Patented Mar. 11, 1947

2,417,071

UNITED STATES PATENT OFFICE

2,417,071

PREPARATION OF WATER-INSOLUBLE ORGANIC SALTS

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No Drawing. Application August 14, 1943, Serial No. 498,736

11 Claims. (Cl. 260—414)

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The present invention relates to a novel process of preparing metal salts of organic carboxylic acids and, more particularly, to a method for preparing water-insoluble metal salts of monocarboxylic acids, especially aluminum soaps, of desired composition, and to the products of said process.

Various water-insoluble metal soaps, including aluminum soaps, have been used for many years. In general, the prior art prepared them by mixing an aqueous solution of an alkali metal soap with an aqueous solution of a metal salt, whereupon the insoluble soap was precipitated. This precipitate was then filtered off, washed and dried. In a typical method for preparing, for example, an aluminum soap, fatty acids were neutralized with aqueous caustic soda, the resulting aqueous sodium soap solution was warmed, and an aqueous solution of an aluminum salt, say aluminum sulphate, was run into the soap solution. An aluminum soap thereupon precipitated, and this was filtered off and washed with water to remove any soluble salts therein. It was a disadvantage of the method that the composition was very difficult to control; in general, a heterogeneous mixture of mono- and di-fatty acid salts was formed, frequently with fatty acid present. For some uses, the free fatty acid had to be removed in a separate step. The product was often lumpy and exhibited wide variation in particle size, and there was a tendency for the particles to occlude salts in the solution.

Moreover, when employing a mixture of fatty acid soaps in the process, the addition of the aqueous salt solution to a body of soap solution resulted in selective precipitation, the most insoluble aluminum salt precipitating first, and the remaining fatty acid anions being precipitated by the aluminum in the inverse order of their solubility. Since, as a practical matter, the most economical way of obtaining fatty acids is in a mixture corresponding to their proportional occurrence in a natural starting material, the method of preparing aluminum soaps taught by the prior art did not give a uniform and homogeneous blend of the aluminum soap components present in the product. Other methods, including some in which the soap solution was added to the solution of the aluminum salt, have also been employed but these methods also had the aforementioned disadvantages. It will be understood by those skilled in the art that none of these methods was well adapted to continuous operation.

It is an object of the present invention to provide a novel process for preparing metal soaps of predetermined composition.

It is also an object of the invention to provide a new process for preparing an aluminum soap of definite and desired composition.

A further object of this invention is to provide

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a process wherein a uniform blend of metal soaps can be prepared from a mixture of fatty acids or their soluble soaps or esters.

The invention also contemplates the provision of an improved and continuous process for preparing metal soaps in particles of approximately uniform size and substantially free from occluded impurities.

It is also within the contemplation of the invention to provide an aluminum soap of definite composition and of desired physical properties.

Moreover, it is another object of the present invention to provide an aluminum soap in novel form.

According to this invention, a solution of a water-soluble salt of an organic carboxylic acid containing a proportion of hydroxyl desired in the finished metal salt is run into a mixing vessel concomitantly with a solution of a water-soluble metal salt, and the solutions are promptly contacted. The two solutions are run into the mixing vessel at relative rates substantially equal to their theoretical proportion in the finished metal salts. The metal salt precipitates and forms a slurry, which is preferably adjusted to a desired pH value. The slurry is then filtered, washed and dried.

It is a feature of the invention that the ionic constituents of a desired metal soap product are present in the reaction mixture at all times in substantially the exact stoichiometric proportions required for the compound to be prepared. Thus, each material is run into the reaction vessel at a rate which bears an approximately stoichiometric proportion to each of the other materials being run into the vessel. For example, if aluminum di-stearate is to be formed and an aluminum chloride solution is being run into the vessel at a rate equivalent to 1 mol of aluminum chloride per minute, an alkaline solution of sodium stearate would be introduced simultaneously at a rate equivalent to 2 mols of sodium stearate and 1 mol of free sodium hydroxide per minute. In this manner, simultaneous mutual contact of the reactants is provided, so that, at any differential of time, only a minimum of unreacted material is present in the reaction vessel.

This method has particular advantage where a mixture of salts is to be prepared. Frequently a mixture of salts is prepared because it is more convenient to employ a mixture of fatty acids as the starting material. It will be appreciated that fatty acids derived from natural oils and fats are more inexpensively obtained than are the pure acids, so that considerable economies can be introduced when it is practicable to use such fatty acids in a proportion approximately the same as their occurrence in nature in the corresponding glycerides. Aside from this economical feature, it is sometimes desirable to employ mixtures of

fatty acids for the preparation of metal soaps, as such mixed soaps may be valuable in obtaining modified properties for special uses. The step of flowing the reactants together into the reaction vessel in approximately stoichiometric proportions results in substantially complete precipitation of the insoluble metal salts in each differential of time. Accordingly, a uniform blend of metal salts of the various organic acids present is obtained. This is obviously a considerable improvement over the selective precipitation of the prior art.

The process of the invention is adaptable to the preparation of organic salts of any metal except the alkali metals. Most of the benefits of the invention are attainable even when preparing the salts of monovalent metals, such as silver, cuprous copper or mercurous mercury, since even in these cases improved results are obtained in that, with a mixture of anions present, a uniform blend of metal salts is produced, rather than a selective precipitate. Moreover, occluded impurities are kept to a minimum, and undesirable by-products resulting from alkaline or acid hydrolysis reactions are substantially eliminated. The following metals have been found to be suitable for use as the polyvalent cation constituents of the organic salts prepared by the present process: calcium, magnesium, lead, tin, iron, cadmium, bismuth, arsenic, antimony, zinc, aluminum, cupric copper, barium, strontium, mercuric mercury, cerium, titanium, chromium, manganese, cobalt and nickel.

The water-soluble salts of organic carboxylic acids employed in the present process may comprise salts, especially sodium and potassium salts, of any acid which gives a substantially water-insoluble salt with the particular metal used, and such salts may be conveniently formed by neutralization of the acids (or saponification of the corresponding glycerides) with a suitable alkaline material. The aliphatic (including alicyclic) monocarboxylic acids are particularly suitable for the reaction, especially the fatty acids having about eight to about twenty-six, and preferably about twelve to about twenty, carbon atoms per molecule. Among the carboxylic acids, the metal salts of which may be prepared by the present process, are myristic acid, palmitic acid, benzoic acid, abietic acid, naphthenic acid, acetic acid, isobutyric acid, caproic acid, undecylenic acid, undecanoic acid, glyceric acid, sulphoacetic acid, linoleic acid, hevacosanoic acid, oxalic acid, citric acid, sulphosuccinic acid, chloracetic acid, furoic acid, chlorpropionic acid, nicotinic acid, melissic acid or mixtures of these acids. The fatty acids available for use in the present process include lauric acid, oleic acid, ricinoleic acid, stearic acid, myristic acid, palmitic acid, linoleic acid, mixed coconut oil fatty acids, mixed tallow fatty acids or mixtures of these acids.

The process of the invention is adaptable to the preparation of metal salts of mixed organic acids, wherein each molecule of the salt comprises a polyvalent metal cation constituent and at least two types of anion constituents. The metal cation constituent of the salt product has at least one valence attached to a carboxylic acid anion constituent and at least one valence attached to the anion constituent of another organic acid. Such other organic acid may be another carboxylic acid (as set forth supra) or other carbylic acid, including dithionic and carbazylic acids; and organic-substituted, polybasic, inorganic acids may be suitably employed, including acids wherein the organic part of the group may be aromatic, aliphatic, alicyclic or heterocyclic, monobasic or polybasic, saturated or unsaturated, straight or branched chain, substituted or unsubstituted, and the inorganic acid part of the group is preferably an oxygen-containing acid anion, including sulphates and sulphonates, borates and sulpho-borates, ortho-, tetra- pyro- and polymetaphosphates, phosphites, etc.

Careful control of the proportion of free alkali employed in the reaction mixture is important in the process. The free alkali may be introduced as caustic alkali, soda ash, sodium bicarbonate, ammonium hydroxide or other alkaline agents, but is conveniently calculated as free sodium hydroxide. Although the ratio of water-soluble metal salt to free alkali or the ratio of acid to water-soluble metal salt has a bearing upon the nature of the product, it has now been found that changes in the ratio of acid to free alkali are particularly important in determining the properties and characteristics of the water-insoluble metal salt product.

In the preparation of aluminum soaps, for example, by reacting a sodium soap solution containing free sodium hydroxide with a solution of aluminum sulphate, the free alkali in the ratio refers to excess sodium hydroxide present in the soap solution, without regard to the sodium hydroxide combined as neutral soap, while the acid of the ratio is the combined fatty acid and is calculated as fatty acids, not as soap.

The pH of the reaction mixture will, of course, be dependent in large part upon the proportion of free alkali employed. Thus, in the case of aluminum soaps, since more alkali is required for the formation of a dihydroxy soap than for the preparation of a monohydroxy soap, the pH of the mixture is normally higher in the former case than in the latter. For certain purposes, a mixture of mono- and di-hydroxy aluminum soaps is prepared, and it is a feature of the invention that a desired composition of mono- and di-hydroxy soaps, whether of a single fatty acid or of a mixture of fatty acids, can be provided; such compositions can then be reproduced at will in the present simultaneous mutual contacting process by reproducing the same proportions of reactants.

If desired, any given composition can be reproduced on a large scale by a simple modification of this method. The pH of a reaction mixture of desired composition is ascertained, and thereafter a soap solution containing a soluble soap and free alkali in required proportion and a metal salt solution of approximately required strength proportional to the soap solution are used. A pH meter or indicators can be employed to control the proportioning of the two solutions and thereby to provide the desired composition in the reaction vessel.

One of the forms in which metal soaps, especially aluminum soaps, are commonly used is as a gel. Such gels are prepared by contacting a substantially anhydrous metal soap with a suitable vehicle, such as alcohols, ethers, esters and hydrocarbons. The gelling tendency is more pronounced in admixture with hydrocarbons, and aliphatic hydrocarbons produce, in general, stiffer gels than do aromatic hydrocarbons. It has now been found that the ratio of fatty acid to free alkali (i. e., alkali reserve) in the soap solution and the pH at which the product is prepared are controlling factors in determining the

physical characteristics of the gel produced, as well as its time of setting.

Aluminum soaps produced by the process of the invention are capable of taking up an amount of a light petroleum fraction of about the order of twenty times their own weight. When a suitable aluminum soap is prepared from a mixture of equal parts by weight of naphthenic acid, oleic acid and the fatty acids of coconut oil on the basis of a fatty acid-free alkali ratio of about 15 to about 20, and preferably about 16.5 to about 19.0, admixture of the soap with a gasoline petroleum fraction gives a clear adhesive and plastic gel; the pH value of the reaction mixture is usually of the order of about 7.5. A fast-setting gel which is lacking in plasticity and adhesiveness and which crumbles easily may be formed in the same manner with sufficient free alkali present to give a fatty acid-free alkali ratio below about 15; in general, a pH of about 8.5 is appropriate for this reaction mixture. Aluminum soaps thus prepared are granular and are suitable for many uses, including cosmetics. When employing soaps prepared by the process of the present invention, it is noteworthy that clear, unclouded gels can be produced. When using fatty acid-free alkali ratios appreciably below 15 for the preparation of the aluminum soap, gels formed therefrom tend to lack cohesiveness, discrete and swollen particles being obtained. With the ratio of fatty acid to free alkali above about 19.5, a sticky aluminum soap is produced, and, with said ratio above about 20, a product of rubbery consistency is obtained. In all of these cases, the pH of the slurry is adjusted to about 5.5 after reaction to induce coagulation of the aluminum soap, as will be described infra.

After precipitation of the desired metal salt, say an aluminum soap, it is preferred to acidify the reaction mixture for the purposes of coagulating the precipitate and of destroying any slight excess of soluble salt, such as sodium soap, which might still be present. An adjustment of the pH thus results in a soap having an open, grainy structure, which can be readily filtered and washed. In selecting an acid for acidification of the reaction mixture, an acidic material stronger than the fatty acid of the soap formed is used. Such acidic material includes mineral acids, many organic acids, and various inorganic salts. The following acids have proved satisfactory for this purpose: acetic acid, hydrochloric acid, sulphuric acid, etc. Among the acidic salts which may be employed are those which are useful as starting materials for providing the metallic cation of the product, such as (in the case of aluminum soap) aluminum chloride, aluminum sulphate, aluminum acetate, etc., corresponding acid-acting, water-soluble salts of other metals also being suitable. The acidification of the reaction mixture permits greater facility in handling the precipitate, as mentioned supra in connection with the washing operation, since, if the pH is not adjusted, the metal salt product has a tendency to clog in the filters. In general, it is preferred to reduce the pH to below 6.5, say to a value of about 5 to about 6, although lower and higher values have also been found satisfactory, depending upon the product desired.

In continuous operation, it is desirable to provide a period of ageing after final pH adjustment (i. e., after acidification) as an aid to the filtering and washing operations. About five to fifteen minutes is sufficient for this purpose, and about ten to twelve minutes' ageing has given

particularly satisfactory results. Although a longer ageing period than fifteen minutes appears to have little, if any, effect on the efficiency of the filtering or washing operations, a further period of ageing, either before or after filtration and washing, is preferably employed as an aid to the drying operation. Such additional ageing may vary widely in time, and improvements in drying have been observed for ageing periods from twenty minutes to twenty hours and longer.

After acidification, with or without ageing, the precipitated salt is separated from the solution by any means desired, such as filtration, centrifuging, settling and decantation, etc. The precipitate is thoroughly washed with water and is then dried in any of several ways. It has been found that the product of the present process is more adaptable to certain drying procedures than was the prior art product. The method of drying is selected which is best adapted to the physical form in which it is desired to provide the product, and it may be produced, after re-slurrying, as spray-dried particles, or may be extruded in filaments, or may be roll-dried into sheets or ribbons. The product in any of these forms may be passed to drying trays or conveyors for further drying, or the grain, as filtered and without intermediate drying, may be spread directly on said trays or conveyors.

The following examples are merely illustrative of the present invention, and it will be understood that the invention is not limited thereto.

Example I

An aqueous solution containing 27.4 grams of potassium hydroxide in 440 cubic centimeters of water is reacted with 100 grams of oleic acid. After the oleic acid is neutralized and goes into solution, the volume is diluted with water to 900 cubic centimeters. A solution containing 24.8 grams of aluminum sulphate in 900 cubic centimeters of water is prepared, and the two solutions are run simultaneously into a mixing vessel furnished with an agitator, equal volumes of the solutions being run into the vessel in unit time. The slurry formed has a pH of 7.4, and, after all of the two solutions have been introduced, additional aluminum sulphate solution is added to lower the pH to 5.5. The precipitate, now coarse and grainy, is transferred to a Buchner funnel and is there filtered and washed with water. The washed precipitate is spread out to dry and comprises an improved aluminum oleate soap. The product is a white, granular solid having a waxy texture.

Example II

A solution containing a mixture in approximately equal parts by weight of sodium naphthenate, sodium oleate and the sodium soaps of the mixed fatty acids of coconut oil and containing excess sodium hydroxide is run into an open reaction pot at a rate equivalent to about 23 parts by weight of soap and about 1.3 parts by weight of sodium hydroxide per minute. Simultaneously, an aqueous solution of aluminum sulphate is also run into the pot at a rate equivalent to 11.1 parts of anhydrous aluminum sulphate per minute. The two solutions are contacted in the pot with the aid of strong agitation, which thoroughly mixes the incoming reactants. There the reaction is brought to substantial completion, and the aluminum soaps are precipitated, sodium sulphate being dissolved in the liquid portion of the mixture. The mixture, which has a pH of 7.5, continuously overflows into a mixing vessel, and

a sufficient amount of the aluminum sulphate solution is run into this vessel to reduce the pH to a value of 5.5 After approximately six minutes in the mixing vessel, the overflow passes to an ageing tank, in which it is retained for an additional six minutes. It then passes to the filter surface of a continuous belt filtering device. Water is sprayed upon the soap on the moving surface, and the precipitated soaps are thoroughly washed thereby. They are subjected to vacuum filtration, which removes water and soluble impurities from the precipitate through the filter body.

The filtered aluminum soap passes to a set of rolls, where a further quantity of water is squeezed out and where the soap is spread into a thin sheet and is cut into ribbons. The ribbons are spread upon a conveyor of a continuous drying device. and the aluminum soap passes through the dryer in about twenty minutes at a temperature of some 210° C. The dried soap, having a moisture content of 0.3%, is then pulverized. The product is light tan in color, is granular in form and has a rubbery consistency. When contacted with gasoline, it swells in a short time (about three minutes) to form a clear, homogeneous, adhesive and plastic gel.

Example III

About 100 grams of fatty acids comprising equal parts by weight of (*a*) naphthenic acid, (*b*) oleic acid and (*c*) the mixed fatty acids of coconut oil are stirred into an aqueous solution containing 17.65 grams of sodium hydroxide. The acids are neutralized and go into solution, and thereafter the volume of the solution is made up to 660 cubic centimeters. An aqueous solution of 25.2 grams of aluminum sulphate is also made up to 660 cubic centimeters with water, and the two solutions are simultaneously run into a fixing vessel at substantially equal volumetric rates. The solutions are promptly and thoroughly contacted with the aid of stirring, and the resulting slurry has a pH of 7.2. After running in the materials, the pH is reduced to 5.1 by the introduction of additional aluminum sulphate solution. The product is in the form of rubbery curds of creamy color.

Example IV

Following the procedure of Example III, 90 grams of the mixture of fatty acids described in Example III are added to an aqueous solution containing 22.4 grams of sodium hydroxide, and the solution is diluted with water to 600 cubic centimeters. An aqueous solution of 28.8 grams of aluminum sulphate in 600 cubic centimeters is also made up, and the two solutions are simultaneously run together into a mixing vessel at equal volumetric rates and are there promptly contacted. A slurry having a pH value of 7.6 is formed, and additional aluminum sulphate solution is introduced to reduce the pH to 5.5. A very fine, white precipitate is formed, and, on transfer to a Buchner funnel, the precipitate filters very slowly, some of the material passing the filter. The precipitate is found to be easily washed and is then dried. Upon contacting the dried product with gasoline, a setting time for formation of a gel of some fifty minutes is required, and the resulting gel is very short, lacking plasticity and cohesiveness.

Example V

Following the procedure of Example III, 75 grams of the mixture of fatty acids described in

Example III are added to an aqueous solution containing 18.3 grams of sodium hydroxide, and after neutralization and solution of the acids, sufficient water is added to bring the volume to 600 cubic centimeters. An aqueous solution of 24.95 grams of anhydrous ferric chloride is also made up to 600 cubic centimeters, and the two solutions are simultaneously run into a mixing vessel at equal volumetric rates. The materials are promptly and thoroughly contacted, and the resulting slurry has a pH value of 7.5. Additional ferric chloride solution is added to the slurry in sufficient amount to reduce the pH to 5.5. The material is then transferred to a Buchner funnel, where it is filtered and washed. The resulting iron soap product is composed of dark brown grains of substantially uniform size.

Various metal salts of this invention can be used for many purposes. They may be employed as and for greases and other lubricants; varnish bases; paints, including pigments and fillers; paint driers; siccatives; thickeners; printing inks; wax stencil papers; rubber substitutes and other compositions for molded articles, such as phonograph records; gels for solid fuels, wave setting, and other uses; fillers for paper; sizing compositions for paper, wallboard, etc.; linoleum; water-proofing compositions; coating compositions for metals, enamels, linoleum, wood, stone, paper, electrodes, glass, bricks and concrete, etc.; fire preventive compositions; compositions for the prevention of fogging; insulating compositions; frothing agents in the flotation of ores; emulsifying agents; textile sizing agents for glass fibre, cotton, silk or other woven or matted fabrics; flexibilizing agents for fabrics; impregnating agents for fibre containers; egg preserving compositions; stuffing compositions for gaskets and diaphragms, and like agents.

Reference is made under the provisions of Rule 43 of the Rules of Practice in the U. S. Patent Office to our co-pending divisional application Serial No. 695,554, filed September 7, 1946, "Aluminum soaps and their preparation."

Although the present invention has been described with reference to particular embodiments and examples, it will be apparent to those skilled in the art that variations and modifications of this invention can be made and that equivalents can be substituted therefor without departing from the principles and true spirit of the invention.

We claim:

1. A process for preparing metal salts of organic carboxylic acids which comprises contacting an aqueous solution of a salt of an organic carboxylic acid with an aqueous solution of a water-soluble salt of a metal giving a substantially water-insoluble salt of said organic carboxylic acid, and maintaining the ionic constituents of said water-insoluble salt in the contacting solutions in substantially stoichiometric proportions.

2. A process for preparing polyvalent metal salts of organic monocarboxylic acids which comprises contacting a stream of an aqueous solution of a salt of an organic monocarboxylic acid containing free alkali with a stream of an aqueous solution of a water-soluble salt of a polyvalent metal giving a substantially water-insoluble salt of said organic monocarboxylic acid, said streams being mutually contacted at relative rates approximately equal to their stoichiometric proportions in a desired reaction, whereby a slurry containing a precipitated substantially water-insolu-

ble metal salt of the organic monocarboxylic acid is formed.

3. A continuous process for preparing polyvalent metal salts of organic monocarboxylic acids which comprises establishing a slurry containing a precipitated substantially water-insoluble polyvalent metal salt of an aliphatic monocarboxylic acid, introducing into said slurry at approximately equivalent predetermined stoichiometric rates aqueous solutions of a salt of an aliphatic monocarboxylic acid, an alkaline agent and a water-soluble salt of a polyvalent metal which reacts with the water-soluble salt of the aliphatic monocarboxylic acid to produce a substantially water-insoluble salt of said aliphatic monocarboxylic acid and the polyvalent metal, said water-soluble polyvalent metal salt solution being introduced into the slurry separately from the solution of the salt of the aliphatic monocarboxylic acid, removing a portion of said slurry, and recovering the precipitated polyvalent metal salt from said removed slurry.

4. A continuous process for preparing polyvalent metal salts of aliphatic monocarboxylic acids which comprises establishing a slurry containing a precipitated substantially water-insoluble polyvalent metal salt of an aliphatic monocarboxylic acid, continuously introducing into said slurry at approximately equivalent stoichiometric rates and with agitation an aqueous solution of a salt of an aliphatic monocarboxylic acid containing free alkali and an aqueous solution of a water-soluble salt of a polyvalent metal which reacts with the water-soluble salt of aliphatic monocarboxylic acid to produce a substantially water-insoluble salt of said aliphatic monocarboxylic acid and the polyvalent metal, continuously removing a portion of said slurry, slightly acidifying said removed slurry to a pH below about 6.5, filtering said acidified slurry to recover the precipitated polyvalent metal salt of the monocarboxylic acid, and washing and drying said precipitated salt.

5. A continuous process for preparing polyvalent metal salts of aliphatic monocarboxylic acids which comprises establishing a slurry containing a precipitated substantially water-insoluble polyvalent metal salt of an aliphatic monocarboxylic acid, continuously introducing into said slurry at approximately equivalent stoichiometric rates and promptly contacting aqueous solutions of a salt of an aliphatic monocarboxylic acid, an alkaline agent and a water-soluble salt of a polyvalent metal giving a substantially water-insoluble salt of said aliphatic monocarboxylic acid, at least said polyvalent metal salt solution being separately introduced, continuously removing a portion of said slurry at a volumetric rate approximately equal to the volumetric rate of introduction of said aqueous solutions, continuously acidifying said removed slurry to a pH of about 5 to about 6, filtering said acidified slurry to recover the precipitated polyvalent metal salt, and washing and drying said precipitated salt.

6. The process set forth in claim 5 wherein a time interval of at least five minutes is provided between the steps of acidifying and filtering the removed slurry.

7. A continuous process for preparing metal soaps which comprises establishing a slurry containing a precipitated substantially water-insoluble polyvalent metal soap of a fatty acid having about twelve to about twenty carbon atoms per molecule, continuously agitating the slurry, continuously introducing into said slurry at approximately equivalent stoichiometric rates an aqueous solution of a water-soluble salt of said fatty acid containing free alkali and an aqueous solution of a water-soluble salt of the polyvalent metal, continuously removing a portion of said slurry, slightly acidifying said removed slurry to a pH below about 6.5, filtering the acidified slurry to remove the precipitated polyvalent metal soap, and washing and drying said precipitated metal soap.

8. The process set forth in claim 7 wherein the slurry established contains a precipitated substantially water-insoluble ferric soap of a fatty acid having about twelve to about twenty carbon atoms per molecule and wherein the aqueous solution of a water-soluble salt of a polyvalent metal introduced into said slurry is an aqueous solution of a water-soluble ferric salt.

9. The process set forth in claim 7 wherein the slurry established contains a precipitated substantially water-insoluble cupric soap of a fatty acid having about twelve to about twenty carbon atoms per molecule and wherein the aqueous solution of a water-soluble salt of a polyvalent metal introduced into said slurry is an aqueous solution of a water-soluble cupric salt.

10. The process set forth in claim 7 wherein the slurry established contains precipitated zinc stearate and wherein the aqueous solutions introduced into said slurry are the aqueous solution of a water-soluble salt of stearic acid containing free alkali and the aqueous solution of a water-soluble zinc salt.

11. A process of producing water-insoluble polyvalent metal salts of aliphatic monocarboxylic acids having predetermined chemical compositions and characteristics which comprises contacting a stream of an aqueous solution of a salt of an organic monocarboxylic acid with a stream of an aqueous solution of a salt of a polyvalent metal giving a substantially water-insoluble salt of said organic monocarboxylic acid, said streams being contacted, at a rate in which the polyvalent metal in the polyvalent metal salt and the monocarboxylic acid radical are equal to their proportion in the desired product, stirring the streams upon contact, acidifying the reaction mass and separating the precipitated polyvalent metal salt of the monocarboxylic acid from the solution.

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