This invention relates to a germicidal detergent composition containing neomycin.

Neomycin is a well-known antibiotic produced by propagation of microorganisms of the species "Streptomyces fradiae" as described in United States Patent No. 2,799,620. Attempts have been made to take advantage of the bacteriostatic properties of neomycin for topical application by incorporating the neomycin, usually as the sulfate, in various aqueous preparations such as soaps and the like. However, this proposal has met with difficulty because neomycin has a known stability range of from about pH 2 to about pH 9 and ordinary soap solutions have a hydrogen ion concentration well above pH 9. Consequently, the antibacterial properties of neomycin are destroyed in such solutions. If the pH of the soap solution is lowered to any extent or if the neomycin is incorporated in conventional anionic detergents, it is found that the neomycin is incompatible with such detergents and a heavy precipitate occurs rendering the resultant composition useless as a germicidal cleaning composition.

The present invention is predicated upon the discovery that if a small amount of a nonionic surface active agent is incorporated into the anionic detergent along with the neomycin, the neomycin is rendered stable and does not precipitate out on standing. The present invention preferably embodies a germicidal detergent composition comprising from about 5 to about 40% of a water-soluble organic anionic detergent, a small but effective amount of neomycin usually from about 0.1 to about 3% (as the base), and from about 0.1 to about 20% of a nonionic surface active agent, the resulting composition having a pH of from about 5.7 to about 7 so that the composition is virtually free of irritating effects on the skin.

Among the suitable anionic detergents are the water-soluble higher fatty acid soaps (e.g. sodium lauryl sulfate, sodium salts of higher fatty acids derived from coconut oil, palm oil and tallow), and the sulfated and sulfonated organic detergents. Examples of the latter are water-soluble salts of higher alkyl aryl sulfonates (e.g. sodium dodecylbenzenesulfonate, sodium laurylbenzenesulfonate), higher alkyl sulfate detergent (e.g. sodium lauryl sulfate, potassium cetyl sulfate, triethanolamine lauryl sulfate, diethanolamine lauryl sulfate and ammonium lauryl sulfate), sulfonic acid esters of polyhydric alcohols incompletely esterified with higher fatty acids (e.g. sodium coco-monoglyceride monosulfate), sulfated higher fatty acid amides (e.g. sodium lauric monooctanolamide sulfide), etc.

Among the suitable nonionic detergents are the polyalkylene oxide condensates with hydrophobic organic compounds, usually of an aliphatic or an aromatic structure. Suitable examples thereof are the higher alkyl aryl polyglycol ethers (e.g. octylphenol or nonylphenol) condensed with 6 to 30 moles ethylene oxide), organic acid esters with ethylene oxide (e.g. tall oil esters with 6 to 30 moles of ethylene oxide), and alkyl aryl polyethylene glycol ethers of polypropylene glycol having a molecular weight of about 2,000 to 10,000, etc. Particularly preferred surface active agents for use in the present invention are the nonionic octyphenoxylethanol series of compounds sold under the trademark Triton, such as Triton X-100, Triton X-114 etc. and corresponding to the formula:

\[ CH_2-OCH_2-C_{10}H_{21}OH \]

and wherein \( n \) is from 6-30, and the nonylphenoxypolyoxyethylene compounds sold under the trademark Igepal corresponding to the formula:

\[ CH_2-OCH_2-C_{10}H_{21}OH \]

wherein \( n \) is from 6-30.

The invention will be described in greater detail in conjunction with the following specific examples in which the parts are by weight unless otherwise specified.

**Example 1**

A germicidal detergent composition is prepared by dissolving 1.5 parts of neomycin sulfate in 40 parts by volume of water. 10 parts by volume of Triton X-100 (reaction product of 9-10 moles of ethylene oxide with octylphenol) are added and the mixture stirred until clear. 10 parts by volume of Triton X-114 (reaction product of 7-8 moles of ethylene oxide with octylphenol), 20 parts by volume of triethanolamine lauryl sulfate and 2 parts of Lanolol 41 (a water-soluble derivative of lanolin) are added with stirring until the solution is clear. Sufficient water is added to make up 100 parts by volume. A clear, sparkling yellow solution is obtained. The pH is adjusted to pH 6.0 with citric acid. The neomycin is compatible in this anionic detergent and nonionic detergent solutions and remains stable for several months at room temperature, and for two months at 42° C. or for one week at 56° C.

**Example 2**

A germicidal detergent composition is prepared following the procedure of Example 1 except that 8 parts of Ingepal CO-710 (nonylphenoxypolyoxyethylene) is used in place of the Triton X-100 used in Example 1. The resulting germicidal detergent composition has substantially the same properties as the composition of Example 1 and is stable for relatively the same period.

**Example 3**

A germicidal detergent composition is prepared following the procedure of Example 1 except that 10 parts of Tergitol Nonionic XG (alkyl aryl polyethylene glycol ether) is used in place of the Triton X-100 used in Example 1. The resulting germicidal detergent composition has substantially the same properties as the composition of Example 1 and is stable for relatively the same period.

I claim:

1. A clear sparkling germicidal detergent solution comprising from about 5 to about 40% of a water-soluble organic anionic detergent, a small but effective amount of a therapeutically effective form of neomycin equivalent to from about 0.1 to 3% neomycin calculated as the free base, and from about 0.1 to about 20% of a nonionic surface active agent selected from the group consisting of the reaction product of octylphenol with from 6 to 30 moles of ethylene oxide and the reaction product of nonylphenol with from about 6 to about 30 moles of ethylene oxide, the resulting clear sparkling solution having added sufficient non-toxic organic acid and water to have a pH of between about 5 and about 7 and total 100%.

2. The composition of claim 1 in which the anionic detergent is triethanolamine lauryl sulfate.

3. A clear sparkling germicidal detergent solution consisting essentially of from about 5 to about 40% of triethanolamine lauryl sulfate, a small but effective amount of a therapeutically effective form of neomycin equivalent to from about 0.1 to 3% neomycin calculated as the free base, from about 0.1 to about 20% of a nonionic surface...
active agent selected from the group consisting of the reaction product of octylphenol with from 6 to 30 moles of ethylene oxide and the reaction product of nonylphenol with from about 6 to 30 moles of ethylene oxide, about 2% of a water-soluble derivative of lanolin, sufficient citric acid to adjust the pH to between about 5 and about 7, and water to a total of 100%, said solution being stable for at least two months at 42° C.

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