

UNITED STATES PATENT OFFICE

2,383,737

DETERGENT COMPOSITION

Albert S. Richardson, Wyoming, Ohio, assignor to
The Procter & Gamble Company, Cincinnati,
Ohio, a corporation of Ohio

No Drawing. Application February 18, 1942,
Serial No. 431,447

16 Claims. (Cl. 252-152)

The present invention relates to cleansing and washing compositions of improved efficiency and to the process of producing the same.

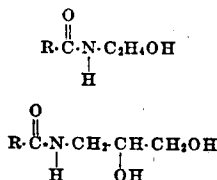
It is an object of my invention to improve the cleansing efficiency of detergents of the class consisting of water-soluble salts of sulfonic acids, alkyl sulfuric acids, and sulfuric acid esters of polyhydric alcohols incompletely esterified with fatty acids of high molecular weight.

Further objects will be apparent from the following description.

Wide use has been made of oils and related water-insoluble compounds in aqueous detergent solutions for the finishing of textiles, but such materials have been little used for enhancing the detergent effect. Such materials are more likely to have the opposite effect in laundering operations and act like an additional load of oily soiling material. A notable exception, and the only important example of the practical use of an organic material to "build" or improve the cleansing efficiency of a detergent, as far as I know, is the use of higher alcohols with water-soluble salts of sulfuric acid esters of higher alcohols.

I have found that certain compounds closely related to each other are outstandingly effective for increasing the cleansing action of detergents of the class consisting of water-soluble salts of sulfonic acids, alkyl sulfuric acids, and the acid sulfate esters of polyhydric alcohols incompletely esterified with higher fatty acids. These compounds are the ethanolamides and glycerolamides of fatty acids having twelve to fourteen carbon atoms in the acyl radical. By themselves these materials are of no value as laundering agents for use in water solution, but in admixture with a larger quantity of a detergent of the class named above they markedly enhance the detergent effect thereof. For this purpose these alkylolamides are decidedly superior to the amide preparations which have heretofore been proposed for use for various purposes with water-soluble detergents, as far as I am aware.

The enhancing agents which I employ may be represented by the following formulas:



in which R·CO represents the acyl radical of a fatty acid having twelve to fourteen carbon atoms. Specific compounds are the ethanolamides and glycerolamides of lauric and myristic acid and the corresponding alkylolamides of mixtures of fatty acids consisting predominantly of lauric and/or myristic acids such as those obtainable

from oils of the coconut oil group, of which coconut oil and palm kernel oil are well known examples.

The invention is applicable to the improvement of all the detergents coming within the classes above mentioned, the advantage of the invention being the improvement of sulfates and sulfonates already characterized by substantial power to cleanse rather than the conferring of cleansing power on reagents which are inactive in this respect.

Important examples of detergent compounds with which the above alkylolamides may be used with advantage are the water-soluble salts of the higher alkyl sulfuric acids where the only restriction on the alkyl radical is that it be chosen so as to insure a distinct detergent effect in use. Thus the invention is applicable to the improvement of the already known detergents in which the principal active constituent is a water-soluble salt of lauryl or oleyl sulfuric acid, for example, triethanol ammonium alkyl sulfate from the mixed higher alcohols obtainable by reducing coconut oil or the sodium alkyl sulfate derived from the higher alcohols of sperm oil, but the invention does not afford a means of making a practical detergent out of an initially inactive compound as regards detergency, such as sodium butyl sulfate.

In addition to the alkyl sulfate detergents specifically mentioned above, water-soluble salts of other alkyl sulfuric acids having decided detergent value and having eight to eighteen carbon atoms in the alkyl radical are improved by the addition of the alkylolamides herein covered. Especially are these alkylolamides useful in improving the detergent power of the salts of those alkyl sulfuric acids derived from a mixture of higher alcohols obtained from oils of the coconut oil group such as coconut oil, palm kernel oil, etc.

Water-soluble salts of sulfonic acids which are detergents in their own right are also improved in cleansing power by the incorporation of a smaller amount of the alkylolamides mentioned above. Examples of such detergents are the water-soluble salts of the following:

1. Higher fatty acid monoesters of lower molecular weight alkylol sulfonic acids, such as the oleic acid ester of the sodium salt of isethionic acid or the coconut oil fatty acid monoester of 1,2 dihydroxy propane 3 sodium sulfonate (more commonly referred to as monoglyceride sulfonate).

2. Higher fatty acid amides of low molecular weight aminoalkyl sulfonic acids, such as the ammonium salt of the oleic acid amide of methyl taurine.

3. Higher fatty alcohol esters of sulfocarboxylic acids, such as the sodium salt of lauryl sulfacetacetic acid.

4. Higher alkylated benzene sulfonic acids, such as the potassium salt of the sulfonic acid derived from the condensation product of benzene and a chlorinated kerosene fraction containing predominantly twelve carbon atoms.

5. Higher fatty alcohol ethers of lower hydroxy alkyl sulfonic acids such as the lauryl ether of 1,3 dihydroxy propane 3 sodium sulfonate.

The third class of detergents which are enhanced by the addition of the ethanolamides and glycerolamides covered by this invention includes the water-soluble salts of the sulfuric acid esters of polyhydric alcohols incompletely esterified with fatty acids of high molecular weight, that is, those having 10 to 18 carbon atoms and especially those having 10 to 14 carbon atoms. The most common example of this type of detergent is the sodium salt of the sulfuric acid ester of coconut oil monoglyceride.

The optimum ratio of alkylolamide to sulfate or sulfonate compound varies with the specific combination of ingredients. The quantity of alkylolamide for best results is from about 10 to about 40 per cent of the weight of the active detergent in practically all cases, usually from about 15 to about 30 per cent, but marked improvement can be obtained with smaller proportions and larger proportions. For truly economical operation the weight of the alkylolamide should not exceed the weight of the active detergent, even though the sudsing and cleansing effect of a given weight of such a mixture consisting predominantly of the alkylol amide might in some cases exceed that of the same weight of the pure sulfate or sulfonate detergent.

The invention will more clearly be understood from the following examples, but these are merely illustrative of the manner in which my invention may be practiced and are not to be construed as limitations.

Example 1.—To 90 parts of commercial sodium alkyl sulfate (37.5% active ingredient) prepared from the higher alcohols obtained by the reduction of coconut oil are added 10 parts of lauric glycerolamide. This mixture contains the glycerolamide and active alkyl sulfate in the ratio of 1 to about 3.4 and may be employed as a detergent product in washing operations with highly satisfactory results as to detergent efficiency, superior to those results obtained by the use of the alkyl sulfate alone.

Example 2.—To 95 parts of the sodium salt of alkyl benzene sulfonic acid (the salt of the product of the sulfonation of the condensation product of benzene and the chlorinated fractions of kerosene having 11 to 13 carbon atoms) containing 35% active constituent are added 5 parts of the ethanolamide of coconut oil thus giving a mixture containing the active constituents in the ratio of 1 ethanolamide to about 6.6 detergent. The mixture is superior to the original detergent in cleansing operations.

Example 3.—A superior detergent is prepared by mixing 90 parts of a commercial detergent containing as the active ingredient 40% of the coconut oil fatty acid ester of sodium isethionate with 10 parts of lauric ethanolamide.

Example 4.—A highly efficient cleansing agent is prepared by mixing 90 parts of the commercial detergent employed in Example 1 with 10 parts of myristic ethanolamide.

Example 5.—To 90 parts of the commercial detergent employed in the Examples 1 and 4 are added 10 parts of lauric ethanolamide. The mixture thus made is far superior in washing power

to the commercial detergent without the lauric ethanolamide.

Example 6.—A superior washing agent is prepared by mixing 90 parts of a commercial detergent containing as the active ingredient 29% of the sodium salt of the sulfuric acid ester of coconut oil monoglyceride with 10 parts of the ethanolamide derived from coconut oil.

I have repeatedly referred to the superior washing power of detergents prepared in accordance with my invention. This superiority is real and represents a source of substantial saving in detergent usage. For example, detergents such as those of the above specific examples, that is, commercial detergent in admixture with alkylolamide, when employed in 0.2 per cent concentration in hard water, a normal concentration used in laundering, will wash much whiter than any concentration of the commercial detergent without added alkylolamide. It follows that the same amount of cleansing can be effected with a much lower concentration of those detergents prepared in the manner disclosed herein.

My invention is not limited to any particular method of mixing the alkylolamides with the sulfate and sulfonate detergents. They may be incorporated in the detergent in any of the forms in which the detergents are manufactured. The alkylolamide may be mechanically mixed in; it may be crutched into the detergent in the form of a slurry; and it may be dissolved in a solution of the detergent. While such ready for use mixtures may be manufactured and may be preferable for many purposes, it is likewise within the scope of my invention to add the alkylolamide to water prior to the adding of the detergent or vice versa, or to add both detergent and builder simultaneously but separately to the water.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A cleansing composition comprising essentially a mixture of a detergent having pronounced detergent power and selected from the group consisting of water-soluble salts of: organic sulfonic acids, alkyl sulfuric acids, and sulfuric acid esters of polyhydric alcohols incompletely esterified with a fatty acid of high molecular weight, and an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of fatty acids having twelve to fourteen carbon atoms, the amount by weight of the alkylolamide being less than the amount by weight of the water soluble salt but sufficient to enhance the detergent power thereof.

2. A cleansing composition comprising essentially a mixture of a detergent having pronounced detergent power and selected from the group consisting of water-soluble salts of: organic sulfonic acids, alkyl sulfuric acids, and sulfuric acid esters of polyhydric alcohols incompletely esterified with a fatty acid of high molecular weight, and an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of lauric and myristic acids, the amount by weight of the alkylolamide being less than the amount by weight of the water soluble salt but sufficient to enhance the detergent power thereof.

3. A cleansing composition comprising essentially a mixture of a detergent having pronounced detergent power and selected from the group consisting of water-soluble salts of: organic sulfonic acids, alkyl sulfuric acids, and sulfuric acid esters of polyhydric alcohols incompletely esterified with a fatty acid of high molecular weight,

and an alkylolamide mixture selected from the group consisting of an ethanolamide mixture and a glycerolamide mixture derived from a mixture of fatty acids obtained from an oil of the coconut oil group and consisting predominantly of lauric and myristic acids, the amount by weight of the alkylolamide mixture being less than the amount by weight of the water soluble salt but sufficient to enhance the detergent power thereof.

4. A cleansing composition comprising essentially a mixture of a detergent having pronounced detergent power and selected from the group consisting of water-soluble salts of: organic sulfonic acids, alkyl sulfuric acids, and sulfuric acid esters of polyhydric alcohols incompletely esterified with a fatty acid of high molecular weight, and from about ten per cent to about forty per cent by weight based on the water soluble salt, of an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of fatty acids having twelve to fourteen carbon atoms.

5. A cleansing and laundering composition comprising essentially a mixture of a water soluble salt of an alkyl sulfuric acid having eight to eighteen carbon atoms in the alkyl radical, the said water soluble salt having pronounced detergent power, and an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of fatty acids having twelve to fourteen carbon atoms, the amount by weight of the alkylolamide being less than the amount by weight of the water soluble salt but sufficient to enhance the detergent power thereof.

6. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having 8 to 18 carbon atoms in the alkyl radical and having pronounced detergent power, and an alkylolamide mixture selected from the group consisting of an ethanolamide mixture and a glycerolamide mixture derived from a mixture of fatty acids obtained from an oil of the coconut oil group and consisting predominantly of lauric and myristic acids, the amount by weight of the alkylolamide mixture being less than the amount by weight of the alkyl sulfate detergent but sufficient to enhance the detergent power thereof.

7. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil, and an ethanolamide of the mixture of fatty acids obtained from coconut oil and consisting predominantly of lauric and myristic acids, the amount by weight of the ethanolamide being less than the amount by weight of the alkyl sulfate detergent but sufficient to enhance the detergent power thereof.

8. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil, and lauric ethanolamide, the amount by weight of the lauric ethanolamide being less than the amount by weight of the alkyl sulfate detergent but sufficient to enhance the detergent power thereof.

9. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the re-

duction of coconut oil, and myristic ethanolamide, the amount by weight of the myristic ethanolamide being less than the amount by weight of the alkyl sulfate detergent but sufficient to enhance the detergent power thereof.

10. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil, and a glycerolamide of a mixture of fatty acids consisting predominantly of lauric and myristic acids, the amount by weight of the glycerolamide being less than the amount by weight of the alkyl sulfate detergent but sufficient to enhance the detergent power thereof.

11. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil, and about 15 to about 30 per cent by weight based on the alkyl sulfate detergent, of an ethanolamide of the mixture of fatty acids obtained from coconut oil and consisting predominantly of lauric and myristic acids.

12. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil and about fifteen to about thirty per cent by weight based on the alkyl sulfate detergent, of lauric ethanolamide.

13. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil and about fifteen to about thirty per cent by weight based on the alkyl sulfate detergent, of myristic ethanolamide.

14. A cleansing composition comprising essentially a mixture of a water-soluble alkyl sulfate detergent having pronounced detergent power and derived from higher alcohols obtained by the reduction of coconut oil and about fifteen to about thirty per cent by weight based on the alkyl sulfate detergent, of a glycerolamide of a mixture of fatty acids consisting predominantly of lauric and myristic acids.

15. A cleansing and laundering composition comprising essentially a mixture of a water-soluble salt of the coconut oil fatty acid mono-ester of 1,2 dihydroxy propane 3 sulfonic acid, which water-soluble salt has pronounced detergent power, and an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of fatty acids having 12 to 14 carbon atoms, the amount by weight of the alkylolamide being less than the amount by weight of the water-soluble salt but sufficient to enhance the detergent power thereof.

16. A cleansing and laundering composition comprising essentially a mixture of a water-soluble salt of the sulfuric acid ester of coconut oil monoglyceride, which water-soluble salt has pronounced detergent power, and an alkylolamide selected from the group consisting of ethanolamides and glycerolamides of fatty acids having 12 to 14 carbon atoms, the amount by weight of the alkylolamide being less than the amount by weight of the water-soluble salt but sufficient to enhance the detergent power thereof.

ALBERT S. RICHARDSON.