ABSTRACTS

Soaps

***Edited by* M. L. SHEELY**

Elimination of Scale Formation in (Glycerol) Concentration. M. Zaliope, Masloboino Zhirovoe Delo, 11, 260-1 (1935). Experiments in the concentration of glycerol solutions showed that on the addition of graphite (0.005%) based on the weight of the evaporated water the scale formation on the pipes is eliminated. The coarse-grained aggregates of the salts formed are deposited at the bottom of the evaporator and are easily removed and separated from the glycerol. By this method the time required for evaporation is reduced 50%. The organic and inorganic residues in the crude glycerols obtained by evaporation with and without the addition of graphite are 4.9 and 5.26% respectively.

(C. A. 29, 22, 8380, November 20, 1935.)

A Pharmaceutical Study of pH — Cosmetics. Frederick F. Johnson, College of Pharmacy, University of Washington, Seattle, Washington. Eggerth (80) has published the results of a detailed investigation concerning the effect of pH on the germicidal action of soaps. Eggerth found for all soaps an acid and an alkaline range in which the soaps were most germicidal. Potassium butyrate was non-germicidal in a concentration of tenth-normal at all pH values within the limits of 3.8 to 10.5. He stated that solutions of soaps having 12 or more carbon atoms in the molecule were alkaline in reaction, and that increasing the number of carbon atoms in the chain increased the alkalinity of the solution due to increased hydrolysis. With increasing molecular weight of the soap, the germicidal titer increased to a maximum and then diminished, the point of inflection varying with the pH and the organisms. Thus, with B. typhosus at pH 5.5 the titer rose with increasing molecular weights up to capric acid and then diminished. With most organisms, the maximum titer for the acid range was reached with lauric and tridecylic acids. In the alkaline range the germicidal action increased with molecular weight to palmitate and then diminished. The lower members of the saturated series of soaps were found to be most germicidal in acid reaction. For instance, the titer for potassium caprate was 1000 times as great at pH 4.4 to 4.7 as it was at pH 9.0 to 10.0.

Eggerth proposed the following explanations concerning the relation between pH and the germicidal action of soaps: (1) Hydrogen ions and hydroxyl ions may affect the bacterium rather than the soap. (2) An acid reaction may decrease the surface tension of the soap and thus increase its concentration at the surface of the bacterium. (3) The pH effect may be due to alterations of the solubility of soap in aqueous phase or in the bacterial protoplasm. (4) The fatty acid may have a greater germicidal action because the acid is less dissociated than the soap, and there is evidence that undissociated molecules penetrate more readily into protoplasm than do ions.

Janistyn (211) called attention to the value of certain acids (anisic, formic, benzoic, butyric, citric, acetic, gallic, tannic, glycerophosphoric, camphoric, etc.) in concentrations which gave a therapeutic skin pH of 3.0 to 5.0 in soaps, skin, mouth and hair preparations, and other cosmetics. Janistyn stated that the disinfecting action of buffered acids is greater than of unbuffered acids because of the higher acid-ion concentration. An anonymous article in the "Drug and Cosmetic Industry" (302) stated that the normal pH of skin is between 4.5-5.0 and that any cosmetic which has a strong alkaline reaction is detrimental to the skin. This article stated that the pH range of blood is from 7.0 to 7.4 and that face creams whose pH values deviate from this range cause irritation to the epidermis. The author also pointed out the insistence of acid and alkaline ranges whereon an optimum effect can be obtained from antiseptic lotions. Mayer (320) has shown the value of pH control in the manufacture of shampoos and has stated that the properly designed soapless shampoo test should have a pH of about 7.0 to 7.5.

(Journal of the American Pharmaceutical Association, 24, 5, 403, May, 1935.)

Volumetric Determination of Fatty Acids in Soaps. W. Stuewe, Chem. Ztg., 1935, p. 468. The soap solution is acidified with sulphuric or hydrochloric acid, and the solid or semi-solid layer of fatty acid which separates on the surface is converted into a completely liquid layer by adding a known weight of oleic acid. The mixture is introduced into flask with a graduated neck, so that the layer of fatty acid and oleic acid occupies the neck. The volume is read and allowance made for the volume of oleic acid added. Specific gravities are given of the more important pure and commercial fatty acids used in the manufacture of soaps, by means of which the weight of fatty acid in the soap can be determined from the volume.

(Rayon and Melliand Textile Monthly, 16, 12, 75, 1935.)

The Oxidation of Unsaturated Fatty Oils by Atmospheric Oxidation. Johs. M. Aas, Fett chem. Umschau 42, 71-5 (1935). A study was made of the oxidation of a number of fatty oils. Since the oxidation conditions (Humidity, thickness of layer and surface of sample exposed to oxidation, temperature and exposure to light) were not kept constant in the various experiments, it was necessary to eliminate the time factor. This was done by determining the change (decrease) in I number (Wijs) as a function of variation (increase) in weight of the sample. Graphical representation of the data shows that, during the early stages of oxidation, the I number decrease is directly proportional to the gain in weight on oxidation, with the exception of linseed oil. During the later stages of oxidation further decrease in I number is not accompanied by a further proportional gain in sample weight as there is a distinct tendency for the sample weight to pass through a maximum and then begin to decrease. By assuming that the total weight increase during the early stages of oxidation is due to O absorption, and that the decrease in I number is a true measure of the double bonds oxidized, it was calculated that the number of O atoms absorbed per double bond were: during the oxidation of medicinal cod-liver oil 1.85-1.97, whale oil 2.18-2.03, herring oil 1.87-1.96, seal oil 2.11, shark oil 1.95, Japanese cod-liver oil 1.96-2.06, linseed oil 1.81 (uncertain), rape oil 2.37, oleic acid 3.06, olive oil 3.65-3.86 and soy oil 3.39. The last 2 substances

ABSTRACTS

Soaps

Edited by M. L. SHEELY

were oxidized in diffuse daylight. Cf. A. R. Savina, S. B. thesis, M. I. T., 1930, and J. W. Perry, S. M. thesis, M. I. T., 1931. Cf. C. A. 29, 369.

(C. A. 29, 22, 8374, November 20, 1935.)

Hydrogenating Whale and Fish Oils. F. Pinsker, Masloboino Zhirovoe Delo, 1935, 157-9. Best results in hardening whale and fish oils were obtained with alkali refined oil and a purified catalyst containing 0,33% Ni in an autoclave at 200° for about 3 hours. Tonsil, active C, kieselguhr, Cu dust, Fe dust and Al dust were used as catalyst carriers.

(C. A. 29, 22, 8378, November 20, 1935.)

Wetting and Spreading Properties of Aqueous Solutions. H. L. Cupples, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C. Surface tensions, interfacial tensions, and spreading coefficients on a refined paraffin oil were determined for aqueous sodium carbonate-oleic acid mixtures containing 1.0, 0.3, and 0.1 per cent of oleic acid, and with a varying alkali-fatty acid ratio. These mixtures are much less sensitive to variation of this ratio than are the corresponding sodium hydroxide —oleic acid mixtures.

(Industrial and Engineering Chemistry 28, 1, 60, January, 1936.)

Can Petroleum Compete With the Vegetable Oils? Chemical & Metallurgical Engineering 42, 12, 651 (December, 1935). For soap making, and for many other purposes, coconut oil is almost an essential. No other type of vegetable oil except this, and the closely related oils of other palms, contain the requisite percentage of capric, lauric, and myristic compounds. These acids of 10-, 12-, and 14-carbon chains are essentials for quick lathering, and satisfactory home performance of the soap. Hence it is not merely the preference of the soap maker that includes coconut-oil fatty acids in practically every formula.

Now come the organic chemists and suggest that they can make equivalent fatty acids by controlled oxidation of the corresponding hydrocarbons as found in petroleum. In fact they say that mixtures of hydrocarbons from C_8 to C_{12} or from C_{10} to C_{14} can as a group be so prepared as to be practically equivalent to the coconut-oil fatty acid as far as the soap-maker's requirements are concerned.

Experimentation in this field has not gone far enough to give general conviction. But there is no doubt as to the chemical possibility, almost the chemical probability, of such substitution. Many industries of the United States will be interested. Certainly it will be a tremendous chemical engineering achievement if one may take products of petroleum and the widely available corn and cottonseed oils and produce for the soap-maker fatty acids just as satisfactory as those from the much less abundant coconut oil. An element of domestic security would thus be achieved. And possibly a tremendously enlarged outlet for corn and cottonseed oils might also be effected, to the benefit of our own agriculture.

Sterilization of Oils. Maison G. DeNavarre, American Perfumer and Essential Oil, Review 31, 4, 70 (December, 1936). It is a well-known fact that many oils used in the manufacture of cosmetics can be, and probably are, quite contaminated with spores of bacteria and molds. Coulthard ran a series of experiments to determine if the temperature of 150°C., recommended in the B. P. 1932, was a satisfactory dry heat sterilization process. He found that heating one hour at this temperature did not kill all spores. But heating to an air temperature of 165 to 170°C. did sterilize the oils. The oils lost some color in the process, but the taste was essentially the same. O'Brien and Parish, in the same journal, used a similar technique and found similar results. However, they tried the Tyndallization process (heating to 80°C. for one hour on three successive days), and this was not always a sure method.

Dispersion of Metallic Soaps in Fatty Acids. *Oil and Colour Trades Journal,* 88, 1922, 481 (August 16, 1935). It is generally supposed that metallic soaps, such as driers, etc., can be dispersed more permanently if the medium contains free fatty acids, and the addition of fatty acids to paints and varnishes for the prevention of precipitation of driers has been suggested on more than one occasion. The point has been tested by C. J. Boner ("Ind. Eng. Chem.," 1935, p. 665), who finds from tests with aluminum, calcium and magnesium stearates, aluminum oleate, and lead naphthenate dispersed in the fatty acids of coconut oil, cottonseed oil, tallow, also oleic acid and abietic acid, that fatty acids do not appear to be universal dispersing agents for metallic soaps, although commercial observations on the point may be substantiated by further work. With these mixtures, colloidal dispersions are formed, and not true solutions.

PATENTS

Production Chemical Composition—Triglyceride and Soap Mixture with Strong Acid. U. S. 2,009,796. Benjamin R. Harris, Chicago. Production chemical composition by treating partially saponified triglyceride and soap mixture with strong acid. (Chemical Industries, 37, 3, 264, Sept., 1935.)

Soap; Glycerol. British 423,188, January 28, 1935. Carbinton, Ltd., and John B. E. Johnson. In the manufacture of soap and glycerol by pumping a mixture of saponifiable oil and aqueous solution of saponifying agent under high pressure through a heated narrow reaction tube, e. g., as described in British 367,513 (C. A. 27, 2056), the tube is made of electrically conducting material and is heated by passing an electric current through it. (C. A. 29, 13, 4614, July 10, 1935.)

Bleaching fat acids, oils and fats. The Mathieson Alkali Works. Fr. 778,882, Mar. 26, 1935. Oil, fat, etc., is heated to a point between its m. p. and 100° and an alkali or alk. earth hypochlorite in water is added in successive small amts. sufficient for the desired bleaching. The oil, etc., is cooled before each addn., stirred with the hypochlorite, allowed to settle and finally reheated.