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PINE-AMMONIA DETERGENT COMPOSITION

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3 Claims

ABSTRACT OF THE DISCLOSURE

A pine-ammonia detergent composition is provided wherein the composition exhibits a predominant ammonia odor at the product level which is reversed to a predominant and lingering pine odor at the use dilution level by providing a pine oil to ammonia ratio of at least about 1:1 in the detergent composition and, preferably, from about 2:1 to 10:1.

This invention relates to detergent compositions which have a predominant ammonia odor at the product level and a predominant pine odor at the use dilution level. More particularly, this invention relates to reversing the ammonia odor of a detergent product to a pine odor upon aqueous dilution of the product by controlling the ratio of pine component to ammonia at the product level.

BACKGROUND OF THE INVENTION

Most users of detergent compositions, particularly housewives and household workers, prefer a detergent composition that has a predominant ammonia odor at the product level. The ammonia odor is preferred since it is generally associated with a product that is strong and capable of doing a good cleaning job. However, a pleasant, mild, lingering pine scent is preferred after the cleaning job has been completed since the pine scent is less irritating and more pleasant than a strong ammonia odor, and provides an indication of freshly cleaned premises.

Generally, detergent compositions which exhibit a predominant pine odor contain about 1% or more of a pine component such as pine oil, pine-type odorizers, fragrances, perfumes, or the like. Detergent compositions which exhibit a predominant ammonia odor usually contain from about 0.1 to 10% ammonia on an active basis, and generally at least about 0.25% ammonia based upon the entire composition where the ammonia is included as an active cleaning component. These detergent compositions typically contain soaps, synthetic detergents, chelating agents, solvents, builders, and the like, as is well known to those skilled in the art.

THE INVENTION

In accordance with the present invention, detergent compositions which exhibit a predominant ammonia odor at the product level and a predominant pine odor at the use dilution level can be generally obtained by providing detergent compositions containing a pine component and ammonia at a ratio of at least about 1:1. When detergent compositions were provided wherein the ratio of pine component to ammonia was less than about 0.5:1, the use dilutions of such compositions were frequently found to retain and exhibit a predominant ammonia odor. On

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the other hand, when detergent compositions were provided wherein the ratio of pine component to ammonia exceeded about 1:1 and higher, the resulting use dilutions obtained exhibited and retained a predominant pine odor. It was further found that even a ratio of 10:1 can be exceeded without affecting, in any way, the predominant ammonia odor obtained at the product level of the compositions. However, the pine component to ammonia ratio should not fall below about 1:1 and should be preferably retained within the range of from about 2:1 to 10:1.

The amount of ammonia which can be included in the detergent compositions of the invention was found to be based upon the water content of the entire composition since it was further found that the strength and duration of the ammonia odor is a function of its concentration which is related to the water content of the composition rather than to the entire composition.

As used throughout this application and in the appended claims, the term "ammonia" should be understood as referring to that chemical compound represented by the formula NH_3 and which is generally obtainable from commercially available ammonium hydroxide (NH_4OH) compounds containing active ammonia (NH_3) on the order of about 28% by weight. It should be further understood, therefore, that the amounts of ammonia referred to throughout this application and in the appended claims are computed on the basis of the NH_3 content.

In providing the detergent compositions of the invention, it has been found that the amount of ammonia that can be employed should be at least about 0.75% by weight based upon the water content of the compositions. When ammonia was employed in amounts of less than about 0.75%, it was found that the pine component of the invention could mask the ammonia odor at the product level, whereas amounts of ammonia in excess of about 0.75% were sufficient to provide the desired ammonia odor at the product level.

Ammonia can be employed in the detergent compositions of the invention in amounts of up to about 10% or higher. Although the maximum amount of ammonia which can be employed is not critical, amounts in excess of about 10% are not desirable since they are uneconomical and limit, to some degree, the amounts of other components which might be desired to include in the detergent compositions. A useful range of ammonia is an amount of from about 1% to 5% by weight based upon the water content of the compositions, and this range is preferred.

The pine component employed in the detergent compositions of the invention is a commercially obtainable terpene rich oil such as is produced during wood carbonization by dry distillation of pine tree wood or by extraction from chips of resinous tree stumps and has a distillation range of from about 190° to 230° C. Terpinol is generally the most abundant single constituent, but substantial amounts of borneol, fenchyl alcohol, and terpenes are also usually present as well as minor amounts of hydrocarbons, ethers, esters, ketones and phenols. As employed throughout this application and in the appended claims, therefore, the term "pine oil" should be understood as referring to and is intended to refer to a terpene-rich oil such as described above.

As mentioned earlier, the detergent compositions of the invention can include other components as is well known

to those skilled in the art. Generally, the quantities and amounts of such components have been found to have little or no effect on the odor reversal obtained in the compositions of the invention. Consequently, soaps, and/or synthetic detergents, disinfectants, solvents such as alcohols, glycols, low molecular weight glycol ethers, and the like, can be included as well as "builders" such as tetrapotassium pyrophosphate (TKPP), sodium tripolyphosphate (STP), trisodium or potassium phosphate, sodium carbonate, and the like, in order to improve detergency. Small amounts of chelating agents such as ethylenediamine tetraacetic acid (EDTA), and small amounts of dyes or reducing agents which serve to color and prevent oxidation of the detergent compositions can also be employed as is known to the skilled artisan. A typical detergent composition, exclusive of the pine oil and ammonia components of the invention, is tabulated below setting forth the range of each ingredient usually employed.

TYPICAL DETERGENT COMPOSITIONS

Ingredient:	Range of amounts (percent by weight of composition)
Soaps and/or synthetic detergents	1-25
Disinfectants	0-5
Solvents	0-25
Builders	0-25
Chelating agents	0-5
Reducing agents	0-2
Perfumes	0-5
Dyes	0-0.1

When including a surface active agent; that is, a synthetic detergent, in the detergent compositions of the invention, it is preferred that the anionic type be employed rather than either the cationic or nonionic type of surface active agents. Anionic surface active agents are preferred since they permit phenolic disinfectants to be included in the detergent compositions of the invention without deleteriously affecting the disinfecting properties of the phenolic disinfectants, whereas nonionic surface active agents seriously impair this disinfecting property of phenolic disinfectants. Although cationic surface active agents can be employed, they are generally uneconomical, do not drain freely from the surfaces cleaned and tend, therefore, to leave a hydrophobic film on the surfaces cleaned.

When formulating the detergent compositions of the invention, it should be clearly understood that the pine oil included in the compositions comprises the principal water insoluble "oil-type" constituent, regardless of other types of "oil-type" constituents desired to be included in the compositions.

The invention will be more fully appreciated when considered together with the following examples which are set forth as being merely illustrative and not limitative of the invention. Unless otherwise specified, all parts and percentages are by weight.

Example I

A number of detergent compositions were formulated containing varying amounts of ammonia and pine oil together with other components such as soaps, solvents, fillers, chelating agents, and the like, which do not contribute in any way to the odor of the composition. The total nonaqueous content of these compositions was maintained below 30%. The predominating odor, whether it was pine or ammonia, of these compositions was evaluated by an independent panel comprising ten persons. A summary of the results found by the panel is tabulated below in Table 1, the results being based upon a response of 50% or more of the panel. The amount of pine oil shown in Table 1 was that which was necessary to mask the ammonia odor, the pine oil being calculated on the entire composition while the amount of ammonia shown in Table 1 was based upon the water content of the composition.

TABLE I

Minimum Amount of Pine Oil Needed to Mask Ammonia Odor

Weight percent ammonia (based on H ₂ O content)	Weight percent pine oil (based on entire composition)	Ratio of pine oil: ammonia
0.05% (5,000 p.p.m.)	0.05% (500 p.p.m.)	0.1
0.75% (7,500 p.p.m.)	0.75% (7,500 p.p.m.)	1.0
1.0% (10,000 p.p.m.)	>20.0% (200,000 p.p.m.)	>20.0

From the results set forth in Table 1 above, it can be seen that as the concentration of ammonia increased from 0.5-1.0%, a factor of 2, the ratio of pine oil:ammonia necessary to overcome the ammonia odor increased 200 fold.

Table 1 also shows that in a composition containing 0.5% ammonia, pine oil in excess of 0.05% resulted in a predominant pine odor, while less than 0.05% pine oil resulted in a predominant ammonia odor. When ammonia was present in an amount of 0.75%, it required about an equal amount of pine oil to balance the ammonia odor. At the level of 1.0% ammonia, based upon the water content, even an amount of 20% pine oil was not sufficient to overcome the ammonia odor. In other tests, it was found that when ammonia was present at a level of 1%, an ammonia odor was predominant, regardless of the pine oil concentration.

For detergent compositions containing only small amounts of nonaqueous components such as pine oil, detergents, soaps, builders, and the like, the concentration of ammonia relative to the amount of water present in the composition is almost the same as it would be with respect to the entire composition and, for all practical purposes, can be considered as being the same. However, in detergent compositions containing appreciable quantities of pine oil and other nonaqueous ingredients, there was found to be an appreciable difference. For example, in a composition containing 90% by weight pine oil, 2% by weight soap, and 0.5% by weight ammonia, approximately one-half of the panel selected ammonia as being the predominant odor. The reason for this was that the composition contained 6.2% ammonia (0.5:7.5) relative to the water content, and the 90% pine oil was not sufficient to clearly overcome the ammonia odor. Aqueous dilutions of this composition, however, even when diluted with only equal volumes of water, were judged by the panel to exhibit a predominant pine odor.

It should be understood that the compositions of this invention are intended to be diluted with water so that an ammonia concentration of from about 0.75% to 10% in typical compositions will be reduced to about 0.5% or less, thereby permitting the pine odor to predominate. The absolute intensity of the pine odor obtained upon dilution appears to be enhanced by the background of ammonia as compared with aqueous dilutions of pine oil containing no ammonia.

Example II

A number of ammonia-pine detergent compositions were formulated in which the ratio of pine oil to ammonia was varied from composition to composition. The compositions were evaluated for predominant pine or ammonia odor and the use dilutions of each composition were similarly evaluated, the evaluation being conducted by the panel identified in Example I above. The predominant odor was recorded together with the percentage of the panel that indicated the predominant odor. The basic formulation of the detergent composition included 36% by weight of a 40% concentrated soap and 1% by weight of p-chloro-o-benzylphenol. Pine oil was added in the amounts indicated in Table 2 below and the ammonia was included on the basis of the water content of the compositions. In Table 2, the predominant odor for ammonia is indicated by A while that for pine is indicated by P, and the numeral indications in parentheses

5 represent the percentage of the panel that determined the predominant odor.

6 in an amount of from about 0% to 5% by weight, solvents selected from the group consisting of alcohols, gly-

TABLE 2
Odor at Product and Use Dilution Levels as a Function of Pine Oil:Ammonia

Sample.....	1	2	3	4	5	6	7	8
Amt. pine oil, percent.....	4	4	4	2.5	5.0	7.5	10	4
Amt. ammonia, percent.....	2	4	1.5	1.0	1.0	1.0	1.0	-----
Pine oil: ammonia.....	2:1	1:1	2.7:1	2.5:1	5:1	7.5:1	10:1	-----
Odor (at product level).....	A (100)	A (100)	A (100)	A (90)	A (90)	A (80)	A (90)	P (100)
Odor (at use dilution of 1:11)...	P (80)	P (60)	P (70)	P (90)	P (80)	P (100)	P (100)	P (80)
Odor (at use dilution of 1:64)...	P (70)	P (60)	P (70)	P (80)	P (100)	P (100)	P (100)	P (100)

The results in Table 2 reveal that the panel detected a strong ammonia odor at the product level for all samples, except sample 8 which contained no ammonia. The foregoing results also reveal that throughout the ratio range of 1:1 to 10:1, pine oil:ammonia, at least 80% of the panel detected the ammonia odor at the product levels. At the use dilution levels, on the other hand, detection of the predominant pine odor increased significantly as the ratio of pine oil:ammonia varied above the 1:1 ratio.

Example III

Several detergent compositions were formulated wherein the amounts of all components were varied. The compositions and the amounts of components are set forth below in Table 3.

TABLE 3
Ammonia-Pine Detergent Compositions

Composition.....	1	2	3	4	5	6
Percent:						
Aqueous ammonia (28% active).....	30	18	18	2	1	3
Pine oil.....	40	25	25	80	60	25
Detergent-soap (coconut soap, 40% active).....	10	20	40	15	25	-----
Synthetic detergent (sodium dodecylbenzene sulfonate).....	-----	-----	-----	-----	-----	10
Solvents (terpene type).....	-----	-----	10	-----	-----	5
Ammonia (based on H ₂ O and ammonia).....	15	7.5	10	4	1	1.3
Pine oil: ammonia.....	2.66:1	3.3:1	2.5:1	20:1	60:1	19.23:1

All of the detergent compositions listed in Table 3 above were subjected to the odor test by the panel and all were found to have a predominant ammonia odor at the product level and a predominant pine odor at the use dilution level, when diluted with about 10 or more volumes of water.

While the ammonia-pine detergent compositions of the invention have been described with particularity and in some detail, it should be understood that various changes and modifications can be made therein, as will occur to those skilled in the art and those practicing the invention, without departing from the scope and spirit of the invention.

What is claimed:

1. A pine-ammonia detergent composition, said detergent composition containing non-aqueous components comprising: water soluble soaps in an amount of from about 0% to 25% by weight; alkyl benzene sulfonates as synthetic detergents in an amount of from about 0% to 25% by weight, p-chloro-o-benzylphenol as disinfectant

15 cols, and low molecular weight glycol ethers in an amount of from about 0% to 25% by weight, builders selected from the group consisting of tetrapotassium pyrophosphate, sodium tripolyphosphate, trisodium phosphate, potassium phosphate, and sodium carbonate in an amount of from about 0% to 25% by weight, ethylenediamine tetracetic acid as chelating agent in an amount of from about 0% to 5% by weight, reducing agents in an amount of from about 0% to 2% by weight, perfumes in an amount of from about 0% to 5% by weight, dyes in an amount of from about 0% to 5% by weight, and when said composition contains a mixture of said soaps and synthetic detergents, said mixture is present in an amount of from about 1% to 25% by weight; and, a mixture of pine and ammonia consisting of from 1% to 7.5% by weight ammonia based upon the water content of said detergent composition; and, pine oil in an amount sufficient to provide a pine oil:ammonia ratio of 1:1 to 10:1 such that said detergent composition exhibits a predominant ammonia odor at the product level and a predominant pine odor at the use dilution level when diluted at a ratio of at least 1:11 of said detergent composition to water, respectively.

2. The pine-ammonia detergent composition as defined in claim 1 wherein ammonia is present therein in an amount of from about 1% to 5%.

3. The pine-ammonia detergent composition as defined in claim 1 wherein the ratio of pine oil:ammonia ranges from about 2:1 to 10:1.

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