the 0.20% concentration produces low results which may be attributed to lowered surface activity. The results from both combinations in hard water show that maximum effect is reached when the builder concentration was only about 15 percent. Practically all of the combinations gave high pH values.

Summary

Tetrasodium pyrophosphate has been shown to possess the following outstanding advantages as a component in built soaps:

1) Ability to increase suds.
2) Ability to increase detergency.
3) Ability to increase the amount of builder without diminishing the cleansing efficiency of the soap.
4) Low pH for use in household soaps.

Final conclusions as to its value in combination with other builders must await completion of the work on ternary and quaternary combinations which are now under way.

The authors wish to acknowledge the work done by Mr. E. L. Brown who has conducted most of the actual launderometer tests in this investigation.

ABSTRACTS

Oils and Fats

Edited by
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PROCESSING OF RAPE OIL. M. Gordienko. *Fette u. Seifen 46,* 684-5 (1939).

PROCESSING A WHALE. W. Picker. *Fette u. Seifen 46,* 682-3 (1939).

FAT TRAPS FOR WASTE WATER. W. Passavant. *Fette u. Seifen 46,* 583-5 (1939). Several equipments are illustrated and described.

COTTONSEED HULLS AS AN INDUSTRIAL RAW MATERIAL. D. M. Musser and R. F. Nickerson. *Ind. & Eng. Chem. Ind. 31,* 1229-33 (1939). A review.

SEPARATION OF SATURATED FROM UNSATURATED FAT ACID. H. Fiedler. *Fette u. Seifen 46,* 579 (1939). Method of prepg. oleic acid according to Hartusch (*J. Am. Chem. Soc. 61,* 1142-4) yielded the purest product.

ANTIOXIDANTS AND THE AUTOXIDATION OF FATS. F. E. Deatherage and H. A. Mattill. *Ind. and Eng. Chem. 31,* 1325-31 (1939). An apparatus for the study of the autoxidation of fats and related materials has been designed to permit the collection and analysis of the various volatile products formed in the reaction, the measurement of the oxygen consumption, and analysis of the oxidation residue. Oleic acid, oleyl alcohol, methyl oleate, butyl oleate, and cis-9-octadecene appear to be autoxidized in a similar manner to yield the same types of products — among others, peroxides, peracids, aldehydes, substituted ethylene oxides, acids, alcohols, combinations of these, and water.

After the addition of oxygen to form peroxides at the ethylene linkage, these peroxides may cleave to give aldehydes; they may react with another double bond to give two moles of ethylene oxide; or they may aid in the further oxidation of the carbon chain. The aldehydes formed also autoxidize to give peracids and acids.

The oxygen consumption per mole of double bond destroyed is least for oleic acid, most for oleyl alcohol. The amount of oxygen consumed is about the same for methyl oleate and cis-9-octadecene. In each case about one-fourth of the oxygen taken up appears as water.

Oxido derivatives are among the main products of the autoxidation process. When oleic acid is oxidized, oxidooleic acid does not appear as such but is apparently converted to half esters of dihydroxy stearic acid. The oxido derivatives are all of the same geometrical configuration and correspond to the high-melting dihydroxy isomeric derivative of the original substrate in each case.

CHARACTERISTICS AND REACTION PRODUCTS IN GOING TALLOWY. E. Glimm and H. Nowack. *Fette u. Seifen 46,* 632-5 (1939). A review.

IS TRIMETHYLAMINE THE CAUSE OF FISHINESS IN BUTTER? W. Mohr and A. Arbes. *Fette u. Seifen 46,* 678-82 (1939). Efforts to identify trimethylamine in fishy butter were futile. Trimethylamine could be detected when it was added to fresh butter.

DETERMINATION OF PHOSPHATIDES. A. Schramme. *Fette u. Seifen 46,* 635-8 (1939). Briefly the method for detn. of phosphatides in soybeans comprises: extn. with benzol-alc. (80:20) soln., evapg., redissolving in ether, drying with glauber salt, filtering, evapg. and detg. P. The P figure is multiplied by 25.4 to convert to per cent lecithin.

THE COURSE OF THE REACTION IN AUTOCLAVE SPLITTING. L. Lascaray. *Fette u. Seifen 46,* 628-32 (1939). Temp., splitting agent amt. or type can affect the speed of splitting but do not influence the equil. of the reaction. The amount of splitting water increases the limit of the reaction without influencing the speed of the reaction. The splitting reaction in a heterogeneous system is a homogeneous reaction which takes place at the boundaries of the phases. The new theory indicates that splitting agents act through increasing the solubility of water in the fat phase.

THE EFFECT OF COD LIVER OIL AND FISHMEAL ON THE FLAVOR OF POULTRY PRODUCTS. E. M. Cruickshank. *U. S. Egg & Poul. Mag. 45,* 752-4,762 (1939). Two percent of cod-liver oil in the fattening ration or two percent of best quality cod-liver oil plus a 15 per cent level of high grade fishmeal fed for a six-month period up to the time of killing was without detrimental effect on the flavor of the carcasses, either fresh or stored, of Light Sussex chickens. A 15 percent level of low grade fishmeal (fat content 20 percent) plus two percent of cod-liver oil fed for a four-week or six-month period up to killing produced a slight fishy flavor in a few of the fresh carcasses though not in the stored carcasses. Individual differences in the development of fishy flavor on the same ration appear to exist. Eggs from birds fed the high-

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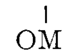
er levels of fishmeal plus two percent cod-liver oil were more susceptible to fish taint than the carcasses, especially with fishmeal of poor quality.

Weight loss of stored margarine. A. Schloemer. *Z. Untersuch. Lebensm. 78,* 138-41 (1939). Loss of 2% in wt. by evapn. of moisture occurred in 1 to 15 weeks in ¼ kg. packaged com. margarines during storage. The wt. loss of the ½ kg. packages was slower.

Oxidation of vegetable drying oils: The ketol and peroxide groupings. R. S. Morrell and E. O. Phillips. *Fette u. Seifen 46,* 541-6 (1939). In the drying of a vegetable oil oxygen is attached to (1) the "remote" double-linkage to give a polymerizable peroxide to which the gel formation is attributed, (2) a "near" double-linkage but at a slower rate and passes gradually to a ketol substance. Any excess of "near" peroxide is indicated by the normal peroxide value. It is suggested that the activity of the unpolymerized peroxide is the cause of the surface condensation of moisture which eventually gives rise to "bloom." Further investigation of a ketol grouping associated with the peroxide grouping has led to the conclusion that a diketosubstance is formed on stoving the film in air; whereas on heating in nitrogen the "remote" peroxide supplies the necessary oxygen. The formation of coloured metallic salts of the enolised diketooxidation product of the type  $X—CO—\underset{OM}{C}=CH—Y$ is the cause of the yellowing of air-dried white paint films. The bleaching of films in sunlight and in air is explained by the decomposition of coloured diketosubstances.

Selective oxidation of unsaturated compounds. II: The quantitative analysis of fat acid mixtures with the aid of selective oxidation, together with a thiocyanogen report on linoleic acid. H. P. Kaufmann and H. Fiedler. *Fette u. Seifen 46,* 569-72 (1939).

Hydrogenation of vegetable oils. II. Conjugated hydrogenation of soybean oil with propyl alcohol. V. A. Rush and I. L. Dvinyaninova. *J. Applied Chem. (U. S. S. R.) 12,* 428-31 (in French, 431) (1939). Soybean oil contg. oleic 20.1, linoleic 71.2 and satd. acids 8.7%, was hydrogenated in the presence of Ni catalysts (Normann's) and PrOH (H donor) by the method previously described. The product contained oleic 74.5, isooleic 4.8, satd. 11.1 and linoleic acids 9.6%, which is nearly the same as that of olive oil, the presence of iso acids in the product being the only difference. The yield of aldehyde formed from PrOH was 21.7% (theory); 17.3% (theory) of aldehyde was decompd. to C_2H_6 and CO and the rest was not accounted for; probably, it reacted with alc. forming acetal or was condensed with C_2H_6. III. Conjugated hydrogenation of oils with various degrees of unsaturation. *Ibid.* 431-6 (in French, 436). — Olive, sunflower, linseed and soybean oils, refined with NaOH (20° Bé.) to acid no. 0.5-0.1 mg. and washed until no trace of soap was present, were hydrogenated in the presence of 24 g. of PrOH per 150 g. of oil and 1% Ni catalyst (Normann's) at 260° for 15 min. The hydrogenation proceeded selectively and terminated at the point when practically all linoleic acid was transformed into oleic acid, except with linseed oil. The solidification of oil was caused by the isomerization of oleic acid, forming elaidic acid. (*Chem. Abs.*)

The relation of phospholipids to fat in dairy products. B. Heinemann. *J. Dairy Sci. 22,* 707-15 (1939). The per cent "lecithin" in various dairy products was found to be as follows: skim milk, 0.015-0.018 per cent; raw whole milk, 0.035-0.036 per cent; skim milk from reseparated cream, 0.035-0.093 per cent; pasteurized sweet cream, 0.066-0.199 per cent; buttermilk, 0.114-0.126 per cent; butter, 0.153-0.212 per cent; separator slime, 0.229 per cent. The results obtained indicate that as the fat content of the product increases, there is an increase in the relative amount of "lecithin" in the plasma and a decrease in the relative amount associated with the fat, except in buttermilk and skim milk from reseparated cream.

The carotenoid content of milk fat. P. F. Sharp and D. B. Hand. *J. Dairy Sci. 22,* 737-41 (1939). The average carotenoid content of the commercial, bottled market milk in New York State was 3.4 mg. per liter of melted fat in winter and 10.1 in summer. The corresponding values for average Holstein milk from the Cornell herd was 3.49 and 5.78; for Jersey milk 5.87 and 10.5 and for Guernsey milk 8.50 and 16.4. Bottled market milk ranged from 1.51 to 7.26 in winter and from 4.85 to 24.6 in summer.

Fish oil fatty acids. A. A. Bat, T. P. Equpov, A. Lavrova and F. Pakhmatulin. *Masleboino Zhirovoe Delo 14,* 5, 21-4 (1939). The optimum conditions for the production of fatty acids from whale and seal oil, and soapstock of dark cottonseed oil by treating the crude fats with caustic soda solutions at elevated pressures were studied. Odorless and colorless fatty acids with low molecular weights were obtained by autoclaving the fats with 100 percent. excess of 9-16° Be. caustic soda at 230° C. for 3 hours. By this method the iodine number is reduced to 95-97 and the products are freed from the fishy odor. Any peculiar odor can be removed completely by salting out the soaps and decomposing with sulfuric acid. The fatty acids are resistant to atmospheric oxygen and give good soaps. (*Chem. Abs.*)

Reesterification of stearic acid ester with higher fatty acids and reesterification of tristearin and triolein. Yosiyuki Toyama. *J. Soc. Chem. Ind., Japan 42,* Supp. binding 218(1939). Heating of an equimol. mixt. of Me stearate and oleic acid at 280° for 2 hrs. caused resterification and about 40% of the oleic acid changed to Me oleate. Heating of an equimol. mixt. of Me stearate and lauric acid caused reesterification and 30-40% of each took part in the reaction. The heating of 1 mol, tristearin and

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2 mols. oleic acid at 280° for 2 hrs. caused reesterification and 50% of oleic acid was changed to triglyceride. Heating of mixts. of tristearin, lauric or behenic acid (1:3 mols) caused reesterification and changed 30-40% of each constituent. The heating of an equimol. mixt. of tristearin and triolein at 280° for 2 hours caused reesterification to give mixed glycerides and the amount of tristearin decreased. (*Chem. Abs.*)

Soap as an egg-substitute. Walter Meyer. *Seifensieder Ztg. 66,* 825-6 (1939). M. reviewed the literature on adding soap to bakery goods ingredients or shortening to make lighter and more moist bake goods. The process was known at least since 1893. This should be considered adulteration. A baker was prosecuted and punished for selling baby-food (Sanitats-Kindernahr-Zwiebackextrakt) in which soap was used as an emulsifier instead of eggs.

PATENTS

Process of refining animal and vegetable oils. B. Clayton et al. *U.S. 2,182,755.* In a continuous system the oil is heated before addition of refining agent.

Composition from rubber and fatty acids and processes of preparing the same. A. W. Ralston and W. M. Selby. *U. S. 2,182,180.* Rubber and fatty acids are condensed in the presence of a Friedel-Crafts reaction product.

Process for manufacturing sebacic acid. H. A. Bruson and L. W. Covert (to Röhm & Haas Co.). *U. S. 2,182,056.* Sebacic acid is prepd. by heating derivs. of ricinoleic acid with alkali under pressure.

Alkyl 12-ketostearate. H. L. Cox (to Union Carbide and Carbon Corp.). *U. S. 2,170,730.* 12-ketostearic is first prepd. from castor oil and this is esterified with an alc.

Process for the dehydrogenation of hydroxy carboxylic acids and esters thereof. W. A. Lazier (to E. I. du Pont de Nemours & Co.). *U. S. 2,178,760.* Example: 3,000 g. of hydrogenated castor oil was heated with 300 g. of Ni-kieselguhr catalyst at 184 to 273°C. for 6 hrs. On separation of reaction products by filtration and crystallization from acetone there was obtained a 65% yield of 12-ketostearin.

Manufacture of fluid phosphatide preparations. K. Braun and R. Rosenbusch (to J. D. Riedel-E. de Haen Akt. ges.). *U. S. 2,168,468.* Fluid phosphatides are prepd. for incorporation into soap by mixing with castor oil fat acids and a small amt. of polyethanolamines.

Thioamides and processes of preparing the same. A. W. Ralston (to Armour & Co.). *U. S. 2,168,847.* Aliphatic thioamides are prepd. by reacting aliphatic nitriles with sulfur and NH_4S in an inert non-aq. solvent. The aliphatic nitriles used in the prepn. are prepd. from fat acids.

Process of concentrating ores. A. W. Ralston and W. O. Pool (to Armour & Co.). *U. S. 2,168,849.* Amines of fat acids are used in the process.

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Soaps

Edited by M. L. SHEELY

Washing sludge from neutralizing glycerol liquor. V. Bukharin and N. Chirkova. *Masloboino Zhirovoe Delo 1939,* (3), 21. A successful procedure has been developed for recovering glycerol by washing filter-press mud in a cyclic autoclave process. A ton of sludge can be washed in 8 hrs., lowering the glycerol content from about 8-9% to 2.5% or less, sometimes as low as 0.8%. Losses from pptn. of sludge and glycerol entrainment are thus greatly diminished in the neutralization of glycerol liquors. (*Chem. Abs.*).

The use of distilled fatty acids in the soap industry. F. Wittka. *Seifensieder-Ztg. 66,* 153,187 (1939). The frequently observed unsatisfactory storage behavior of soaps prepd. from distd. fatty acids has several probable causes, namely, (1) the presence of high proportions of easily oxidized unsaponifiable substances such as sterols in the fatty acids, (2) high isooleic acid content and (3) presence of pro-oxidants, e.g., certain Twitchell reagent components.

Glycerol in paper towels. W. L. Hardenburg. *Paper Mill 62,* No. 7, 22 (1939). A brief discussion of the use of glycerol in tissue paper towels.

A new method for determining caustic alkali in the presence of alkali carbonates in soaps. Cl. Bauschinger. *Fette u. Seifen 46,* 471-2 (1939). The new DGF method is especially superior for detg. small amts. of alkali. A 2:1 mixt. of alc. and cyclohexane is used as a solvent and the titration is carried out at room temp.

The hemolytic action of modern soap substitutes. F. Deichmüller. *Fette u. Seifen 46,* 645-6 (1939). The sulfonated products (Fewa, Igepon, lamepon, etc.) have weaker hemolytic effects than Na-oleate, but, in contrast to soap they are not affected by Ca salts.

The chemical constituents of sulfated oils. R. M. Koppenhoefer. *J. Am. Leather Chemist Assocn. 34,* 622-41 (1939). Extensive analyses of sulfated castor oil, sulfated neatsfoot oil and sulfated cod oil indicated the following facts concerning the sulfation of these oils. Sulfation of castor oil occurs predominantly at the hydroxyl group of ricinoleic