ABSTRACTS . . . . R. A. Reiners, Editor

• Oils and Fats

Ralph W. Planck, Abstractor
Dorothy M. Rathmann, Abstractor

The lipids of fish. 5. The lipids remaining in the flesh of the haddock after extraction by acetone and ethanol-ether. June Olley and J. A. Lovern (Dept. of Scientific and Ind. Res., Torry Res. Station, Aberdeen, Scotland). *Biochem. J.* **57**, 610-619 (1954). Haddock flesh, previously exhaustively extracted with acetone and ethanol-ether (3:1 by vol.) at room temperature, was extracted successively with boiling ethanol-benzene (2:1 by vol.), boiling chloroform-methanol (1:1 by vol.) and pyridine at 100°. The composition of the total lipids of haddock flesh, amounting after purification, to 0.55% of the fresh tissue, is: lecithin, 42.8%; unidentified lipid, 15.2%; waxes and alcohols, 10.5%; free cholesterol, 6.1%; free fatty acids, 6.1%; phosphatidylethanolamine, 5.4%; inositol lipids, 4.4%; cholesterol esters, 3.4%; triglycerides, 2.4%; hydrocarbons, etc., 2.0%; and plasmalogens, 1.7%. A discussion of the varying efficiency for the different solvents for each lipid has been given.

Appendix—Manometric determination of the solubility of oxygen in liquid paraffin, olive oil and silicone fluids. R. Rodnight (Dept. of Biochem., Inst. of Psychiatry, Maudsley Hospital, S.E. 5, London, England). *Biochem. J.* **57**, 661-663 (1954). A description is given of a manometric apparatus used for the determination of the solubility of O_2 in non-aqueous fluids such as olive oil.

South African pilchard oil. 2. Concentrates of highly unsaturated fatty acids and alcohols derived from South African pilchard oil. M. H. Silk, H. H. Sephton, and H. H. Hahn (National Chem. Res. Lab., South African Council for Scientific and Ind. Res., Pretoria, South Africa). *Biochem. J.* **57**, 574-577 (1954). A study has been made of the urea complex fractionation and lithium soap-acetone techniques in the segregation of concentrate of highly unsaturated fatty acids from the body oil of the South African pilchard. For comparison, the alcohols resulting from lithium aluminum hydride reduction of pilchard glycerides have also been fractionated by the urea complex. The urea complex method affords an excellent stepwise fractionation resulting in a concentrate of high average unsaturation rich in the shorter C_{16} and C_{18} chain lengths. The lithium soap-acetone procedure affords a concentrate of lower average unsaturation than does the urea method, but the segregate is relatively richer in the longer C_{20} and C_{22} chain lengths. Urea fractionation of total pilchard fatty alcohols affords a concentrate of high average unsaturation rich in the C_{16} and C_{20} chain lengths.

South African pilchard oil. 3. The fatty acid composition of South African pilchard oil. M. H. Silk and H. H. Hahn (National Chem. Res. Lab., South African Council for Scientific and Ind. Res., Pretoria, South Africa). *Biochem. J.* **57**, 577-582 (1954). A new approach has been suggested for the analysis of total marine oil acids without isolation of individual components. The techniques of lithium soap-acetone segregation, molecular distillation, reversed-phase partition chromatography and urea complex fractionation have been applied in the successive subdivision of pilchard acid fractions. Relatively simple mixtures of acids have been obtained; the composition of one of which has been calculated without isolation of an individual component. The techniques employed have been such as might be expected to have caused little or no modification of the component acids.

South African pilchard oil. 4. The isolation and structure of a hexadocatetraenoic acid from South African pilchard oil. M. H. Silk and H. H. Hahn (National Chem. Res. Lab., South African Council for Scientific and Ind. Res., Pretoria, South Africa). *Biochem. J.* **57**, 582-587 (1954). The techniques of lithium soap-acetone segregation, molecular distillation, urea complex fractionation and reversed-phase partition chromatography have been applied in successive subdivision of the total fatty acids of South African pilchard oil. Application of these techniques has resulted in the isolation of a new acid characterized by physical and chemical means as hexadeca-6:9:12:15-tetraenoic acid. Some physical and chemical constants are given such as: pale yellow oil; ultraviolet absorption spectra of alkali-isomerized acid; refractive index, n_D^{20} 1.4870; infrared spectra from 1325 to 1425 cm^{-1}; ultraviolet spectra from 170-240 millimicrons.

The last nut. Anon. *Ind. Eng. Chem.* **46**(6), 13A (1954). A description of a commercial solvent extraction plant for tung oil is given.

Spectrophotometric study of the rancidness of oil. J. P. Wolff. *Revue Francaise des Corps Gras* **1**, 214-226 (1954). The oxidation of crude glyceride oils in specially purified cyclohexane as the solvent was studied qualitatively and quantitatively by ultra-violet spectrophotometry. The formation of oxygenated compounds analogous to diketones, absorbing at 270 mμ, which appeared during secondary oxidation reactions and more particularly during heating, in acid medium or in a limited quantity of oxygen, was detected. The measure of specific absorption of the oil at 232 mμ permitted the determination of the linoleic peroxides and by difference with the total peroxide index, the oleic peroxide content. It was shown that the nonvolatile oxidation products contained in the crude oil occur more or less transformed in the refined product. Thus the peroxides give rise to conjugated diene or triene compounds which are readily oxidizable and polymerizable and tend to decrease the resistance of the oil to oxidation. It is concluded that the ketonic compounds are practically not eliminated by the refining and that it cannot be hoped to obtain high quality refined products from poor grade crude materials.

The utilization of ucuuba fat. G. B. Martinenghi. *Olearia* **8**, 47-55 (1954). Ucuuba fat can be refined to give a cream colored product only if the raw material is light in color and has an acid number of 9 or less. The only modification of the rather poor quality ucuuba fat (acid number about 40) now commercially available is by hydrolytic splitting carried out preferably by the Twitchell method followed by the recovery of the glycerine and distilled fatty acids which are practically white and consist mainly of myristic acid.

The importance of micro-methods in the chemistry of fats. G. Gorbach. *Olii Minerali Grassi e Saponi Colori e Vernice* **31**, 121-127 (1954). Semi-micro methods, techniques and apparatus of use in the chemical study of fats are reviewed.

The seed oils of Clitoria ternatea and of Entada phaseoloides. D. N. Grindley, E. H. W. J. Burden, and A. A. Akour (Wellcome Chem. Labs., Khartoum). *J. Sci. Food Agric.* **5**, 278-80 (1954). Physical and chemical constants are tabulated for oils extracted from the seeds of *E. phaseoloides* and *C. ternatea.* Fatty acid contents (%) found, respectively: linoleic 30.6, 16.7; oleic 40.5, 52.3; saturated C_{16} and C_{18} 20.4, 25.8; saturated C_{20-24} 8.5, 5.2.

A chemical study of the fruits of three South African Ximenia species, with special reference to the kernel oils. S. P. Ligthelm, D. H. S. Horn, H. M. Schwartz, and M. M. Von Holdt (S. African Council for Sci. & Indus. Research). *J. Sci. Food Agric.* **5**, 281-8 (1954). Oils were extracted from the kernels of three S. African species of *Ximenia* in yields of 64.1 to 68.4% (dry wt.). Physical and chemical constants are tabulated. Fatty acid compositions were determined by distillation of methyl esters in Longenecker column and in spinning band column, and by distillation of the hydrogenated esters. Data are given on the distillation curves and analyses of the fractions. High molecular weight unsaturated acids comprise between 22.0 and 30.9% of the oils and consist of tetracosenoic, hexacos-17-enoic (ximenic), octacos-19-enoic, and triacont-21-enoic (lumequeic) acids. Evidence is presented for the presence of 3-7% tetracos-15-enoic acid and 5-12% octacos-19-enoic acid not previously found in seed oils. The oils contain traces of linoleic acid and 32.5 to 40.5% oleic acid.

PATENTS

Solvent extraction apparatus with automatic controls. J. A. DeSmet (La Societe Anonyme "Extraction continue DeSmet"). *U. S. 2,684,288.* Description is given of an apparatus for the continuous countercurrent extraction of a layer of pulverized oleaginous grains.

Process for modifying glyceridic fats and oils. E. L. Skau (U. S. A., Secy. Agric.). *U. S. 2,684,377.* Peanut oil is interesterified by heating in the presence of sodium methylate. The excess catalyst is destroyed with phosphoric acid. A 40 percent solution of the product is made by adding acetone and hexane, in the ratio of 85 to 15 by wt., the solution is chilled to about —13°C. and precipitated solids are removed.

Process for fractionating glyceridic mixtures obtained as hydrocarbon solutions. E. L. Skau(U. S. A., Secy. Agric.). *U. S. 2,684,378.* Acetone is added to cottonseed oil-hexane-water solution until the acetone to hexane ratio is 85:15 and the final mixture contains about 40 percent cottonseed oil. This mixture is cooled at about −8°C. Solids which form are removed. Winterized oil is obtained by removal of the solvents.

Production of fats. K. H. Imhausen and P. Krieghoff(Imhausen & Co. G. m. b. H. and K. H. Imhausen). *U. S. 2,684,970.* Mixtures of free fatty acids derived from natural fats and oils are almost completely hydrogenated, and esterified with a polyhydric alcohol. Hydrogenation may precede or follow esterification. The product is a hard, brittle fat of relatively low melting point.

Bleaching and stabilization of fatty acid esters, including glycerides, especially monoglycerides. W. G. Alsop(Colgate-Palmolive Co.). *U. S. 2,684,971.* Bleaching is achieved by treating the fatty acid esters with an oxidizing agent. Excess oxidizing agent is removed and color-forming bodies are deactivated by addition of a sulfur-containing inorganic reducing agent.

Food supplements and animal feed containing food supplements. R. P. Dunmire(Nutrition Products, Inc.). *U. S. 2,685,517.* The supplement consists of solid sand-sized particles in various shapes prepared from the desired nutrient or feed supplement dispersed in a hard, waxy, hydrogenated oil.

Method of making hard butter. G. Barsky and G. Zinzalian (E. F. Drew & Co.). *U. S. 2,685,592.* In a method for the preparation of substantially neutral glyceride esters of higher fatty acids, glycerine is reacted with an excess of fatty acids at 450°F. and under a vacuum of about 25 in. Hg. The temperature is then gradually raised to about 550°F. where it is held until the free fatty acid content of the mixture is constant. Exess fatty acids are distilled from the product by increasing the vacuum to about 29 in. Hg.

Manufacture of useful compounds and products from the seed oil of Mallotus philippinensis muell. arg. (Kamala). Joti Sarup Aggarwal, Vishwa Nath Sharma and Sushil Chandra Gupta(Council Scientific & Ind. Res., New Delhi). *U. S. 2,685,593.* A solution of kamala seed oil in an organic solvent is hydrogenated and saponified. The free fatty acids are mixed with petroleum ether and the omega-hydroxystearic acid, which precipitates, is isolated. α-Kamlolenic acid is obtained by saponification of kamala seed oil, precipitated with petroleum ether, and crystallized from benzene.

Stabilization of dehydrated vegetable material. T. W. Campbell and G. M. Coppinger(U. S. A., Secy. Agric.). *U. S. 2,686,123.* Oxidative deterioration of the dehydrated vegetable material is inhibited by the addition of an acyl pyrogallol.

Stabilization of forage crops with hydroquinone derivatives. E. M. Bickoff(U. S. A., Secy. Agric.). *U. S. 2,686,124.* Forage crops are stabilized by the addition of an alkyl dialkylaminomethyl hydroquinone or an alkyl dialkylaminomethyl quinone.

Vinylidene chloride polymer plasticized with a glyceryl triester. R. J. Reid, W. M. Smith, Jr., and B. H. Werner(Firestone Tire and Rubber Co.). *U. S. 2,686,168.* Vinylidene chloride homopolymers or copolymers are plasticized by the addition of 0.5 to 10.0% by wt. of glyceryl triacetate, tripropionate or tributyrate.

Phosphatide composition. N. W. Myers(A. E. Staley Manufacturing Co.). *U. S. 2,686,190.* A fluid phosphatide composition prepared from the phosphatides and glycerides of soybean oil contains 60 to 70% acetone-insolubles, not more than 0.3% water and 1 to 5% free fatty acids, and has a fluidity below 78 sec. at 77°F.

Esters from sperm oil. E. Grunthal and L. Mannes(Henkel & Cie., G. m.b.H.). *U. S. 2,686,191.* Sperm oil is heated with water at temperatures which will cause hydrolysis of glycerides but not of non-glyceride esters. Practically neutral fatty alcohol esters of the unsaturated fatty acids are isolated from the hydrolyzate.

Continuous percolation extraction. M. Bonotto. *U. S. 2,686,192.* Description of apparatus for the continuous extraction of oil-bearing process material with a liquid organic solvent is given.

Process for treating glyceridic oils and fats. B. M. Watson. *U. S. 2,686,193.* Dry steam is injected into crude oil in relatively small quantities and at relatively low temperatures. The precipitated, hydrated, non-oil constituents are then removed from the oil.

Sin'itiro Kawamura, Abstractor

Emulsification of butter fat. Rinjirô Sasaki and Susumu Koyama. *J. Oil Chemists' Soc., Japan* 3, 16-18(1954). Butter was analyzed for N substances; it contained casein 270, albumin 28, and globulin 28 mg. %. Butter contained P equivalent to 317 mg. % lecithin. These 4 compounds (possible emulsifiers) were prepared from milk, duck eggs, or soybean lecithin. They were added to butter fat or to hardened whale oil in the amount corresponding to the content in butter, and the emulsification degrees were estimated. Among them albumin was the most effective emulsifier.

Emulsification of edible fats and oils. Rinjirô Sasaki and Susumu Koyama(Univ. Toyko). *J. Oil Chemists' Soc., Japan* 3, 12-16(1954). The highest moisture content (%) of the emulsion made from fat, water, and emulsifier was called emulsification degree of the fat or the emulsifier. The moisture content was determined by colorimetry with $CoCl_2$ or by the distillation method. The results with the 2 methods were similar. When fats (experimented with butter fat and flatfish oil) were oxidized with 60% H_2SO_4 and 40% H_2O_2, the emulsification degree increased in parallel with OH value of the oxidized fats. As the emulsifiers the following were examined: egg yolk, sulfated oil, starch, Na caseinate, Ca caseinate, soybean lecithin, oxidized flatfish oil, and unsaponifiable fraction of lanolin. Na caseinate and the unsaponifiable matter of lanolin were best emulsifiers to get the emulsification degree of 30. Mixture of Na caseinate with egg yolk or with soybean lecithin gave no better result than Na caseinate alone.

A committee report. The method for examining raw materials of fat. Tomotaro Tsuchiya *et al. J. Oil Chemists' Soc., Japan* 3, 42-6(1954). The methods were described for the following: sampling, determination of impurities, moisture, fat, and acid number of extracted oil.

A committee report. Data for sampling. Tomotaro Tsuchiya *et al. J. Oil Chemists' Soc., Japan* 3, 178-83(1954). The data are presented which were used as the basis for making the decision of the method published (cf. the preceding abstr.). The analyses of soybeans, linseeds, kapok, castor beans, and sesame seeds are tabulated and treated statistically.

Solvent fractionation of fish oil glycerides. Hideo Marumo and Shin'ichi Tomiyama. *J. Oil Chemists' Soc., Japan* 3, 6-9 (1954). Cuttle-fish oil subjected to low-temperature interesterification (cf. *J. Am. Oil Chemists' Soc.* 31, 273[1954]) was fractionated with solvents. Acetone or acetone plus methanol were suitable for obtaining dewaxed oil almost free from saturated acid glycerides on one hand and crystalline ''stearine'' of almost ocmpletely saturated glycerides on the other hand. Furfural extraction was very effective after low-temperature esterification.

Plasticizers from fatty oils. I. Plasticizers from castor-oil fatty acids and lower fatty acids of coconut oil. Koichi Murai, Giichi Akazome, Shungo Ito, and Narakazu Tsujisaka. *J. Oil Chemists' Soc., Japan* 3, 2-6(1954). Neither methyl nor butyl esters of ricinoleic acid could be mixed with polyvinyl chloride. Esters of ricinoleic acid whose OH group was esterified were synthesized and tested as plasticizers for polyvinyl chloride. Methyl acetylricinoleate (**I**), methyl octanoylricinoleate (**II**), methyl benzoylricinoleate (**III**), and methoxyethyl acetylricinoleate (**IV**) were completely miscible with polyvinyl chloride. Partly miscible were methyl lauroylricinoleate and butyl octanoylricinoleate, and nonmiscible was butyl acetylricinoleate. Plastic films were made with these plasticizers (**I-IV**) and were examined for tensile strength at −40, −15, 5, and 25°, elongation at these 4 temperatures, 50% modulus and 100% modulus at 25°, and the residual stress just after and 2 hours after elongation by 100%. Comparisons were made with di-*n*-octyl phthalate, di-2-ethylhexyl adipate, and tricresyl phosphate. The second group of plasticizers synthesized include 1,4-butyleneglycol dicaprylate, 1,3-butyleneglycol dicaprylate, diethyleneglycol dicaprylate, triethyleneglycol dipelargonate, 1,3-butyleneglycol di-2-ethylhexanoate, diethyleneglycol di-2-ethylhexanoate, triethylene glycol di-2-ethylhexanoate, polyethyleneglycol (200 or 400) di-2-ethylhexanoate, and 1,3-butyleneglycol dilaurate. All compounds except the last-mentioned one were miscible with polyvinyl chloride. **I**, **IV**, and nearly all of the second group of compounds (diol esters of fatty acids) were excellent plasticizers.

Five-year plan of Indian fats and oils industries. With notes on ghee and vanaspati. Tôru Takagi, Tatsuo Tanaka, and Yoshiyuki Toyama(Nagoya Univ.). *J. Oil Chemists' Soc., Japan* 3, 121-32(1954). Economic-technical compilation on Indian industries of vegetable oils, paints, varnishes, and soaps is given.

The properties of free fatty acids and neutral glycerides of the rice bran oils of high acid value. Yoshiyuki Toyama and Yasuhisa Toyama. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **5**, 37-40(1952). Four samples of rice bran oil with acid value 27-119 were fractionated into neutral part and free fatty acids. The fatty acids of the former (neutral glycerides and other esters) had neutralization value lower by 3.0-5.9 and iodine value higher by 2.9-10.1 than those consisting the free acid part. The neutral part contained di- and monoglycerides. The unsaponifiable fraction of the rice bran oil contained free higher alcohol.

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

The metabolism of short-chain fatty acids in the sheep. 3. Formic, n-valeric and some branched-chain acids. E. F. Annison and R. J. Pennington (Rowett Res. Inst., Bucksburn, Aberdeenshire). *Biochem. J.* **57**, 685-691(1954). *Iso*butyric, *n*-valeric, *iso*valeric and α-methylbutyric acids can be absorbed into the blood from the rumen in the sheep. All these acids are metabolized to some extent when incubated with rumen epithelial tissue. The rate of metabolism of *iso*valeric acid was increased by the presence of carbon dioxide. In the absence of carbon dioxide this acid inhibited the respiration of rumen epithelium. Liver and kidney slices also metabolized these acids, with breakdown to acids of shorter chain length.

Some esterases of the rat. W. N. Aldridge (Med. Res. Council Unit for Res. in Toxicology, Serum Res. Inst., Woodmansterne Road, Carshalton, England). *Biochem. J.* **57**, 692-702(1954). With the method of using organophosphorus compounds for the differentiation of esterases into A- and B-types, another A-type esterase in pancreas of the rat has been demonstrated. The properties of the A-type esterases from serum and pancreas and the B-type esterase of intestinal mucosa have been examined. From a comparison of the A-type esterase of pancreas (lipase) and the B-type of intestinal mucosa, suggestions have been discussed on the difference between esterase and lipase. The uses of organophosphorus compounds for the characterization of esterases have been discussed.

Utilization of fatty acids by and lipolytic activities of Mucor mucedo. A. M. Stern, Z. J. Ordal and H. O. Halvorson (Univ. Illinois, Champaign). *J. Bacteriology* **68**, 24-7(1954). Lipase production and rate of growth of *Mucor mucedo* were determined at various temperatures between 16 and 45° and at pH 3.70 to 7.88 on basal media containing, as a single carbon source, soybean fatty acids, stearic, oleic or palmitic acids, methyl linoleate or linolenate. The effect of glucose on the rate of growth in these media was also determined. Soybean fatty acids were well utilized as a sole carbon source; addition of glucose stimulated growth. Stearic and oleic acids were utilized; methyl linoleate was less effective; palmitic acid and methyl linolenate were not suitable carbon sources and, at higher concentrations, may have inhibited growth. Aeration by shaking decreased the lipase activity. Maximum lipase production on a medium containing soybean oil occurred in 9 days at 38°C. and pH 6.38.

Sin'itiro Kawamura, Abstractor

Lipoxidase. Hiroyasu Fukuba (Ochanomizu Univ., Tokyo). *J. Oil Chemists' Soc., Japan* **3**, 103-6, 120(1954). A review with 40 references.

Nutritive value of lipides. VI. Nutritive value of the liver oils of Elasmobranchii. Takashi Kaneda and Seinosuke Ishii. *Bull. Japan. Soc. Sci. Fisheries* **18**, 85-91(1952-53). When examined by feeding albino rats with the diet containing 15% fat, shark liver oils containing no or little squalene or containing not much vitamin A were almost as nutritive as soybean oil. Such oils tested included oils of *Chimaera barbouri, Carcharhinus japonica, Squalus suckleyi, Dasybatus japonica, Squatina japonica, Pseudotriakis acrages, Alopias pelagicus,* and *Mitsukurina oustoni.* The liver oil of *Etmopeterus* sp. owing to its high content of squalene, and that of *Sphyrna zygaena* owing to its high contents of vitamin A and unsaturated fatty acids, were inferior to other oils.

Nutritive value of lipides. VII. Nutritive value of component fatty acids of hardened sardine oil. Takashi Kaneda and Seinosuke Ishii. *J. Japan. Soc. Food Nutrition* **5**, 78-81(1952-53). Sardine oil hydrogenated with Raney Ni to I no. 88 was saponified and the fatty acids were fractionated into liquid acids 53%, solid saturated acids 22.48%, and solid unsaturated acids 24.52%. Comparison of nutritive value with albino rats was made among ethyl esters of each fraction and ethyl oleate. Only ethyl esters of solid saturated acids were inferior and the other 3 esters were comparable nutritionally. Highly unsaturated acids supposedly consisting of C_{20} and C_{22} acids were separated from sardine oil and were derived to ethyl esters, which were hydrogenated with Raney Ni to different degrees. The increase in body weight in 26 days was ethyl oleate 22-30 g., ethyl esters (I no. 366) —10 to 22 g. (toxic), hydrogenated ethyl esters (I no. 273) 6-21 g. (toxic), the same (I no. 174) 20-24 g. (good), the same (I no. 152) 22-28 g. (good), and the same (I no. 70) 12-26 g.

Nutritive value of lipides. VIII. Nutritive value or toxicity of highly unsaturated fatty acids. 1. Takashi Kaneda and Seinosuke Ishii. *Bull. Japan. Soc. Sci. Fisheries* **19**, 171-7(1953-54). Highly unsaturated acids were separated from sardine oil carefully by repeating Na salt-acetone method. The ethyl esters of such acids with I no. 336 were as nutritive as ethyl oleate, while air-oxidized esters of the above acids (I no. 161) were very toxic for rats. In the feeding experiments only small amounts of vitamins B_1 and B_2 were given. Thus fresh highly unsaturated acids are not toxic, and the toxicity hitherto ascribed is possibly due to the oxidized product.

Nutritive value of lipides. IX. Nutritive value of polymerized liver oil of Squalus suckleyi. Takashi Kaneda and Kimie Arai. *Ibid.*, 700-2(1953-54). Soybean oil, liver oils of dog fish *(Squalus suckleyi)* plus soybean oil (7:3), polymerized product of the above mixture (170°, 70 min. in CO_2), and deodorized product of the above polymerized oil, added to the basal diet brought the increase in the body weight of albino rats (range in 3-4 tests), respectively, 47-63, 42-57, 52-66, and 58-75 g. in 29 days. Thus the latter 2 were a little more nutritive than soybean oil.

Nutritive value of lipides. X. The formation of seborrhea in albino rats fed the esters of fatty acids with higher alcohols. 1. Takashi Kaneda and Hisae Sakurai. *Ibid.*, 1168-75(1953-54). Seborrhea was formed with oleyl oleate, and further with cetyl oleate, oleyl stearate, octadecyl oleate, and partially hydrogenated product of oleyl oleate. The ether extract of the viscera and meat of rats fed oleyl oleate had low saponification no. and contained much unsaponifiable matter; thus the oleyl oleate given was presumed to deposite as itself in the tissue and to cause seborrhea.

Nutritive value of lipides. XI. Nutritive value or toxicity of highly unsaturated fatty acids. 2. Takashi Kaneda, Hisae Sakurai, and Seinosuke Ishii. *Ibid.* **20**, 50-7(1954-55). The autoxidized product of the ethyl esters of liquid acids of linseed oil showed the same toxicity for rats with the autoxidized highly unsaturated fatty acids. Thus any unsaturated acids might become toxic after autoxidation. The component responsible for toxicity was sought for from the autoxidized esters of linseed liquid acids by urea segregation. The fraction forming the adduct with urea was nontoxic, while the fraction not forming the adduct was very toxic. The most toxic substance contained in the autoxidized unsaturated fatty acids should be a peroxide.

• Drying Oils

Raymond Paschke, Abstractor

Odorless thinners: new muscle for oil paint? Anon. *Chem. Eng.* **61**(8), 142(1954). Oil-based interior paints, already hurt and threatened even further by latex emulsions, look to odorless mineral spirits to help stabilize their markets.

The French paint industry. Anon. *Am. Paint J.* **38**(45), 30 (1954). A discussion of the social, psychological, and economic factors which handicap the French paint industry is given.

Upgrading of linseed oil, particularly by isomerization. J. D. von Mikusch. *Bull. Schweiz. verein Lack-u. Farben-Chem.* **1953** (22), 2-19. Properties of an isomerized linseed oil with ~ 50% conjugation are described. The effect of some pigments in retarding drying is much more marked with this oil than with linseed oil and is characteristic of conjugated oils. The optimum drier contents to be employed with isomerized linseed oil in presence of various pigments are tabulated. Film-forming properties of isomerized and untreated linseed oil are compared. (*J. Appl. Chem. Abs.* **4**, ii 143[1954])

Instruments for measuring gloss, hiding power, and color of paint films. D. B. Judd (Nat. Bureau of Standards). *Am. Paint J.* **38**(41), 66(1954). A review with 14 references.

New metal salts as paint-drying agents. J. M. F. Marzol and A. Doadrio (Inst. Alouso Barba, Madrid). *Anales real soc. espan. fis y quim.* (Madrid) **49B**, 591-4(1953). Salts of mono alkyl phthalates are used. (*C. A.* **48**, 7316)

Fatty acids of epoxy resins. E. Narracott and J. Nielsen (London). *Fette-Seifen-Austrichmittel* **56**(2), 92(1954). Of the 3 methods of curing epoxy-resins for coatings, viz., (1) with alipathic amines, (2) with phenolic and other resins, and (3) with fatty acids, only the last method is discussed. Various possibilities of esterification of epoxy-resins with fatty acids have been investigated, and the properties and merits of the resulting products are discussed.

Mildew growth on paint films. Anon. *Ontario Hydro Res. News* **5**(2), 24-5(1953). An account is given of mildew growth on oil-base decorative paint in a concrete tunnel through which humid, warm air slowly flowed. Such growth is favoured by continuous high atmospheric humidity ($<75\%$), temperature (75°), still air, lack of light and sunshine, and a light-coloured paint. Mould growth is less likely when the paint film dries rapidly and with a solution of Na_3PO_4 (1 oz. per gal.) plus Na pentachlorophenate (1 oz. per gal.) or NaClO (½ oz. per gal.), followed by repainting when the sterilized surface is thoroughly dry. The paint should contain a fungicide, or one should be added. Rapid-drying hard-finish paints containing chlorinated rubber or polyvinyl chloride are also satisfactory. (*Build. Sci. Abstr.* **26**, 300)

Glycerine alkyds tailored to need. Part II. C. R. Bragdon. *Am. Paint J.* **38**(44), 66(1954). This part discusses methods of manufacture, material costs and how changes in formulation affect them. Also considered are factors influencing the choice between buying and making a resin.

Catalyst studies on vinyltoluene-drying oil reactions. F. J. Buege (Dow Chemical Co.). *Ind. Eng. Chem.* **46**, 1695-1700 (1954). The film clarity of vinyltoluene-modified unconjugated drying oils is a function of the iodine number of the oil. Oils of higher iodine values produce products of improved clarity. Conjugated oils are sufficiently reactive with vinyltoluene in uncatalyzed reactions to form clear products. The product clarity of vinyltoluene-modified Q viscosity linseed oil is improved by increasing catalyst concentration or using catalysts that decompose at slower rates. The viscosity of vinyltoluene-drying oil reaction products catalyzed with either ditert-butyl peroxide or 2,2-bis(tert-butylperoxy)butane increases as the concentration of the catalyst is increased.

Polyvinyl acetate as a paint vehicle. R. J. Davis (Celanese Corp.). *Paint Varnish Production* **44**(7), 26(1954). A short review is given of the polymerization of vinyl acetate, of the properties of polyvinyl acetate and PVA paints, and of paint formulation.

Thermal polymerization of drying oils. A. S. Gupta (Natl. Chem. Lab., Poona). *Oils & Oilseeds J.* (India) **5**(10/12), 113-17(1953). A review with 41 references. (*C. A.* **48**, 9077)

The role of petrochemicals in paint. P. Heiberger (National Lead Co., Philadelphia). *Paint Varnish Production* **44**(8), 23 (1954). A discussion is given of the paint chemicals which are derived from petroleum and of how these chemicals are prepared.

The physical and chemical characteristics of commercial tung oils. R. L. Holmes, F. C. Pack, J. C. Minor, and R. S. McKinney (Southern Regional Res. Lab.). *Proc. Am. Tung Oil Assoc.* **1953**, 56-61. A total of 116 commercial tung-oil samples, 86 from domestic mills and 30 from S. America, were analyzed for total eleostearic acid, α-eleostearic acid, β-eleostearic acid, *n*, acid no., heat test, Wijs I no., color, sp. gr., unsaponifiable matter, volatile matter, sapon. no., and viscosity. All the samples were found to be very uniform products of high quality. (*C. A.* **48**, 8555)

Corrosion resistant finishes. A. J. Liebmann. *Am. Paint J.* **38**(47), 26(1954). Protective coatings must resist more severe chemical attacks than 20 to 50 years ago. A number of new film-forming products have been made available. In many cases good assembly with the metal is more important than formulation. Several conditions and their treatment are given.

Alkyd resins. D. G. McNabb (Reichhold Chemicals Ltd.). *Can. Chem. Processing* **38**(7), 54(1954). Since 1946 there has been a steady and remarkable growth in the consumption of alkyd resins in Canada. In 1952, 40 million pounds were used. A very small part of this figure is supplied through imports and it is anticipated that continuing demand will call for increased production facilities.

The mechanism of the corrosion-inhibition action of paints, with special reference to basic pigments. J. E. O. Mayne and D. Van Rooyen (Univ. of Cambridge, Eng.). *J. Appl. Chem.* **4**, 384-94(1954). It has been shown previously that water becomes non-corrosive to iron and steel after contact with certain metal soaps (Pb, Zn, Ba, Sr, Ca) of linseed-oil fatty acids. Aqueous extracts of the lead and calcium soaps have now been analyzed, mainly by chromatography. The extracts contained salts of formic acid, azelaic acid and an unsaturated hydroxy-acid derivative from pelargonic acid; small quantities of the salt of acetic, propionic, butyric and suberic acids were also detected. Immersion tests showed that lead and calcium formates were corrosive, but the lead and calcium salts of azelaic acid, suberic acid and pelargonic acid were inhibitive at pH 4.6. A synthetic mixture was made, which had inhibitive properties similar to those of a natural extract. Two hypotheses are put forward to explain the results.

Protection of steel. Part I. Surface preparation is all-important. M. E. Schleicher (McDougall-Vutler Co., Buffalo, N. Y.). *Paint Ind. Mag.* **69**(7), 18(1954). Surface preparation by chemical and solvent methods and by physical methods is discussed.

Industrial finishes. C. G. Moore (Glidden Co., Chicago). *Am. Paint J.* **38**(47), 77(1954). Crystallizing, crackle, hammer, and wrinkle finishes are discussed.

Miniature paint factory in a test tube. R. B. Shurts. *Nat. Paint Varn. Lacquer Assoc. Circ.* **766**. An apparatus is described for preparing small quantities of paint for testing purposes.

Gas heat treatment of oils and resins. L. Walter. *Paint Varnish Production* **44**(7), 21(1954). An outline of the heat treatment necessary to produce the desired properties in the materials used in the manufacture of paints and varnishes is given and the types of burners used are described. A number of installations and appliances in which heating is carried out by towns gas as available in England are also described.

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Electrolytic thickening of wrinkling oils. P. Pawlyk (New Wrinkle, Inc.). *U. S. 2,676,918.* Tung, linseed, castor, or polyenic oils can be anodically oxypolymerized at 40-50° at a c.d. of 0.15-7.0 amp./sq. dm. Unlike thermal bodying at higher temperatures which can become exothermal and is product catalyzed, this process is always in operating control. The conductive salts needed for the anolyte are selected so that they become driers in the eventual use of the oil, e.g. Co^{++}, Mn^{++}, or Pb^{++} resinates, linoleates, or naphthenates. Ceric, titanic, ferrocyanic, and chromate salts can be employed as electrolytic catalysts. If the catholyte is separated by a diaphragm, 2.5-5% H_2SO_4 or 10% NaOH solutions can be used therein for improved conductance. If no diaphragm is used, organic acids, such as acetic, can be used. (*C. A.* **48**, 8558)

Sin'itiro Kawamura, Abstractor

Drying property of fish oil and its improvement. I. Drying property of cuttle-fish oil. Hideo Marumo and Shin'ichi Tomiyama. *J. Oil Chemists' Soc., Japan,* **3**, 9-12(1954). Low temperature interesterification and dewaxing were applied to cuttle-fish oil and various amounts of saturated fatty acid glycerides were removed. The drying property of the treated oil with more than 10% saturated acids was inferior (they were not dry even after 1 month). The treated oil with less than 10% saturated acids became dry temporarily, but was sticky again after aging. Such oils were improved by heat polymerization. Thus the inferior drying property of fish oil is due not only to its content of saturated acids but also to some factor unstable to heat treatment (300°).

Drying property of fish oil and its improvement. II. Composition of cuttle-fish oil. Hidero Marumo and Shin'ichi Tomiyama. *Ibid.*, 67-70(1954). The composition of cuttle-fish oil before and after low-temperature interesterification and dewaxing was examined. Cuttle-fish oil itself contained about 13% mono- and diglycerides, while the oil almost free from saturated acids contained about 23% mono- and diglycerides and 12% methyl ester. The fraction rich in methyl ester and mono- and diglycerides had inferior drying property. The inferiority of drying property of fish oil freed from saturated acids may be due to the presence of mono- and diglycerides. This was ascertained by experiments with a series of mixtures containing linseed oil and various amounts of mono- and diglycerides and methyl ester.

Drying property of fish oil and its improvement. III. Dibasic acid treatment of cuttle-fish oil. Hidero Marumo and Shin'ichi Tomiyama. *Ibid.*, 70-3(1954). Cuttle-fish oil freed from saturated acids was reacted with phthalic or maleic acid anhydride to prevent the undesirable effect of mono- and diglycerides present. Practical paint could be formulated from the treated oils.

Drying property of fish oil and its improvement. IV. Styrenation of cuttle-fish oil. Hidero Marumo, Shin'ichi Tomiyama, and Akira Nakajima. *Ibid.*, 109-12(1954). Cuttle-fish oil was treated with styrene (or styrenated) after oxidation or after removing of saturated acids by the formerly reported method. The products were superior in drying property.

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• Waxes

R. L. Broadhead, Abstractor

Microscopic examination of waxes. I. W. Hessler(Werner & Mertz A.-G., Mainz, Ger.). *Fette u. Seifen* **55**, 529-32(1953). Photomicrographs of commercial waxes are given. (*C. A.* **48**, 8563)

New synthetic waxes. A. Presting. *Chem. Tech.*(Berlin) **5**, 265-8(1953). The use of montan wax from German brown coal is proposed for modification of the properties of synthetic waxes such as Acrawax, Santowax O, and Armowax. (*C. A.* **48**, 7919)

Wax encyclopedia. III. Analysis of waxes and commercial products. 1. Examination and evaluation. L. Ivanovszky. *Seifen-Ole-Fette-Wachse*, **79**, 555-6, 578-9(1953). (*C. A.* **48**, 8503)

Antifoam compositions and method of foam inhibition. G. W. Luvisi(National Aluminate Corp.). *U. S. 2,668,150.* A method of defoaming various aqueous solutions such as encountered in operations involving sewage, boiler cleaning, phosphate concentration, pulping, etc., consists in adding 5-15% by weight of a defoaming composition consisting essentially by weight of 5-10% of mixed higher fatty acids, 1-5% wax, 5-20% polyoxyethylene glycol 400 dilaurate, 1-25% polyoxypropylenediol, and 65-75% hydrophobic solvent. (*C. A.* **48**, 7921)

Wood-coating composition. A. E. Budner(S. C. Johnson & Son, Inc.). *U. S. 2,676,893.* A good coating of high gloss and easy bufferability is applied from a mixture of wax (I), dimethylpolysiloxane (II), water (III), and naphtha (IV). I (2.25-7.0%) is selected from any animal, vegetable, or mineral wax. II (1.25-5%) with a viscosity range of 100-30,000 centistokes is used. III (10-20%) is employed to remove hydrocarbon-insoluble spots from the surface and prevent streaking of II. IV is selected from any hydrocarbon solvent having an aniline point of —22° to 185°F. so as not to damage a wood finish but to have adequate solvency for the wax. IV forms the remainder of the ingredients. To prepare the coating, II is dissolved in IV, and I is melted and added. The temperature of the mixture is brought to about 160°F., and III is added with vigorous agitation. Agitation is continued until the temperature is reduced to 85°. (*C. A.* **48**, 8560)

Self-sealing and moistureproof wrapping paper. B. L. Trillich (Munising Paper Co.). *U. S. 2,676,897.* Flexible, calendered paper sheets are coated on one side with an emulsion of 100 parts polyvinyl acrylate latex and 1 part by weight di-2-naphthyl-*p*-phenylene-diamine. The other side is coated with any of the usual wax emulsions. (*C. A.* **48**, 7816)

Carbon paper backings. Productos Rolan, Vda. e hijos de J. Sitjar. *Span. 206,265.* Instead of using synthetic resins to back carbon papers, shellac is used. This is then covered with a very fine layer of wax to impermeabilize the paper and to neutralize the shellac layers and avoid curling. (*C. A.* **48**, 8542)

Sin'itiro Kawamura, Abstractor

The preparation of musk-like perfume by the lactonization of hydroxypalmitic acid in bees' wax. Yoshiyuki Toyama and Hiroshi Hirai. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* **5**, 36-7 (1952). 14-Hydroxypalmitic acid (*Chem. Abs.* **47**, 3010) isolated from bees' wax with 2-naphthalenesulfonic acid (lactonization catalyst) gave 14-ethyltetradecanolide (a new compound), boiling at 140-150° at 3 mm. Hg., d_4^{20} 0.9368, n_D^{20} 1.4690, which had musk-like fragrance.

A further study on hydroxypalmitic acid in bees' wax. Yoshiyuki Toyama and Yasuhisa Toyama. *Ibid.* **6**, 28-32(1953). Japanese bees' wax (4 samples) contained about 15% hydroxypalmitic acid. The method of isolating this hydroxy acid was improved. An isomer of 14-hydroxypalmitic acid with lower m.p. was present but its isolation was unsuccessful.

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• Detergents

Lenore Petchaft Africk, Abstractor

Improvement of disinfecting properties of soaps. V. G. Zubareva(Med. Inst. Chkalovsk). *Gigiena i Sanit.* (9), 50-2 (1953). Addition of 1:200 proportions of ethylmercuric phosphate to common soaps increases their disinfecting properties 4-4.5 fold, as tested against *Micrococcus pyogenes* var. *aureus*. (*C. A.* **48**, 7321)

Sweating and efflorescence of hard soaps. H. Zilski. *Seifen-Ole-Fette-Wachse* **80**, 103-4, 129-30, 151-3(1954). Sweating and efflorescence of soap are caused by structural changes of the colloidal system, mainly due to high content of electrolyte (NaCl). (*C. A.* **48**, 8563)

Specialty soaps. R. B. Trusler and Irene Bugas(Davies-Young Soap Co., Dayton, Ohio) and K. M. Reese. *Ind. Eng. Chem.* **46**, 1354-62(1954). The manufacture of various types of specialty soaps made by the Davies-Young Soap Co. is described. Items discussed include types and specifications of raw materials, raw material handling equipment especially various types of soap kettles, flowsheet of production, and formulation of such specialties as liquid toilet soaps, paste soaps, shampoo bar, and drycleaning soaps.

What's ahead for soaps and synthetic detergents? A. W. Smith (Dow Chemical Co., Midland, Mich.). *Soap, Chem. Specialties* **30**(7), 41-3, 65(1954). Future developments in the detergent industry will include increased acceptance of bar detergents partially based on synthetics, increased popularity of heavy duty type formulations as opposed to the light duty products, increased acceptance of low-sudsing products and increased use of liquid detergents.

Scouring agents in the textile industry and their most important properties. M. Rosch. *Melliand Textilber.* **34**, 567-9(1953). Measurements of surface tension, wetting-out effect, and frothing power are not always an indication of the cleansing power of a detergent as shown by tests with 4 detergents on a wool fabric and a cotton fabric. The order of scouring efficiency was for wool the inverse to, for cotton the same as, that of their wetting out and frothing power. The effect of temperature, and of mixing detergents is also discussed and it is concluded that there is no advantage in mixing anionic with nonionic detergents since the mixtures generally do not give as good results as either component alone. (*C. A.* **48**, 5506)

On gel formation in soaps. N. Pilpel(King's College, Univ. of London, Strand, W.C.2, London, Eng.). *J. Colloid Sci.* **9**, 285-99(1954). Viscoelastic gels are formed by the addition of electrolytes to aqueous soap solutions. Equations have been derived that enable gel formation to be explained in terms of the conversion of the soap from the form of small, detached spherical micelles into long-interlinked cylindrical micelles. The mechanism proposed reasonably explains the gel properties of the soaps of sodium oleate, elaidate, and oleylsulfate, and the influence on these properties of small amounts of long-chain alcohols, other soaps, and perfluoro-compounds.

A theory of critical micelle concentration of colloidal electrolyte solutions. Y. Ooshika(Kobayasi Inst. of Physical Research, Kokubunji, Tokyo, Japan). *J. Colloid Sci.* **9**, 254-62(1954). A theory of the critical micelle concentration of colloidal electrolyte solutions and the effect of added alcohols is developed by using a lamellar model. The logarithm of the critical micelle concentration is approximately a linear function of the number of carbon atoms of the hydrocarbon chain, and the constants involved are of reasonable values. Debye's theory is shown to be incorrect. Since added alcohol molecules form a kind of mixed micelle, it is concluded that the logarithm of the ratio of the decrease of the critical micelle concentration by addition of alcohol to the concentration of alcohol is a linear function of the number of carbon atoms of the alcohol chain. The agreement of the theory with experiment is quite satisfactory.

Soap and detergent perfumery. E. D. Kilmer (Lever Brothers, Edgewater, N. J.). *Soap, Chem. Specialties* 30(7), 34-6, 163 (1954). Factors involved in stability of soap perfumes and methods of evaluation are reviewed.

Nonionic surfactants—their chemistry and textile uses. C. F. Jelinek and R. L. Mayhew (General Aniline & Film Corp., Easton, Penn.). *Textile Research J.* 24, 765-78 (1954). Nonionics have the following advantages for use in textile processing: Their liquid form and lack of substantivity fit them for high-speed processing where ease and speed of solution and speed of rinsing are required. Their compatibility with a wide variety of materials makes their use possible in many types of formulations. The alkylphenol derivatives possessing the proper hydrophobic-hydrophylic balance have many applications due to good wetting, emulsifying, detergent and limesoap dispersing properties, coupled with their stability to acid, alkali, and oxidizing agents. Disadvantages include low solubility in hot aqueous solutions and concentrated solutions of electrolytes, no softening effect on fabrics, and low sudsing characteristics when foam needs are high.

The properties of detergent solutions. I. Molecular weights determined by light-scattering measurements. E. Hutchinson (Stanford U., Stanford, Calif.). *J. Colloid Sci.* 9, 191-6 (1954). It is pointed out that all published results to date for light-scattering experiments on detergent solutions have been interpreted by a method which implicitly treats these solutions as being nonelectrolytes. Reasons are presented for believing that the molecular weight or degree of association is best determined by experiments in which a large excess of neutral salt is added to the detergent solutions.

Lauryl alcohol sulfates. Serge Giers (American Alcolac Corp., Baltimore, Md.) and Denise Boido. *Soap, Chem. Specialties* 30(8), 38-41, 179 (1954). Several new salts, potassium, zinc, ammonium, calcium, magnesium, and ethanolamines, have been prepared commercially. Most of their surface active properties are similar to those of the sodium salts, though the potassium compound generates more foam in the presence of lanolin. The physical properties cover a broad range of viscosity and cloud point, permitting a wider selection of properties. Some of these new salts are finding applications as replacements for the sodium salt.

Toxicology of surfactants. L. C. Barail. *Soap, Chem. Specialties* 30(6), 51-3, 109 (1954). The influence of pH of surfactants on skin toxicity and relation to isoelectric theory is reviewed. The wide difference in toxicity of products that are anionic, cationic and nonionic is pointed out. No synthetic detergent has been found to belong to the very high toxicity group, but some belong to high or medium toxicity groups, and many to low and non-toxic groups.

Sulfonation-sulfation. J. P. Sisley. *Revue Francaise des Corps Gras* 1, 199-123 (1954). The chemistry of the sulfonation and sulfation of various animal and vegetable fats and oils and the acids and alcohols derived from them is reviewed. Sulfur derivatives of petroleum products also are considered. Forty-seven references.

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Nonfoaming surface-active alkyl benzene sulfonate composition. J. C. Harris (Monsanto Chem. Co.). *U. S. 2,683,692.* A nonfoaming detergent composition useful in industrial applications is prepared by adding the acetic acid salt of monoalkylamine of from 14 to 16 carbon atoms to an alkylbenzene sodium sulfonate containing between 8 and 14 carbon atoms in the alkyl group, as a foam depressant.

Improvements in the bleaching of soaps and soapstocks. Unilever Ltd. *Brit. 713,029.* An improved process for bleaching soap consists in continuously passing the stream of molten soap containing the hypochlorite bleaching agent and a bleaching aid such as persalts through an elongated treating zone at a rate to accomplish the required bleaching, and continuously discharging the bleached soap at the end of the treating zone.

Improved manufacture of odorless soaps from low grade oils. Compania Industrial. *Brit. 710,825.* Odorless soap of high consistency is made from low grade animal or vegetable oils and fats without formation of foam by treating the fatty acids obtained by the Twitchell splitting process with activated carbon and then with molten alkali at about 300° in the absence of water and at substantially atmospheric pressure.

Improvements in or relating to detergents and process for making the same. Monsanot Chemical Co. *Brit. 705,658.* A non-separable detergent is prepared by hydrating an alkali metal salt capable of hydration with water to form a hydrate thereof in the presence of an ethylene oxide condensation product.

Sin'itiro Kawamura, Abstractor

Corrosion of metals in the aqueous solutions of surface-active agents. I. Jiro Mikumo and Toru Kusano. *Res. Rept. Nagoya Ind. Sci. Res. Inst.* 6, 33-4 (1953). Corrosion of Fe pieces by surface-active agents was examined at 35° by measuring weight change of the Fe pieces. Corrosion was slight with 1% solution of nonionic agents (experiments with polyethylene glycol monolaurate and sorbitan monostearate) in comparison with 1% solution of cationic agents (experiments with cetyl pyridinium chloride and oleyl hydroxymethyl triethyl ammonium chloride) giving lower pH values. Among anionic agents 1% solution of Na oleate and Na laurate gave no corrosion, while that of Na higher alcohol sulfate gave a rather large corrosion and that of Na dodecylbenzenesulfonate gave smaller corrosion. Some agents gave less, but some other more of corrosion in 0.1% solution than in 1% solution. The corrosive action of Na_2SO_4 could be hindered by surface-active agents. The addition of Na_2CO_3 or Na_3PO_4 largely depressed the corrosion by surface-active agents.

Surface-active agents. Jirô Mikumo (Nagoya Univ.). *J. Oil Chemists' Soc., Japan* 3, 145-8 (1954). A review with 14 references.

Detergency evaluation. II. Preparation of artificially soiled cotton fabrics. 2. Akihiko Yabe, Mioko Ono, and Dai Ishizaki. *J. Oil Chemists' Soc., Japan* 3, 18-22 (1954). Moisture of the cloth to be soiled is of great influence on the soiling and detergency. To get a uniform cloth in respect with moisture, the cloth to be soiled was protected by carbon tetrachloride vapor. Soiling was more difficult with hardened tallow than with peanut oil, the former was more easily washed with soap, but less easily washed with water than the latter. The soiled fabric became difficultly washable during storage.

Detergency evaluation. III. Statistical consideration of the effects of detergents, temperature, and concentration on detergency. Akihiko Yabe and Dai Ishizaki. *Ibid.* 79-83 (1954). The optimum conditions for detergency were 40° in temperature and 0.3% in concentration. The kind of detergents was had a pronounced effect. Nonionic detergent (Lissapol N plus carboxymethyl cellulose) was much superior to anionic ones.

Cationic surface-active agents of the alkylamine series. Yoshiro Namba, Fumio Bessho, and Hiroshi Miyazaki. *J. Oil Chemists' Soc., Japan* 3, 23-6 (1954). Nitriles were prepared by heat dehydration of fatty acids with simultaneous passing of ammonia. Stearic or higher fatty acids were reacted at 300° for 4 hours successfully, while myristic acids were reacted at 290° for 6 hours and lauric at 270° for 10 hours to obtain corresponding nitriles. As the dehydrating catalyst alumina was best; others tested included silica gel and active clay. Fatty amines were prepared by hydrogenating nitriles. The optimal conditions with Raney Ni were to heat at 120-150° with 2-4 parts NH_3 for 1 part of nitrile. The production of secondary amine was less than 7%. Amines of C_{12} or C_{18} were derived to alkyl trimethyl ammonium chloride by reaction with methyl chloride. Surface activity of such cationic agents was measured at the concentrations of 0.01, 0.10, 0.25, and 0.50%.