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CYCLOHEXYLCYCLOHEXANONE IN MERCAPTOACETATE HAIR-TREATING COMPOSITIONS

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ABSTRACT OF THE DISCLOSURE

Novel cosmetic preparations for the treatment of hair comprising ammonium, alkali metal and alkaline earth metal mercaptoacetates in combination with cyclohexylcyclohexanone which do not deteriorate on storage and which are substantially free of unpleasant sulfide odors normally characteristic of such preparations.

Compositions for the conditioning or removal of human hair for cosmetic purposes are known in the art. These compositions usually contain a sulfur compound, preferably organic, capable of reducing the cystine disulfide linkages of the keratin component of hair under alkaline conditions.

For example, in the generally known method of waving hair by the "cold permanent" waving process, a mercaptan or mercapto carboxylic acid salt (e.g., mercaptoacetic acid salt) is dissolved in water, the pH of the solution adjusted to a suitable alkaline value generally between about 8.5 and 10.5, and the resulting alkaline solution applied to the hair in order to soften or "relax" and condition the hair for change in configuration. The treated hair is manipulated to a desired configuration which is then set by treating the hair with a solution of an oxidizing agent, such as potassium bromate or hydrogen peroxide.

Further, chemical depilatories have been known for sometime and are usually based on inorganic sulfides, mercaptans or mercaptoacetic acid salts. The generally preferred depilatory preparations are in cream or paste form suitable for easy application to localized areas of the human skin. The chemical depilatories act by reducing the cystine disulfide linkages of the keratin molecule in human hair. The resulting sulfhydryl degradation products react with the alkali present in the depilatory to cause swelling and disintegration of the hair. In general, the pH value should be above about 11 for rapid, effective depilation; lower pH values require longer contact time with subsequent skin irritation due to the alkali present.

The use of the aforementioned sulfur compounds in hair-treating preparations, either for "cold permanent" waving or depilation of the hair, is based on the ability of the sulfur compounds to rupture the disulfide linkages of the keratin fibers. Keratin is a protein composed of a number of amino acids including cystine, and it is the cystine components that provide the lateral disulfide linkages between the polypeptide chains in the protein fibers.

A common defect of hair-treating preparations containing mercapto compounds e.g. mercaptoacetates, is development of a hydrogen sulfide or similar noxious odor. It is known to employ perfuming agents in hair-treating compositions; the choice of perfuming agent is restricted by the relatively high alkalinity of the preparations. Thus, the use of saponifiable esters or aldolizable aldehydes is inadvisable. Also the presence of the —SH group may cause conversion of perfume alcohols to malodorous mercaptans.

An object of the present invention is to provide novel

hair-treating cosmetic preparations based on mercaptoacetates. A further object is to produce novel depilatory compositions which do not deteriorate on prolonged storage. The production of novel "cold permanent" hair waving solutions is another object of the invention.

These objects are attained by the incorporation of 2-cyclohexylcyclohexanone in the alkaline mercaptoacetate containing hair-treating preparation in an amount sufficient to mask the noxious odors generally associated with such compositions. Only small amounts of 2-cyclohexylcyclohexanone are required and a preferred effective amount to use is from about 0.15% to about 2.0% of the total weight of the cosmetic preparation.

Aqueous alkaline mercaptoacetate hair-treating compositions in which 2-cyclohexylcyclohexanone can be effectively employed may contain additives, such as for example, methyl cellulose or polystyrene thickening agents, wetting agents and emulsifiers, etc., as illustrated in U.S.P. 2,631,965, 2,689,815, 2,719,815 (relating to hair waving solutions) and U.S.P. 2,352,524 and 2,823,168 (relating to depilatory compositions). Generally, commercial mercaptoacetate preparations for treating hair contain between about 4% to 7% by weight of mercaptoacetic acid in the form of the ammonium, alkali metal or alkaline earth metal salt. For use in "cold permanent" hair waving the mercaptoacetate compositions preferably have a pH value between about 8.5 and 10.5, while for depilatory use they possess a pH value from about 10 to about 12.5. The "cold permanent" waving solutions usually contain ammonium mercaptoacetate together with thickeners, notably methyl cellulose in amount of about 1–10% by weight of the total solution. The depilatory compositions preferably have a pH value of from about 10.0 to 12.5 and contain the calcium or strontium salt of mercaptoacetic acid generally together with suitable thickeners, clays, etc. to provide desired liquid or paste type compositions.

The preparation of the novel hair-treating cosmetic preparations of this invention will be described in the following examples. It is to be understood however, that these examples are merely illustrative and are not intended to limit the scope of the invention claimed herein. All parts given are by weight, except where otherwise noted.

EXAMPLE I

Preparation of hair waving solution

Typical commercial mercaptoacetate hair waving lotions containing about 6.5% mercaptoacetic acid sufficient ammonium hydroxide to give the solution a pH value about 9.2 were prepared from the following components:

[Amounts expressed as percent by volume]

	Solution (a)	Solution (b)	Solution (c)
Ammonium mercaptoacetate (60% solution)	8.76	8.76	8.76
Ammonium hydroxide (26° Bé.)	3.98	3.98	3.98
Non-ionic emulsifier	2.00	2.00	2.00
Water	85.26	84.26	83.26
Cyclohexylcyclohexanone-Tween 80* (50:50 mixture)		1.00	2.00

*Tween 80 is a polyoxyethylene sorbitan monooleate produced by Atlas Chemical Industries.

The lotions so obtained are not discolored nor do they develop objectionable sulfide odor on storage at room temperature for 34 days whereas the solution to which no addition was made, developed a strong sulfide odor on standing under the same conditions.

Human hair swatches were immersed for 30 minutes in separate containers of these cold wave solutions. Solu-

tion (a) was the commercial mercaptoacetate wave preparation whereas solution (b) contained the addition of 0.5% of 2-cyclohexylcyclohexanone and solution (c) contained 1.0% 2 - cyclohexylcyclohexanone. The hair swatches were removed from the softening or wave solution, treated with potassium bromate-neutralizer solution and rinsed.

Hair swatches:

Solution (a) ---------- Appreciable sulfide odor.
Solution (b) ---------- No odor.
Solution (c) ---------- No odor.

EXAMPLE II

Depilatory composition

A conventional depilatory preparation having a pH of 11.0 was produced from the following ingredients: cetyl alcohol (8 parts), stearyl alcohol (8 parts), calcium mercaptoacetate (5.4 parts of 97%), calcium hydroxide (10.4 parts), emulsifier (2.6 parts, Brij 35, polyethylene (23) lauryl ether, produced by Atlas Chemical Industries) and distilled water (65.6 parts) and divided into three portions. To one portion of the depilatory there was added 1.0% by weight of a perfume mixture (consisting of 30.0 parts of 2-cyclohexylcyclohexanone, 25.0 parts of linalol, 40.0 parts of spike lavender, 5.0 parts of geraniol and 0.1 part of a C–12 aldehyde); to another portion of the depilatory there was added 0.5% of cyclohexylcyclohexanone and the third portion contained no cyclohexylcyclohexanone or perfume.

The depilatory was applied to the skin, allowed to remain in contact for about five minutes before washing off with water. The sample of depilatory containing no cyclohexylcyclohexanone developed an unpleasant sulfide odor that persisted on the skin even after repeated washing. The samples containing 2-cyclohexylcyclohexanone did not develop any sulfide odor and the skin after washing was clean with a pleasant odor.

The odor repressing agent of this invention 2-cyclohexylcyclohexanone is a colorless to pale yellow liquid having a pleasing odor. As obtained commercially it may contain the isomeric 4-cyclohexylcyclohexanone in various amounts. The commercially available product may also contain relatively small amounts (i.e., less than 5% by weight) of cyclohexanone, cyclohexanol and or cyclohexylcyclohexanol. Such small amounts do not affect the odor repressing properties of 2-cyclohexylcyclohexanone and act as non-reactive diluents at worst. For the purposes of this invention, 4-cyclohexylcyclohexanone can be used in place of the more common 2-cyclohexylcyclohexanone with similar results.

I claim:

1. A cosmetic preparation for the treatment of hair comprising an alkaline solution of a mercaptoacetic acid salt selected from the group consisting of ammonium, alkali metal and alkaline earth metal mercaptoacetates and an amount of cyclohexylcyclohexanone sufficient to effectively repress the sulfide-type odor produced by the mercaptoaceate compound.

2. A cosmetic preparation for the treatment of hair comprising a solution of a mercaptoacetic acid salt selected from the group consisting of ammonium, alkali metal and alkaline earth metal mercaptoacetates, said solution having a pH value in excess of 8.5 but not exceeding about 12.5 and an amount of cyclohexylcyclohexanone sufficient to effectively repress the sulfide-type odor of the preparation.

3. A cosmetic preparation for the treatment of hair comprising a solution of a mercaptoacetic acid salt selected from the group consisting of ammonium, alkali metal and alkaline earth metal mercaptoacetates, said solution having a pH value in excess of 8.5 but not exceeding about 12.5 and from about 0.15% to about 2.0% by weight of cyclohexylcyclohexanone.

4. A hair waving preparation comprising a solution of ammonium mercaptoacetate having a pH value of from 8.5 to 10.5 and from about 0.15% to about 2.0% by weight of cyclohexylcyclohexanone.

5. A depilatory formulation comprising a solution of alkaline earth metal mercaptoacetate, said solution having a pH value of from about 10.5 to about 12.5 and from about 0.15% to about 2.0% by weight of cyclohexylcyclohexanone.

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