

1

3,346,503

HEAVY-DUTY LIQUID DETERGENT EMULSION COMPOSITIONS AND PROCESSES FOR PREPARING THE SAME

James M. Huggins, St. Ann., Mo., assignor to Monsanto Company, a corporation of Delaware
No Drawing. Filed Oct. 11, 1963, Ser. No. 315,704
12 Claims. (Cl. 252-106)

The present invention relates to improved heavy-duty liquid detergent emulsion compositions and processes for preparing the same, and, more particularly, to heavy-duty liquid detergent emulsion compositions having incorporated therein a bacteriostatic agent and to processes for incorporating a bacteriostatic agent into heavy-duty liquid detergent emulsion compositions.

Because bacteriostatic agents which are substantive to cloth afford protection against bacteria that cause odors and infections, liquid detergent compositions can be materially enhanced if they contain such agents. The polyhalogen substituted carbanilides are particularly effective bacteriostatic agents which are known to be substantive to cloth. However, these compounds are practically insoluble in water and have the tendency under certain conditions, such as high temperatures, to degrade and form toxic products. It is known that the polyhalogen substituted carbanilides are soluble to some extent in certain types of liquid organic detergent actives, although these detergent actives are not as effective as built or heavy-duty type liquid detergent compositions. By built or heavy-duty liquid detergent compositions are meant those compositions which contain certain additives which enhance the cleansing action of the organic detergent active. However, it has, heretofore, not been possible to formulate heavy-duty liquid detergent compositions containing the polyhalogen substituted carbanilides for the reason, among others, that these liquid detergent compositions contain additives, such as inorganic alkaline salts used as builders, which affect not only the stability of the organic active detergent but also the stability of the polyhalogen substituted carbanilide, with the result being that the heavy-duty liquid detergent compositions readily separate into different phases which is, of course, objectionable.

There are, in general, two methods commonly used in the formulation of heavy-duty liquid detergent compositions; one being the use of hydrotropes which aid in solubilizing the organic detergent active in the composition thereby minimizing phase separation, while the other is by use of a stabilizing component which permits an emulsified system to be prepared which is stable to phase separation. These two methods have, heretofore, not been successful in formulating heavy-duty liquid detergent compositions having incorporated therein, as bacteriostatic agents, the polyhalogen substituted carbanilides without materially affecting the properties of the detergent compositions, such as stability against phase separation of the composition, viscosity of the composition and the like, and/or affecting the polyhalogen substituted carbanilides such as by degrading and/or rendering them inactive as bacteriostatic agents. Now, however, it has been found that heavy-duty liquid detergent compositions can be prepared having incorporated therein, as bacteriostatic agents, polyhalogen substituted carbanilides when the compositions are formulated as emulsified systems according to the teachings of the present invention.

It is, therefore, a prime object of this invention to provide phase-stable heavy-duty liquid detergent emulsion compositions having incorporated therein, as bacteriostatic agents, polyhalogen substituted carbanilides.

It is another object of this invention to provide a process for incorporating polyhalogen substituted carbanilides, as

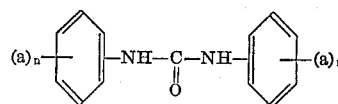
2

bacteriostatic agents, into heavy-duty liquid detergent emulsion compositions without materially affecting the properties of such compositions.

Other objects will become apparent from a reading of the following detailed description.

It has now been found possible to prepare a heavy-duty liquid detergent emulsion composition having incorporated therein, as a bacteriostatic agent, a polyhalogen substituted carbanilide without the properties of the detergent emulsion composition being materially affected by admixing the polyhalogen substituted carbanilide with certain amounts of selected detergent active materials and thereafter incorporating this admixture into the heavy-duty liquid detergent emulsion composition as will be more fully discussed hereinafter.

The polyhalogen substituted carbanilides which may be used in practicing the present invention are of the following structure:



wherein a is halogen and n is an integer between 1 to 3 inclusive. Although any halogen can be used, bromine and chlorine are preferred and chlorine is especially preferred. Of these polyhalogen substituted carbanilides, the trichloro-carbanilides are preferred and 3,3',4'-trichloro-carbanilide and 3,4,4'-trichlorocarbanilide have been found to be particularly effective for use in practicing the present invention. As illustrative of other polyhalogen substituted carbanilides suitable for use include:

- 3,3'-dibromo-carbanilide
- 3,3'-dichloro-carbanilide
- 3,3',4'-tribromo-carbanilide
- 3,4,4'-tribromo-carbanilide
- 3'-bromo-3,4-dichloro-carbanilide
- 3-4-dibromo-3'-chloro-carbanilide
- 3-4-dibromo-4'-chloro-carbanilide
- 3,3',4',5'-tetrachloro-carbanilide
- 3,4,3',4'-tetrachloro-carbanilide
- 3-4-dibromo-3',4'-dichloro-carbanilide
- 3,4,3',5'-tetrachloro-carbanilide
- 3,4,3',4',5'-pentachloro-carbanilide
- 3,4,5,2',4',5'-hexachloro-carbanilide

Ordinarily the polyhalogen substituted carbanilides can be used in amounts as low as 0.1 percent and as high as 1 percent based on the total weight of the composition, however, it is preferred that they be used in amounts between about 0.2 percent and about 0.5 percent.

In addition to the polyhalogen substituted carbanilides, the heavy-duty liquid detergent emulsion compositions comprise an emulsified system of an organic detergent active component, inorganic builder materials and a stabilizing component with the system considered, for purposes of this invention, to be comprised of a dispersed active phase (organic detergent active component) stabilized within an aqueous alkaline continuous phase (inorganic builder materials dissolved in water) by the stabilizing component.

The organic detergent active materials that have been found to be especially useful in the practice of the invention are those which are water-soluble (i.e., soluble in water to at least the extent of about 0.1-0.3 weight percent, which is about the concentration at which they will ultimately be utilized to wash clothes, for example), are normally liquid under conditions for practicing the present invention and which are capable of being dispersed and stabilized within the aqueous continuous phase by the stabilizing component. Such organic deter-

gent active materials are believed to function with the stabilizing component through an ester linkage formation and therefore should contain an available hydrogen inked through an oxygen atom to the organic active compound (hydroxylated organic active compound) and in particular are those of the nonionic polyoxyalkylene type and containing at least one polyoxyalkylene (from ethylene oxide, and/or propylene oxide, and/or butylene oxide, but preferably from ethylene oxide) chain having from about 5 to about 50, and preferably from about 10 to about 25 oxyalkylene units in the chain. Typical examples of hydroxylated organic active materials which are prepared include the nonionic condensation products of ethylene oxide and/or propylene oxide and/or butylene oxide with an alkylphenol having an alkyl (hydrocarbyl) chain that contains from 6 to 20 carbon atoms; with a monohydric primary alcohol, which is preferably highly branched (such as those produced via the Oxo process) but can also have the straight chain configuration, wherein the alcohol contains from about 10 to about 18 carbon atoms; with fatty acids having from 10 to 18 carbon atoms, including those derived from tall oil; with fatty amines, for example, n-dodecylamine, n-tetradecylamine, etc. In addition, hydroxylated organic active materials suitable for use include the nonionic condensation products of ethylene oxide and/or propylene oxide and/or butylene oxides with the fatty acid (lauric, palmitic, stearic and oleic) esters of hexitol anhydrides (hexitans and hexides) derived from sorbitol. Additionally, the nonionic condensation products of ethylene oxide and/or propylene oxide and propylene glycol having molecular weights between about 1,000 and 3,000 are also suitable.

Generally, between about 2 weight percent and about 20 weight percent of the useful hydroxylated organic active materials can be present in the liquid detergent emulsion compositions that are made according to the processes of the invention. However, the preferred liquid detergent emulsion compositions contain from about 4 to about 15 weight percent of one or more of them. In addition, the useful hydroxylated organic active materials will ordinarily be utilized, in the practice of the present invention, in the liquid state. While most of the desired detergent active materials described above are liquids under ambient conditions, those that are not ordinarily liquids at room temperature can readily be melted by warming them to about 50–60° C.

Minor proportions (as compared to the amount of the hydroxylated organic active materials that are utilized) of detergent materials, such as anionic surfactants, can be used to supplement the above-described hydroxylated organic active materials in the practice of the present invention. Typical of these other types of detergent materials are the anionic surface active aromatic sulfonates, such as the sodium sulfonate of an alkylated aromatic hydrocarbon. These sulfonates are usually prepared by alkylating an aromatic hydrocarbon of the class consisting of benzene, toluene, xylene, for example, with aliphatic or olefinic hydrocarbons having from 9 to 18 carbon atoms, and then sulfonating and neutralizing the resulting alkylaromatic hydrocarbon. Another example of detergent active materials that can supplement the hydroxylated organic active materials described hereinbefore are the nonionic alkanolamines having from 10 to 20 carbon atoms in the alkane portion of the molecule. These alkanolamines are formed by reacting a fatty acid, such as tall oil fatty acid, coconut fatty acids, stearic acid, lauric acid, etc., with an alkanolamine such as monoethanolamine, diethanolamine, monoisopropanolamine, diisopropanolamine, mono-n-propanolamine, di-n-propanolamine, etc. A still further example of detergent-active materials that can supplement the hydroxylated organic active materials described hereinbefore are the anionic alkyl oxide-alcohol or -phenol condensates which have been sulfated, as for example, the sodium salt of sulfated

tallow alcohol containing about 20 moles of ethylene oxide per mole of alcohol, the potassium salt of sulfated dodecylphenol containing about 8 moles of ethylene oxide per mole of phenol, the sodium salt of sulfonated dodecylbenzyl ether of phenol which has been condensed with about 20 moles of ethylene oxide per mole of phenol and the like. Ordinarily, these "supplemental" (to the hydroxylated organic active materials) detergent active materials can be utilized in the compositions within the scope of this invention at levels of from a mere trace to several weight percent. However, the preferred liquid detergent emulsion compositions contain no more than about 40 weight percent of such supplemental materials based on the hydroxylated organic active material employed. It should be noted that the supplemental detergent active materials of the present invention need not be present in the dispersed active phase but may be present in the continuous liquid phase of the liquid detergent emulsion composition.

Another major component of the present invention are inorganic builder materials, usually comprised of inorganic phosphates, carbonates, sulfates, hydroxides, silicates or combinations thereof, and, in particular, the alkali metal salts of the foregoing materials. The alkali metal salts are preferably the potassium and sodium salts, although ammonium salts may be employed, particularly in combination with the potassium or sodium salts. The phosphate compounds are preferably the chain polyphosphates. Such polyphosphates contain more than 1 phosphorous atom per molecule, as distinguished from orthophosphates which contain only one phosphorus atom per molecule. Chain polyphosphates are non-cyclic (and usually linear) phosphates, as distinguished from ring or cyclic phosphates such as trimetaphosphates and tetrametaphosphates. Examples of the more common chain polyphosphates are tetrapotassium pyrophosphate, tetrasodium pyrophosphate, sodium tripolyphosphate, potassium hexametaphosphate and sodium hexametaphosphate.

Another additive which is preferably utilized along with the chain polyphosphates are the water-soluble sodium and potassium silicates. As is well-known, sodium silicates can vary quite widely in composition, ranging from tetra and disilicates having a mole ratio of $\text{Na}_2\text{O}:\text{SiO}_2$ of 1:4 and 1:2, respectively, to the more alkaline silicates, such as the orthosilicate having a mole ratio of $\text{Na}_2\text{O}:\text{SiO}_2$ of 2:1. In general, sodium silicate ($\text{Na}_2\text{O}:\text{SiO}_2=1:2$) is the preferred silicate compounds for use according to the present invention. However, other silicates, or mixtures of silicates, having an overall mole ratio of $\text{Na}_2\text{O}:\text{SiO}_2$ between about 1:1 and 1:4 can be used. The carbonates, hydroxides and sulfates are preferably the sodium and potassium carbonates, hydroxides and sulfates. Ordinarily at least about 5 percent of the builder material by weight of the total composition can be used and usually not over about 60 percent with the preferred range being between about 30 and about 50 percent by weight. Additionally, minor amounts, usually less than about 2 percent by weight of the total composition, of additives, such as dyes, perfumes, anti-redeposition agents (carboxymethyl cellulose) and the like can be incorporated into the composition.

The stabilizing component of the liquid detergent emulsion compositions of this invention which are believed to function by an ester linkage formation with the hydroxylated organic detergent active are maleic polymers (polyelectrolytes) which result from the copolymerization in substantially equimolar proportions of maleic anhydride with a lower molecular weight olefinically unsaturated compound having less than 5 carbon atoms. Examples of such copolymerizable lower molecular weight olefins are ethylene, propylene, isobutylene, vinyl methyl ether and the like. Ordinarily, the molecular weight of the lower molecular weight olefins that can be used in the practice of this invention will be

within the range of from about 26 to about 100, and preferably from about 26 to about 60. The linear polymers that result from polymerizing maleic anhydride with one of these copolymerizable lower molecular weight olefins can also be cross-linked with cross-linking agent such as a diamine, an alkylene polyamine, or a diolefinic material such as an ether of a hydrocarbon, etc. Examples of polyamines which have been found to be particularly useful are diethylene triamine, triethylene tetramine, tetraethylene pentamine, and higher molecular weight polyethylene polyamines. Preferred diolefinic cross-linking materials includes divinyl benzene, diallyl ether, vinyl crotonate, diallyl esters, and the like. It has been found that maleic polymers such as those described above, having molecular weights between about 1,000 and 100,000 can be used in the practice of the invention. For better stability maleic polymers having molecular weights of from about 1,200 to about 50,000 are preferred.

Usually these maleic polymers can be utilized in liquid detergent emulsion compositions at levels of from about 0.1 to about 8 weight percent, based on the weight of the final liquid detergent emulsion composition. For compositions having extremely good stability to phase separation along with good drainage characteristics (from a container such as, for example, a measuring cup), however, between about 0.25 and about 3 weight percent of one of maleic polymers preferably should be contained therein.

In general, the heavy-duty liquid detergent emulsion compositions of the instant invention comprise an aqueous continuous phase (the inorganic builder materials dissolved in water) having dispersed therein an active phase (the hydroxylated organic active component and the polyhalogen substituted carbanilide) with the stabilizing component present at the interface of the phases. The water in the aqueous continuous phase can be present in amounts between about 25 percent to about 70 percent by weight of the total composition and preferably between about 40 percent and about 70 percent. Additionally, the ultimate concentrate composition is preferably formulated with a viscosity of between about 150 and 1200 c.p.s. and, also, such that an aqueous solution of the composition of about .25 percent by weight has a pH of between about 8 and about 11. In general, the heavy-duty liquid detergent emulsion compositions achieve the preferred properties, among others, of being highly concentrated, stable against phase separation and the like by the stabilizing component keeping the hydroxylated organic active component in a highly dispersed state (emulsified) within the aqueous continuous phase.

It has been found that when a polyhalogen substituted carbanilide is incorporated into a heavy-duty liquid detergent emulsion composition it is important that it be present in the dispersed active phase. Although the polyhalogen substituted carbanilide is practically insoluble in water, it can be incorporated into a heavy-duty liquid detergent emulsion composition by preparing the detergent emulsion composition in any normal or conventional manner except that between about 1 percent to about 3 percent of the hydroxylated organic active component and/or supplemental detergent active component by weight of the total composition is admixed with the polyhalogen substituted carbanilide and this admixture is added to the detergent emulsion composition after the composition has been formulated with the hydroxylated organic active component (if used in amounts greater than that used to form the admixture), and/or the supplemental detergent active material, inorganic alkaline materials and stabilizing component. It has been found that if less than about 1 percent of the hydroxylated organic active component and/or supplemental detergent active component is used in combination with the polyhalogen substituted carbanilide, the viscosity of the admixture is too high to provide proper blending and emul-

sification of the admixture in the detergent composition. It has also been found that if more than about 3 percent of the hydroxylated organic active component and/or supplemental detergent active component is used in combination with the polyhalogen substituted carbanilide, the resulting liquid emulsion composition is unstable and phase separation will occur. It should be noted that if the supplemental detergent active component is used, those that are normally liquid at the temperature conditions for formulating are preferred.

The liquid detergent emulsion composition, as previously mentioned, may be prepared in any conventional or normal manner which is known and which generally follows the procedure of heating a predetermined amount of water to between about 60° C. to about 80° C. and adding the hydroxylated organic active component, and, if used, the supplemental detergent active material, the inorganic builder materials and the stabilizing component in such a manner as to form the desired aqueous continuous phase and the dispersed active phase. To such a composition can be added with sufficient agitation about 1 percent to about 3 percent of the hydroxylated active component and/or supplemental detergent active component having admixed therewith the desired amount of the polyhalogen substituted carbanilide. It should be noted, however, that the temperature should not exceed about 80° C. during the step of formulating the polyhalogen substituted carbanilide because above about 80° C. such compounds are subject to degradation and can form toxic products, such as chloroanilines, to an undesirable extent. One method for preparing the liquid detergent emulsion composition comprises, in general, forming the liquid emulsion of water, hydroxylated organic active component and stabilizing component in an acidic medium and thereafter adding the other additives, such as the alkaline inorganic builder salts to form the heavy-duty liquid detergent emulsion composition having the desired alkaline pH. This process is further set forth in copending patent application Ser. No. 139,379, filed Sept. 20, 1961, and reference is made thereto for purposes of incorporating herein some of the various ways to prepare a heavy-duty liquid detergent emulsion composition in such a manner as to form the desired aqueous continuous phase and the dispersed active phase.

In order to illustrate the invention, the following examples are presented with parts by weight being used unless otherwise indicated.

Example I

Heavy-duty liquid detergent emulsion compositions are prepared formulated as follows:

Additive:	Percent
Water -----	46.1
Sodium carboxymethyl cellulose (95% by weight) -----	0.5
Fluorescent dye -----	0.025
Disodium acid pyrophosphate -----	5.0
Nonionic organic active (nonyl phenolethylene oxide condensate) -----	10.0
Maleic anhydride-ethylene copolymer -----	1.0
Tetrapotassium pyrophosphate -----	20.0
Potassium hydroxide (45% by weight) -----	7.0
Sodium silicate ($\text{Na}_2\text{O}:\text{SiO}_2$ of 1:2) (44.1% by weight) -----	10.0
3,4,4'-trichlorocarbanilide -----	0.3

In general, the compositions are prepared by heating the water to about 60° C. and thereafter adding the above additives to the water in a mixer in their above listed order, each additive being added and mixed under high shear agitation over a period of about 1 to about 7 minutes while ensuring that the temperature of the mix does not exceed about 72° C. In one instance, designated (1), the 3,4,4'-trichlorocarbanilide is admixed with the total organic active and the admixture added to the mix

after the disodium acid pyrophosphate; in another instance, designated (2), the 3,4,4'-trichlorocarbanilide is added to the mix in the above listed order, i.e., after the sodium silicate; and in a still further instance, designated (3), the 3,4,4'-trichlorocarbanilide is added to the nonionic organic active (about 1 percent of the nonionic by weight of the total composition) which was withheld from the formulation, and the admixture added to the mix after the sodium silicate.

The foregoing three detergent emulsion compositions are tested for bacteriostatic activity. The standard Tergo-Tometer method is used with the 3-inch diameter cloth being washed at 75° F. with 1.3 mls. of the composition to give a .2% detergent concentration. After washing, the cloth is air dried, sterilized, and inoculated with *Staphylococcus aureus* for 24 hours and then checked with an indicator (methyl red) to show bacteriostatic activity. The following table sets forth the results:

TABLE 1

Detergent gel compositions:	Active
(1) -----	YES
(2) -----	NO
(3) -----	YES

It should be noted that although the heavy-duty liquid emulsion composition prepared by admixing the polyhalogen substituted carbanilide with the total organic active and then formulating into the composition (designated as 1) showed the bacteriostatic agent to be active, it was found that about 6% by weight of the 3,4,4'-trichlorocarbanilide, i.e., about 50 p.p.m. from a total of 913 p.p.m., degraded into toxic products, such as chloroanilines, and, therefore, rendered the heavy-duty liquid emulsion composition unsuitable for use as a detergent composition.

In addition, the detergent emulsion composition (3) exhibited no phase separation after storage for 4 weeks at 50° C. and 8 weeks at about 25° C. Also, the following table compares the properties of a detergent emulsion composition formulated in Example I, i.e., (3), with an identical formulated detergent emulsion composition which contains no 3,4,4'-trichlorocarbanilide, designated (4).

TABLE 2

Property	(3)	(4)
Initial viscosity, c.p.s.-----	305	275
Specific gravity-----	1.385	1.39
pH, 1% solution at 25° C.-----	10.4	10.4

The above dramatically illustrates the problem of incorporating the practically water-insoluble polyhalogen substituted carbanilides into heavy-duty liquid emulsion compositions and the ability to successfully achieve this by practicing the concepts of the present invention.

Example II

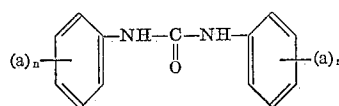
A heavy-duty liquid detergent emulsion composition is prepared formulated as follows:

Additive:	Percent
Water -----	29.9
Disodium acid pyrophosphate -----	3.0
Nonionic organic active (dodecyl phenol-ethylene oxide condensate) -----	9.0
Maleic anhydride-ethylene copolymer -----	0.8
Tetrapotassium pyrophosphate (60% by weight) -----	41.1
Sodium carboxymethyl cellulose -----	0.7
Potassium hydroxide (45% by weight) -----	5.5
Sodium silicate (Na ₂ O:SiO ₂ of 1:2) (44.1% by weight) -----	8.0
Admixture of: nonionic organic active (dodecyl phenol-ethylene oxide condensate) -----	2.0
3,4,4'-trichlorocarbanilide -----	0.25

The above composition is prepared by heating the water to about 60° C. and thereafter adding the above additives to the water in a mixer in the above listed order, each additive being added and mixed under high shear agitation over a period of about 1 minute to about 10 minutes while ensuring that the temperature of the mix does not exceed about 72° C. This composition showed excellent stability against phase separation after 31 weeks at room temperature, i.e., about 25° C., and at the end of this period it was found by analysis that about 98% of the original 3,4,4'-trichlorocarbanilide was still present in that form.

What is claimed is:

1. A process for preparing a phase-stable, bacteriostatically active, heavy-duty liquid detergent emulsion composition which comprises preparing an emulsion consisting essentially of an aqueous continuous phase having dissolved therein an inorganic builder material selected from the group consisting of sodium and potassium phosphates, carbonates, silicates and combinations thereof in an amount between about 5% to about 60% by weight of said composition, a stabilizing component in an amount between about 0.1% to 8% by weight of said composition of a co-polymer having a molecular weight between about 1,000 and 100,000 of substantially equimolar proportions of maleic anhydride with an olefinically unsaturated compound selected from the group consisting of ethylene, propylene, isobutylene and vinyl methyl ether, and a dispersed phase of a water soluble nonionic detergent selected from the group consisting of alkyl phenols having an alkyl group of from 6 to 20 carbon atoms, monohydric primary alcohols containing from 10 to 18 carbon atoms, fatty acids containing from 10 to 18 carbon atoms, fatty amines containing from 12 to 14 carbon atoms, fatty acid esters containing from 10 to 18 carbon atoms of hexitol anhydrides, and containing at least one polyoxyalkylene chain having from about 5 to about 50 oxyalkylene units wherein the alkylene is selected from the group consisting of ethylene, propylene and butylene and condensates of propylene glycol with ethylene and propylene oxide having molecular weights between about 1000 and 3000, and adding thereto an admixture of a polyhalogen substituted carbanilide in an amount between about 0.1% to about 1% by weight of said composition and having the formula



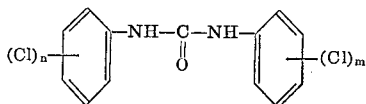
- wherein *a* is a halogen selected from the group consisting of chlorine and bromine and *n* is an integer between 1 and 3 inclusive and a detergent material, in an amount from about 1% to 3% by weight of said composition, selected from the group consisting of said nonionic detergents, supplemental detergents and mixtures thereof, said supplemental detergents selected from the group consisting of anionic alkyl benzene sulfonates and nonionic fatty acid alkanolamides, said nonionic detergent being present in an amount between about 2% to about 20% by weight of said composition.

2. A process according to claim 1, wherein said prepared emulsion additionally contains a supplemental detergent selected from the group consisting of anionic alkyl benzene sulfonates and nonionic fatty acid alkanol amides, said supplemental detergent being present in said composition in an amount less than about 40% by weight of said nonionic detergent.

3. A process according to claim 1, wherein said stabilizing component is a maleic anhydride-ethylene copolymer having a molecular weight of from about 1,200 to about 50,000, said detergent material is said nonionic detergent and the amount of said polyhalogen substituted carbanilide added in admixture with said detergent material is from about 0.2 to 0.5 weight percent of said emulsion.

9

4. A process according to claim 1, wherein said polyhalogen substituted carbanilide is trichlorocarbanilide having the formula



wherein n is the integer 2 and m is the integer 1.

5. A process according to claim 4, wherein said prepared emulsion additionally contains a supplemental detergent selected from the group consisting of anionic alkyl benzene sulfonates, and nonionic fatty acid alkanol amides, said supplemental detergent is present in said composition in amounts less than about 40% by weight of said nonionic detergent.

6. A process according to claim 4, wherein said stabilizing component is a maleic anhydride-ethylene copolymer having a molecular weight of from about 1,200 to about 50,000, said detergent material is said nonionic detergent and the amount of said polyhalogen substituted carbanilide added in admixture with said detergent material being from about 0.2 to 0.5 weight percent of said emulsion.

7. A process according to claim 6, wherein said trichlorocarbanilide is 3,3',4'-trichlorocarbanilide.

8. A method according to claim 6, wherein said trichlorocarbanilide is 3,4,4'-trichlorocarbanilide.

9. A process according to claim 7, wherein said nonionic detergent is an alkyl phenol-ethylene oxide condensate in which the alkyl group contains from 6 to 20 carbon atoms and the mol ratio of alkyl phenol to ethylene oxide is from about 1:10 to about 1:25.

10

10. A process according to claim 8, wherein said nonionic detergent is an alkyl phenol-ethylene oxide condensate in which the alkyl group contains from 6 to 20 carbon atoms, and the mol ratio of alkyl phenol to ethylene oxide is from about 1:10 to about 1:25.

11. A composition produced by the process of claim 1.

12. A composition produced by the process of claim 1, wherein said polyhalogen substituted carbanilide is selected from the group consisting of 3,3',4'-trichlorocarbanilide and 3,4,4'-trichlorocarbanilide.

References Cited

UNITED STATES PATENTS

2,621,169	12/1952	Robinette et al.	
2,745,874	5/1956	Schetty et al.	
2,846,398	8/1958	Beaver et al.	252-106
3,060,124	10/1962	Ginn	252-135
3,075,922	1/1963	Wixon	252-135
3,101,324	8/1963	Wixon	252-138
3,156,655	11/1964	Bright	252-109
3,177,115	4/1965	Casely et al.	252-107 X
3,235,505	2/1966	Tuvell	252-135

OTHER REFERENCES

Soap and Chemical Specialties, Sept. 1963, pages 51 and 214.

LEON D. ROSDOL, *Primary Examiner*.

30 ALBERT T. MEYERS, *Examiner*.

S. E. DARDEN, *Assistant Examiner*.