING OXIDIZED DRYING OIL. I. J. Novak (Raybestos-Manhattan, Inc.). *U. S. 2,488,680.* A vegetable drying oil which has been oxidized by treatment with an O-containing gas at below 250°F. is extracted with water before additional heating at a higher temperature to inhibit darkening of the oil at the higher temperature.

COATING COMPOSITION COMPRISING AN ALKYD RESIN AND ALKOXY METHYLOLMELAMINE. P. E. Marling (Monsanto Chemical Co.). *U. S. 2,486,665.* Mono- and diglycerides of drying oil acids are heated with a polybasic carboxylic acid in the presence of anthraquinone to form an alkyd resin which is mixed in the proportions of 50-85% with 15-50% of an alkyd ether of methylolmelamine which is soluble in butanol.

COATING COMPOSITIONS. H. S. Lilley, J. W. Darling, and Imperial Chemical Industries Ltd. *Brit. 572,822-3.* Varnishes and other coating compositions are prepared by heating a drying or semidrying oil fatty acid with an oil-soluble phenolic resin derived from a phenol having an alkyl substituent in the para position to the hydroxyl group. An improved varnish results from esterifying the above product with excess polyhydric alcohol and further heating that product with a polybasic acid or anhydride. (*Chem. Abs. 43,* 7720.)

WRINKLE DRYING COMPOSITION CONTAINING DEXTRAN BENZYL ETHER. E. L. Luáces (New Wrinkle, Inc.). *U. S. 2,490,070.* A wrinkle drying coating composition consists of 100 parts of a wrinkling oil, 10-50 parts of dextran benzyl ether, and a thinner, admixed at room temperature.

TALL OIL ESTERS. S. O. Greenlee (Devoe and Raynolds Co.). *U. S. 2,493,486.* Between 0.55 and 1.7 parts of tall oil are esterified with 1 part of a high molecular weight resinous polymeric polyhydric alcohol having an average of more than 5 esterifiable groups per molecule to form a drying composition. The alcohol is a polyether derivative of a dihydric phenol having alternating aliphatic chains and aromatic nuclei united through ether oxygen and being free from functional groups other than epoxy and hydroxyl groups.

SYNTHETIC RESIN AND PROCESS FOR MAKING IT. P. Caccia. *U. S. 2,491,851.* A synthetic resin which is useful as an extender and reaction accelerator for rubber is made by heating together 2 mols of unsaturated fatty oil, 24 mols of sulfur, and 6 mols of quinoline or pyridine to 180° under reflux to initiate an exothermic reaction, and allowing the reaction to proceed without further heating.

SYNTHETIC DRYING OILS. W. W. Johnstone (Universal Oil Products Co.). *U. S. 2,491,496.* An olefinic hydrocarbon fraction is reacted with HF and a drying oil recovered from the HF layer which has a molecular weight of 150-1000, a boiling range of 150-400°, a density of 0.83-0.93, an index of refraction of 1.47-1.53, a bromine number above 140, a maleic anhydride value of 50-80, and an average of about 2.5-3.5 double bonds per molecule.

FILM CASTING COMPOSITIONS AND METHOD OF MAKING SAME. A. E. Young and E. K. Stilbert (Dow Chemical Co.). *U. S. 2,492,124.* A new coating composition consists of an aqueous colloidal solution of one part styrene-butadiene or similar copolymer and less than 1.5 parts drying oil or unsaturated polymer thereof, sufficient oil being present to produce a continuous film upon spreading.

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# • Detergents

Lenore Petchaft, Abstractor

FORMATION AND STABILITY OF THIN LAMINAS. THE LAMINOMETER. R. Matalon. *Research* (London). Suppl., *Surface Chemistry 1949,* 195-201. An apparatus was designed that appears particularly suited for the study of the foaming properties of aqueous detergent solutions. Surface-tension measurements give no information as to the stability of the laminas in a foam. In the new apparatus, a rectangular Pt wire frame is pulled out of the surface of the solution to be tested. During this process, the variation of the force acting on the frame is recorded as a function of the height of the frame above the surface of the solution. The shape of the extension curve thus obtained depends on the surface tension of the solution, on the thickness of the horizontal wire, on the foaming characteristics of the solution, and on the rate of extension. The analysis of a number of experimental curves illustrates the applicability of the laminometer to the evaluation of frothing properties. (*Chem. Abs. 43,* 8795.)

CHEMICAL COMPOSITION OF SODIUM OLEATE FOAMS. M. Raison. *Research* (London), Suppl., *Surface Chemistry 1949,* 187-93. The foaming of sodium oleate solutions (0.0015-0.0165M), was studied in the Abribat foaming apparatus by use of either $CO_2$-free air or $O_2$-free $N_2$. With high initial foam concentrations, the foam was collected in 5 or 6 fractions; whereas with low initial concentrations, the foam was collected in a single receiver. In every case, the foaming was continuous, and was carried to completion. Oleic acid and sodium were determined both in the foam and the exhausted solutions. For all initial concentrations, the foam was found to be acid. The concentration of acid increased with decreasing initial concentration (e.g. the ratio soap/acid was 1:0.876 for an initial concentration of 0.00167M, and was 1:0.426 for 0.00591M). This enrichment in acid of the foam was also indicated in the results of the fractionation experiments; the further the exhaustion of the solution proceeded, the less acid became the foam. Drainage of water from the foam permitted the maintenance of an almost constant volume of the underlying solution throughout the experiment. The results appear to indicate the existence of oleic acid-oleate complexes. This assumption agrees with the very high surface pressures observed (50 dynes/cm.). The assumption that soap films are bounded by two layers of oleic acid is not in agreement with the experimental evidence. Composition and concentration of the exhausted solutions are believed to be conditioned by the initial physical structure of the solution. (*Chem. Abs. 43,* 8794.)

Reactions at interfaces: emulsion saponification. F. Lachampt, C. Zviak, and H. Rossignol. *Research* (London), Suppl., *Surface Chemistry 1949,* 165-72. The rate of saponification of glycerides by caustic soda in water-in-oil emulsions was studied by determining the amount of soap formed. At constant temperature, the rate of saponification increased with the fineness of the emulsion. Increase of temperature, though initially favoring the start of the reaction, soon inhibited further reaction; this effect was due to a breaking down of the emulsion. For high concentrations of caustic soda, the reaction was invariably completed independently of the degree of fineness of the emulsion; for weak soda concentrations, the reaction was never completed; and for intermediate concentrations, saponification was completed with coarser emulsions, whereas finer emulsions were broken down. Neutral electrolytes (*e.g.* NaCl) inhibited saponification, but catalysts, such as fatty acids and β-naphthol, stabilized the emulsions and thus had a favorable effect. Microscopic examinations and experiments in glass tubes in which glycerides and soda were superimposed indicated that saponification proceeds by diffusion of the soda across the soap film formed at the interface. (*Chem. Abs. 43,* 8795.)

Soap or synthetic? Dewey H. Palmer. *Standardization 20,* 130-2(1949). Accurate comparisons can be made of the effectiveness of synthetic detergents only by standard washing-test methods. Tables list: (1) newly adopted American standards for soaps and detergents, (2) classification of competitive brands of household soaps, manufactured by major soap companies, and (3) some important brands of synthetic detergents. (*Chem. Abs. 43,* 9492.)

Specifications for soaps, cosmetics, and glycerol. P. N. Das Gupta. *Indian Soap J. 14,* 311-15(1949). Specifications are given for yellow or hard washing soap, carbolic soap, soft soap, milled toilet soap, shaving soaps, shaving creams, vanishing cream, cold or night creams, tooth pastes, and glycerol. (*Chem. Abs. 43,* 9492.)

Types of solubilization in solutions of long-chain colloidal electrolytes. William D. Harkins, Rose Mittelmann, and M. L. Corrin (University of Chicago, Chicago, Ill.). *J. Phys. & Colloid Chem. 53,* 1350-61(1949). Evidence is presented which indicates the existence of four types of solubilization in solutions of colloidal electrolytes: (1) solubility in the water, which when micelles are present, cannot be determined; (2) solubilization of non-polar substances in the non-polar interior of the micelle; (3) solubilization of polar-non-polar molecules in a position similar to that of the soap molecules; and (4) adsorption at the surface of the micelle.

Soap from the physical-chemical point of view. Andrea Paleni. *Olearia 3,* 245-54(1949). Review on modern technology of soapmaking, and the saponification process. 16 references. (*Chem. Abs. 44,* 858.)

The adsorption of sodium myristate by carbon black. Marguerite A. Reade, A. S. Weatherburn, and C. H. Bayley (National Research Laboratories, Ottawa, Canada). *Can. J. Research F27,* 426-8(1949). The adsorption of sodium myristate from 0.1% aqueous solutions by a series of carbon blacks and an activated charcoal has been measured at 70°. In every case a preferential adsorption of fatty acid was observed. The extent of adsorption of both the fatty acid and alkali components of the soap increased with decreasing particle size, *i.e.,* with increasing surface area of the carbons. The adsorption by activated charcoal was considerably higher than that obtained with even the finest of the carbon blacks.

Evaluation of wetting agents. Leonard Shapiro (Synthron, Inc., Ashton, R. I.). *Am. Dyestuff Reptr. 39,* 38-45, 62 (1950). An attempt has been made to modify existing evaluation methods so that the actual plant performance of the various wetting agents may be more accurately determined. A woven tape modification of the Draves wetting test has been compared with the standard skein tests. The tape method has many advantages in speed, convenience, and reproducibility. The results of a series of tests with varying hook weights, concentrations, and temperatures are described. The reversal in apparent effectiveness of wetting agent concentrations with completeness of wetting has been confirmed for skeins, but no such effect was found with tapes or canvas strips. Rewetting tests by the tape method are described, and have the advantages that both sinking tests and specular reflection tests can be employed on the same fabric.

Wetting agents and their applications. Rudolf Schiffner. *Chem. Tech. 1,* 91-2(1949). A general discussion of various wetting agents used in the dyeing industry, in materials for spraying plants, and on coal-dust fires. (*Chem. Abs. 44,* 859.)

Characteristics of detergent-suspended clays. Todd M. Doscher (University of Southern Calif., Los Angeles, Calif.). *J. Phys. & Colloid Chem. 53,* 1362-71(1949). The effect of adding non-ionic detergents, oil, and sodium and calcium chloride to clay suspensions has been studied. It has been found that addition of calcium chloride together with suitable quantities of oil and certain hydrophilic, non-ionic detergents is capable of producing stable dispersions which possess relatively low viscosities, gel strengths, and fluid losses.

The compounding of sodium carboxymethylcellulose with synthetic detergents. F. J. Pollok (Imperial Chemical Industries, Ltd., Stevenston, England). *Soap, Perfumery & Cosmetics 22,* 1332-4(1949). The use of sodium carboxymethylcellulose in improving the soil suspending properties of synthetic detergents made from the ethylene oxide condensation products of alkyl phenols is discussed. Illustrations of this mixture in compounding liquid, jelly, and tablet form detergents are given.

Long-chain alkyl sulfates—colorimetric determination of dilute solutions. Fred Karush and Martin Sonenberg (New York University College of Medicine, New York, N. Y.). *Anal. Chem. 22,* 175-77(1950). A simple colorimetric method has been developed for the determination of long-chain alkyl sulfates. Solutions as dilute as $5 \times 10^{-6}$ M can be analyzed with an accuracy of about 2%. The method depends on the formation of a complex between the detergent anion and the cationic dye rosaniline hydrochloride. This complex is extracted into a mixed organic solvent (1:1 chloroform and ethyl acetate) and its spectral absorption is read. The molar sensitivity of the method increases from octyl up to dodecyl sulfate.

Structure of aluminum soap. G. A. Parry and A. J. Taylor. *Nature 164,* 449(1949). It was previously reported that pure Al laurate dried in vacuo over $P_2O_5$ reveals 2.5 ±0.4% water when examined with the Karl Fischer reagent. It was maintained then that the soap molecules react with one another or with free acid to yield the water; however, the idea was controversial. P. and T. explored the reaction between Al alcoholate and a fatty acid. Pure, redistilled Al sec-butylate in dry sec-butyl alcohol was prepared and 2 equivalents of a vacuum-distilled synthetic long-chain fatty acid were added: $Al(OBu)_3 + 2HR \longrightarrow AlR_2OBu + 2\ BuOH$. The calculated quantity of water, dissolved in sec-butyl alcohol was added: $AlR_2OBu + H_2O \longrightarrow AlR_2OH + BuOH$. There was no free water present. Titration of the solution with the Karl Fischer reagent yielded water according to the contention stated above. (*Chem. Abs. 44,* 858.)

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Production of derivatives of oleonitrile having surface active properties. William Kaplan (Sun Chemical Corp.). *U. S. 2,495,105.* Oleonitrile reacted with sulfuric acid to form a sulfonated nitrile.

Process and apparatus for making floating soap. Donald E. Marshall (Colgate-Palmolive-Peet Co.). *U. S. 2,494,891.* Apparatus for manufacture of floating soap in which soap is passed through a multi-barreled, water-cooled plodder so that finely divided bubbles of air are incorporated, then compacting soap without allowing escape of occluded air.