

1

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HAIR CONDITIONING METHOD

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The present invention relates to a hair conditioning agent and to its use. More particularly the invention relates to the use of a hair rinse composition which helps to alleviate the harshness of texture of hair which generally follows the use of shampoo or other hair treating agents.

It is therefore an object of the present invention to provide a method of treating hair which tends to provide a soft texture thereto.

It is another object of the present invention to provide a method of removing the dull film which is generally found on hair following shampooing.

Still another object of the present invention is to provide a method of treating hair which will increase the natural sheen of the hair.

A still further object of the present invention is to provide a method of conditioning hair in order to make it more manageable and easier to control.

These and other objects of the present invention are accomplished as more fully set out in the specification and claims which follow.

Hair rinses have had a long and varied history beginning with the use of vinegar and lemon juice to remove lime soap after shampooing. Later developments resulted in the use of weak solutions of polybasic hydroxy acids which were usually dispensed in the form of a powder which was dissolved in water and applied to the hair as a rinse. Still later quaternary ammonium compounds were found the use of which provided a smooth and soft feel to the hair and the use provided for easier combing and manageability. However, many such compounds would not form stable emulsions with water and product separation was also noticed.

It has been found that the cationic bases of the present invention may be dissolved in water to provide a safe and reliable hair rinse which is easy to apply to the hair.

The preferred hair rinse compositions used in accordance with the present invention comprise a cationic agent which is the reaction product of a hexitol epihalohydrin condensate containing from about 1 to about 4 halohydrin radicals per hexitol residue and a C₁₂ to C₂₂ fatty acid diamide of diethylene triamine. If more than 4 halohydrin radicals per hexitol residue are present in the hexitol component of the reaction product there appears to be a loss of ability of the final product to adequately and effectively provide the required film around individual hair shafts, which film provides for greater manageability and control of the hair. (The ratio in parenthesis following the hexitol component of the reaction product indicates the molar ratio of hexitol to epihalohydrin.) Illustrative of the cationic compounds of the present invention are the reaction product of the condensate of sorbitol epichlorohydrin (1:2) and the tallow acids diamide of diethylene triamine, mannitol epibromohydrin (1:2) and the stearic acid diamide of diethylene triamine, the reaction product lauryl acid diamide of diethylene triamine and sorbitol epichlorohydrin (1:3), the reaction product of cotton seed oil acids diamide of diethylene triamine and dulcitol epichlorohydrin (1:4), the reaction product of lard fatty acids diamide of diethylene triamine and sorbitol epichlorohydrin (1:2), the reaction product of linoleic acid diamide of diethylene triamine and sorbitol epichlorohydrin (1:2), the reaction product of

2

palmitic acid diamide of diethylene triamine and sorbitol epichlorohydrin (1:2).

The chemistry of the hexitol epihalohydrin condensation products and the amidation products of diethylene triamine and the C₁₂ to C₂₀ fatty acids have been well elucidated in the prior art. A number of suitable compounds are disclosed in application Serial No. 654,472, filed April 23, 1957, by John D. Zech.

The cationic bases useful in the practice of the present invention are prepared by condensing the hexitol derivative with the fatty acid diamide at relatively low temperatures, usually about 100° C. to about 150° C. in the presence of a catalyst and for a short period of time of about ½ to about 4 hours. Under these mild reaction conditions, it is desirable however to employ a stoichiometric excess of the fatty acid diamide in preparing the compounds of the present invention in order to insure complete reaction of the halohydrin derivative.

As a viscosity control agent for the hair rinse compositions of the present invention, the use of which reduces the viscosity of the composition, there may be added a glycol or polyglycol of low molecular weight such as, for example, propylene glycol, tetraethylene glycol. A preferred glycol is propylene glycol. The glycol may be added as such to the cationic base or it may be added to the hexitol epihalohydrin derivative prior to its reaction with the fatty acid diamide of diethylene triamine. It is preferred however to add approximately ½ of the required amount of glycol to the hexitol epihalohydrin condensation product and add the balance to the final reaction product of the hexitol epihalohydrin and the fatty acid diamide. It is preferred that the final product contain from about 15% to about 35% by weight of the low molecular weight glycol or polyglycol in order to reduce its viscosity. A more preferred range is one wherein the glycol or polyglycol is added in an amount of from 20% to 25% by weight of the final composition.

The term "halohydrin" is used here, however, in a somewhat restricted sense, in that compounds of chlorine, bromine and/or iodine are included, and those containing only fluorohydrins are excluded. That is fluorohydrins containing only fluorine as a characterizing halogen atom, are excluded; however, halohydrins containing chlorine, bromine and/or iodine, in addition to fluorine are contemplated herein. This limitation is imposed in view of the relative stability of the carbofluorine bond or, in other words, the relative lack of reactivity of fluorine in such compounds. "Halohydrin composition," or "halohydrin compositions," indicate a composition or compositions in which one or more of the aforesaid halohydrins are present.

The following example illustrates the preparation of a hexitol halohydrin fatty acid diamide of diethylene triamine useful in preparing the hair rinses of the present invention.

Example I

913.0 grams of anhydrous sorbitol were heated to a reaction temperature of between 98° and 108° C.; 2.0 cc. of BF₃ etherate catalyst (45% BF₃) were then added.

Thereafter, 1040 grams of epichlorohydrin (molar ratio of sorbitol to epichlorohydrin of 1:2.25) were added dropwise over a period of 1 hour and 10 minutes with vigorous stirring and temperature control in order to maintain the temperature within the above-specified limits. The temperature was maintained with the use of additional heat to insure completion of the reaction.

100 grams of diethylene triamine and 571 grams of edible tallow were heated together at 135° C. for 3 hours. The residue in the flask consisted of a 99% yield of tallow acids diamide of diethylene triamine. The nitrogen con-

tent of the mixture was 5.3% and the HCl equivalent was 700.

81.0 grams of the above prepared sorbitol epichlorohydrin and 664 grams of the above prepared tallow acids diamide of diethylene triamine (molal ratio of sorbitol epichlorohydrin to tallow acid diamide of diethylene triamine of 1:4.66) were heated together for 1½ hours at a temperature of from 90 to 126° C. The resultant condensate was a gummy plastic waxlike material dispersible in water.

The cationic hair rinses of the present invention are prepared by making a weak aqueous solution of the hereinabove defined and readily water-soluble reaction products.

When applied to the hair the hair rinse is allowed to remain several minutes in contact with the hair after which the hair is again rinsed with water. After drying the hair, the cationic ingredient of the rinse remains as a coating upon the hair and serves as a hair conditioning or grooming agent.

Example II

To 3 parts by weight of the reaction product of Example I is added with stirring 1 part by weight of propylene glycol. The resulting product was of reduced viscosity and the addition of the propylene glycol provided for greater ease in further diluting the mixture for subsequent use as a hair rinse. Weak aqueous solutions of this mixture when applied to the hair as a rinse after shampooing resulted in hair which was much easier to manage and control than hair not so treated.

Example III

Product of Example II -----	5
Water -----	95
Water-soluble perfume, q.s.	

One tablespoon of the above formula was diluted with about 1 cup of water and was applied to the hair as a rinse solution following shampooing of the hair. The rinse was allowed to remain in contact with the hair for several minutes after which the hair was again rinsed with water. The hair was then combed and dried, and it was noted that the hair was substantially softer to the touch and was more easily managed and controlled than was hair which had not been so treated with the hair rinse. In addition, the harsh feel of the hair had been effectively reduced when compared with hair which had been merely shampooed, rinsed with water and dried. Moreover, it was noted that there appeared to be a decided reduction in the static charge remaining on the hair which charge acts as a repellent for individual strands and, consequently, makes the hair difficult to control and manage.

The compositions of the present invention seem to form a film around the individual shafts of the hair which

film makes the hair softer to touch and reduces the tendency of the hair to retain a static charge thereon. The mechanism by which the compositions useful in the practice of the present invention work is not completely understood; however, it appears that a loose chemical union may be formed with the hair proteins.

What is claimed as new and that which is desired to be protected by Letters Patent is:

1. A method of rinsing hair which comprises applying to the hair a dilute aqueous solution of the reaction product of a hexitol epihalohydrin condensate containing from 1 to 4 halohydrin radicals per hexitol residue, provided that at least one of said halohydrin radicals contains a halogen atom selected from the group consisting of chlorine, bromine and iodine, and a stoichiometric excess of a C₁₂ to C₂₂ fatty acid diamide of diethylene triamine.

2. A method of rinsing hair which comprises applying to the hair a dilute aqueous solution of the reaction product of sorbitol epichlorohydrin condensate containing about 2 chlorine radicals per sorbitol residue and a stoichiometric excess of tallow acids diamide of diethylene triamine.

3. A method of rinsing hair which comprises applying to the hair a dilute aqueous solution of the reaction product of a hexitol epihalohydrin condensate containing from 1 to 4 halohydrin radicals per hexitol residue, provided that at least one of said halohydrin radicals contains a halogen atom selected from the group consisting of chlorine, bromine and iodine, and a stoichiometric excess of a C₁₂ to C₂₂ fatty acid diamide of a diethylene triamine and from 15 to 35% by weight based on said reaction product of propylene glycol.

4. A method of rinsing hair which comprises applying to the hair a dilute aqueous solution of the reaction product of a hexitol epihalohydrin condensate containing from 1 to 4 halohydrin radicals per hexitol residue, provided that at least one of said halohydrin radicals contains a halogen atom selected from the group consisting of chlorine, bromine and iodine, and a stoichiometric excess of a C₁₂ to C₂₂ fatty acid diamide of a diethylene triamine and about 25% by weight based on said reaction product of propylene glycol.

References Cited in the file of this patent

UNITED STATES PATENTS

2,525,771	Cook et al.	Oct. 17, 1950
2,901,430	Chiddix et al.	Aug. 25, 1959

OTHER REFERENCES

Hilfer: Drug and Cosmetic Industry, 70: 3, March 1952, pp. 328, 329 and 416.
Lincoln: J. Soc. Cosmetic Chemists, 8: 4, July 1957, pp. 222-232.
Sagarin: Cosmetics, Science and Technology, Interscience Publ., Inc., N.Y. (1957), pages 405, 538-9.