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3,816,616

UNITARY SHAMPOO AND CREAM RINSE COMPOSITIONS

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6 Claims

ABSTRACT OF THE DISCLOSURE

A shampoo-cream rinse composition is disclosed. This shampoo comprises the combination of O-alkyl-trimethylammoniumchloride substituted a hydroglucose polymer and an anionic detergent in an aqueous solution. This composition is effective as a shampoo as well as the conditioning action of a cream rinse.

The possibility of combining both shampoo and cream rinse action in a single composition for use in a single treatment of the hair has been investigated but until now has been considered impractical. It is well known that anionic detergents and polymers are suitable for shampooing and that cationic detergents and polymers act as cream rinses in many instances. The difficulty which investigators have encountered where these two types of materials are contacted with one another is that they either precipitate or react with one another to the extent that their individual effectiveness is significantly impaired. This is so even if they remain in solution or in a suspended state. The incompatibility of anionic and cationic compounds is well recognized by workers in the art as indicated by Sagarin in *Cosmetics*, Interscience Publishers, Inc., New York, 1957, where it is stated on page 538 that anionic and cationic materials are not used in combination because they react to form salts. Thus, in practice, the anionic detergent shampoo is used first, followed by a separate cream rinse with a cationic material.

The removal of dirt and excess oils from the hair with a shampoo is conventional but it has been long recognized that after shampooing the hair is difficult to manage, being inclined to knot and tangle and be usually only difficultly combed. The problem of wet combing has been dealt with by treating shampooed hair with a cream rinse which coats the hair shafts and causes the individual filaments in a tress to resist tangling and matting because of the cream rinse residue retained by them. The commonly accepted method, prior to the present invention, has been to shampoo the hair followed by rinsing and the separate application of a cream rinse, followed by a second rinse.

It is an object of the present invention to provide a novel combination hair shampoo and cream rinse which will both clean the hair and condition it to improve its wet combing and general appearance.

Another object of the present invention is to combine a cationic polymer and an anionic detergent without any significant loss of the individual properties of either.

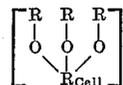
A further object of the present invention is to provide a combined shampoo and cream rinse into which the usual perfumes, opacifiers, colorants, foaming agents, and like materials used to enhance the cosmetic elegance of such compositions may be incorporated.

Another object of the present invention is to provide a composition which, in addition to cleaning the hair leaves a residue of cationic polymer on it which imparts qualities of improved manageability, sheen and ultimate curl retention.

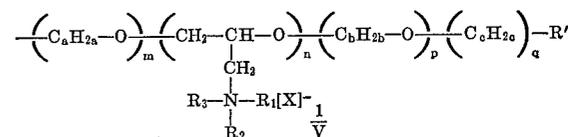
Applicants have discovered, quite surprisingly, that a particular cationic polymer is compatible with anionic detergents including those which are most commonly

used for preparing shampoo compositions. Polymer JR-400, a product of the Union Carbide Corporation is an O-alkyl-trimethylammoniumchloride substituted anhydroglucose polymer. It is water soluble and, at a concentration of 1% and a temperature of 25° C., a viscosity of 400 cps. is produced. A description of this type of polymer is contained in U.S. Pat. 3,472,840, granted to Stone et al. Oct. 14, 1969.

This polymer has the following structural formula:

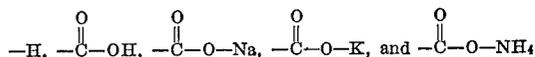


wherein R_{Cell} is the residue of an anhydroglucose unit, y is an integer having a value of from about 50 to about 20,000, and each R individually represents a substituent group of the general formula:



wherein:

- a is an integer having a value of from 2 to 3;
- b is an integer having a value of from 2 to 3;
- c is an integer having a value of from 1 to 3;
- m is an integer having a value of from zero to 10;
- n is an integer having a value of from zero to 3;
- p is an integer having a value of from zero to 10;
- q is an integer having a value of from zero to 1;
- R' is a member selected from the group consisting of



with the proviso that when q is zero then R' is —H; R₁, R₂ and R₃, taken individually, represent a member selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, cycloalkyl, alkoxyalkyl and alkoxyaryl radicals where each of R₁, R₂ and R₃ can contain up to 10 carbon atoms, with the proviso that when said member is an alkoxyalkyl radical there are at least 2 carbon atoms separating the oxygen atom from the nitrogen atom, and with the further proviso that the total number of carbon atoms in radicals represented by R₁, R₂ and R₃ is from 3 to 12 with the further proviso that when R₁, R₂ and R₃ are taken together the nitrogen atom to which R₁, R₂ and R₃ are attached can be a component of a heterocyclic ring selected from the group consisting of pyridine, α-methylpyridine, 2,5 - dimethylpyridine, 2,4,6 - trimethylpyridine, N - methylpiperidine, N-ethyl piperidine, N-methyl morpholine and N-ethyl morpholine; X is an anion;

V is an integer which is equal to the valence of X;

the average value of n per anhydroglucose unit of said cellulose ether is from about 0.01 to about 1; and the average value of m+p+q per anhydroglucose unit of said cellulose ether is from about 0.01 to about 4.

Typical anionic detergents which have been found to be compatible with Polymer JR include triethanolammonium lauryl sulfate, sodium lauryl sulfate, sodium poly-

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hydroxy monoether sulfate and Emcol 4161 (sulfosuccinate half ester amide).

This compatibility is totally unexpected since, in addition to the general knowledge that anionic and cationic substances tend to combine and salt out of solution, the technical information supplied by the maker of Polymer JR specifically states that, "aqueous solutions of Polymer JR are not compatible with anionic polymers such as sodium carboxymethylcellulose and they are also incompatible with anionic detergents."

Polymer JR is supplied in the form of a free-flowing granular powder which is readily dissolved in water without heating, prolonged stirring, or excessive agitation.

Aqueous solutions of Polymer JR are clear and colorless. An anionic detergent which has been found to be particularly suitable for use in the unitary shampoo and cream rinse composition of the present invention is triethanolammonium lauryl sulfate. This detergent is available as a 40% aqueous solution.

The cationic Polymer JR may be first dissolved in water and subsequently combined with the anionic aqueous solution or it may be added directly to the anionic aqueous solution in the form of a powder with stirring. The initial contacting of these two materials produces a stringy precipitate which is easily observable.

The particular means of stirring or agitation is not critical but it has been found that with continued mixing the precipitate appears to redissolve in the mixture and with overnight aging at room temperature a translucent solution is obtained. The combined shampoo and cream rinse composition may have added to it such further materials as may be desired to improve the cosmetic elegance thereof. These include perfumes, dyes, emollients, and other cosmetic ingredients commonly used in hair treating compositions. No particularly incompatible group of such materials has been discerned in work with these compositions.

The following compositions are set forth by way of exemplification and not by way of limitation. The amounts of materials in the following examples are given as a percent weight per weight.

EXAMPLE I

	Percent
Polymer JR	4.0
Triethanolammonium lauryl sulfate (40% solution) ..	40.0
Water (deionized)	56.0

One kilogram of this composition was prepared in a 2 liter beaker by stirring with a three-blade propeller for 1½ hours after adding the triethanolammonium lauryl sulfate to a water solution of Polymer JR. The composition at the end of stirring no longer showed any of an initially formed stringy precipitate. The somewhat viscous substance did contain some entrapped air as a result of the stirring but upon standing overnight it deaerated to a clear translucent solution.

The above composition was used to shampoo bleached hair tresses. After rinsing, the substantivity of the cationic Polymer JR for the hair was demonstrated by contacting the hair with a solution of Fast Ruben B dye. The amount of dye taken up by the treated hair is an indication of the substantivity of the cationic component of the compositions of the present invention. Other freshly shampooed tresses were rolled around a 5/8 inch diameter plastic hair curler after rinsing and dried overnight at ambient temperature and relative humidity. The treated tresses were tested for curl retention at a high relative humidity of about 90 to 95%. The compositions of the present invention repeatedly showed better curl retention than those tresses treated with the commercially available shampoos and cream rinses used in the conventional sequential manner.

A preferred cosmetic composition of the present invention may be prepared by combining the following in-

gredients and blending them together with simple mixing. A one kilogram batch contains:

EXAMPLE II

	G.
Ammonium lauryl ether sulfate	250
Coconut fatty acid diethanolamide	20
Sodium sequestrene	2.5
Disodium N-lauroyl-β-imino-dipropionate	20
FD&C blue #1 (0.5% solution)	4
Formaldehyde (37% solution)	1
Perfume	3
Polymer JR-400	10
Distilled water	689.5

The materials were mixed together in a two-liter flask by means of a propeller for about 2 hours. The resulting composition was transparent though containing some entrapped air. After standing overnight, the composition completely deaerated.

When used as a conventional shampoo, it cleaned the tresses completely, but in addition left a residue of cationic polymer which imparted to the tresses after rinsing with water improved wet combability, curl retention and softness. No cream rinse was required.

Other examples of shampoo-hair conditioners are given below:

EXAMPLE III

Clear condition shampoo

Sulfosuccinate half ester amide detergent (Emcol 4161)	35.00
Lauric acid diethanolamide (1:1)	2.00
Perfume, preservative and color	Q.s.
Polymer JR-400	1.00
Water, D.I.percent...	Q.s. to 100.00

EXAMPLE IV

Opaque conditioning shampoo

Sodium lauryl sulfate	35.00
Ammonium lauryl sulfate	15.00
Glyco amido stearate (Cerasynt IP)	4.00
Lauric acid diethanolamide (1:1)	3.00
Polymer JR-400	1.00
Preservative, perfume and color	Q.s.
Water, D.I.percent...	Q.s. to 100.00

EXAMPLE V

Clear conditioning shampoo

Triethanolammonium lauryl sulfate	40.00
Lauric acid diethanolamide (1:1)	4.00
Polymer JR-400	1.00
Perfume, preservative and color	Q.s.
Water, D.I.percent...	Qs. to 100.00

EXAMPLE VI

Opaque conditioning shampoo

Sodium lauryl monoether sulfate	40.00
Ethylene glycol monostearate	3.00
Lauric-myristic acid diethanolamide (1:1)	4.00
Polymer JR-400	1.00
Preservative, color and perfume	Q.s.
Water, D.I.percent...	Qs. to 100.00

A high molecular weight Polymer JR-30,000 has also been found suitable for preparation of compositions of the present invention. An example of this is as follows:

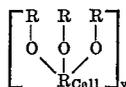
EXAMPLE VII

	G.	5
Sodium lauryl sulfate (28% solution) -----	1067	
Ammonium lauryl sulfate (Sipon L-22) -----	457.2	
Glyco amido stearate (Cerasynt IP) -----	84	
Emcol MM (fatty amides) -----	30.6	
Formaldehyde -----	7.5	10
Versenex 80—Na ₅ -diethylenetriamine penta acetic acid -----	9.3	
Sodium chloride -----	3.9	
Polymer JR-30,000 -----	30	15
Water q.s. to a wt. of 3 kilograms.		

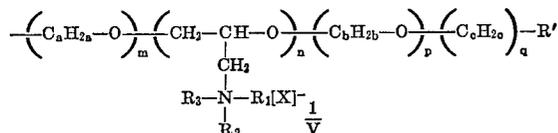
The Polymer JR is dispersed in cold water and added to the sodium lauryl sulfate with stirring. Add Sipon L-22 and stir well. Add Versenex 80 and heat to 70° C. Melt together the Cersaynt IP and Emcol MM. Add this to the initial mixture at 75° C. Hold at this temperature and stir. Allow to cool to room temperature. Add formaldehyde and sodium chloride. Adjust pH to 6.3-6.9 with hydrochloric acid or monoethanolamine and add any color and further water as required. The invention in its broader aspects is not limited to the specific compositions, steps, methods and combinations described, but may be made with the scope of the claims without departing from the principals of the claims and without departing from its chief advantages.

What is claimed is:

1. A shampoo-cream rinse composition which comprises about 7% to 20% by weight of an anionic surface active agent and from about 1% to 4% by weight of O-alkyl-trimethylammoniumchloride substituted anhydroglucose polymer of the formula:



wherein R_{Cell} is the residue of an anhydroglucose unit, y is an integer having a value of from about 50 to about 20,000, and each R individually represents a substituent group of the general formula:



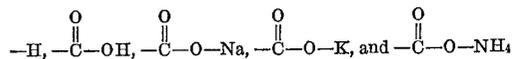
wherein:

a is an integer having a value of from 2 to 3;
b is an integer having a value of from 2 to 3;
c is an integer having a value of from 1 to 3;
m is an integer having a value of from zero to 10;
n is an integer having a value of from zero to 3;

p is an integer having a value of from zero to 10;

q is an integer having a value of from zero to 1;

R' is a member selected from the group consisting of



with the proviso that when q is zero then R' is —H; R₁, R₂ and R₃, taken individually, represent a member selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, cycloalkyl, alkoxyalkyl and alkoxyaryl radicals where each of R₁, R₂ and R₃ can contain up to 10 carbon atoms, with the proviso that when said member is an alkoxyalkyl radical there are at least 2 carbon atoms separating the oxygen atom from the nitrogen atom, and with the further proviso that the total number of carbon atoms in radicals represented by R₁, R₂ and R₃ is from 3 to 12 with the further proviso that when R₁, R₂ and R₃ are taken together the nitrogen atom to which R₁, R₂ and R₃ are attached can be a component of a heterocyclic ring selected from the group consisting of pyridine, α-methylpyridine, 2,5-dimethylpyridine, 2,4,6-trimethylpyridine, N-methylpiperidine, N-ethyl piperidine, N-methyl morpholine and N-ethyl morpholine; X is an anion;

V is an integer which is equal to the valence of X; the average value of n per anhydroglucose unit of said cellulose ether is from about 0.01 to about 1; and the average value of m+p+q per anhydroglucose unit of said cellulose ether is from about 0.01 to about 4 in aqueous solution.

2. A composition as set forth in claim 1 wherein there is also contained perfume, preservative and a coloring agent.

3. A composition as set forth in claim 2 wherein said polymer is present in an amount of about 1% by weight.

4. A method of cleansing and conditioning the hair and scalp by applying an aqueous solution as defined in claim 1 to the hair and scalp, working it into a lather and rinsing.

5. A method of cleansing and conditioning the hair as set forth in claim 4 wherein said polymer is present in an amount of about 1% by weight.

6. A shampoo-cream rinse as defined in claim 1 wherein said anionic surface-active agent is selected from the group consisting of ammonium lauryl ether sulphate, triethanol ammonium lauryl sulphate, sodium lauryl sulphate, sodium polyhydroxy monoether sulphate and sulphosuccinate half ester amide.

References Cited

UNITED STATES PATENTS

2,756,178	7/1956	Verblen -----	424—70
3,580,853	5/1971	Parran et al. -----	424—70

SAM ROSEN, Primary Examiner