

[54] **COSMETIC TREATMENT OF HAIR
WITH THIOUREA OR UREA AND
GLYOXAL**

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[56] **References Cited**

UNITED STATES PATENTS

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[57] **ABSTRACT**

Non-alkaline compositions to beautify hair containing thiourea or urea, glyoxal and an inert cosmetic carrier; and also, preferably, benzyl alcohol and diethylene glycol monoethyl ether. Thin hair is thickened, the molding of thick hair is facilitated and hair is elasticized when treated with the compositions.

10 Claims, No Drawings

COSMETIC TREATMENT OF HAIR WITH THIOUREA OR UREA AND GLYOXAL

This invention relates to the cosmetic treatment of hair. More particularly it contemplates compositions to beautify hair, particularly living human hair.

BACKGROUND OF THE INVENTION

It is a matter of common knowledge and experience that the hair covering of an animal, for example, the coating of hairs on a human head, varies with the individual. This variation can be characterized as ranging from coarse, thick hair down through various degrees of less thick hair ultimately to fine, limp hair. Furthermore, many cosmetic treatments have been proposed to beautify and to correct defects in hair; means are known, for example, to straighten tightly curled hair, or to curl straight hair, and to thicken fine hair, or to recondition hair which has been damaged by overexposure to the sun, or dyes and bleaches, and the like.

It is well known that coarse, thick hair is difficult to mold and style and, once styled, to keep in place. It has been proposed to use creams, oils, alcohols, fats, such as lanolin and the like, and styling gels as cosmetic aids to mold thick hair, but none of these are entirely satisfactory because certain of them impart a greasy look to the hair and, with others, often an additional spray coating is needed to retain the styling. A need therefore exists to provide cosmetic compositions and methods to permit thick coarse hair to be molded easier, to permit the styled hair to stay in place without the need to use hair sprays, and to avoid a greasy look.

On the other hand, softer textured hair and thin hair also presents problems in styling. For example, after treatment with gummy greases and oils or alcohols, softer textured fine hair appears to become thinner and less agreeable to the eye. To illustrate, four hairs may become "glued" into one. This problem is especially acute in so-called baby fine hair in which the thin hairs lay very close to the head. In addition, sparse hair in men and women who have lost or begun to lose hair due to age or for other reasons must be styled to take full advantage of the natural hair available and the prior grooming aids mentioned above, which subtract body, are entirely unacceptable. Therefore, a need also exists to provide non-gummy means to style thin hair which will enhance the appearance thereof by providing body, bulkiness and thickness to the hair.

Hair lacking elasticity also is difficult to style and manage. Hair that has been overprocessed by being chemically penetrated for tinting or bleaching and the like, over and over again, usually is damaged and will no longer take a set. The hair just hangs. Sets are ineffective because the elasticity has been lost.

Many so-called conditioners have been proposed, but few of them elasticize the hair. They function by putting a coating on the hair and give hair the appearance of being well-set. Nevertheless, such hair treated with conditioners lacks the desirable "spring" seen in normally elastic hair. Therefore, a need exists to provide a means to enhance the elasticity of hair, helping to permit the hair so treated to take a set which will hold.

It has now been found that hair can be beautified in a surprisingly efficient manner by formulating non-alkaline cosmetic compositions according to this invention, and treating hair with them. They comprise broadly a sulfur or oxygen containing urea-type compound; a polyaldehyde and a carrier for the same.

It is, accordingly, a primary object of this invention to provide cosmetic compositions to beautify hair.

It is a further object of this invention to provide processes using the new compositions to beautify hair.

A further object of the invention is to provide non-alkaline compositions for hair which beautify the hair without imparting an undesirable permanent set thereto.

Still another object of the invention is to provide compositions and means to mold thick hair easier, permitting it to stay in place without the need to use hairsprays, avoiding a greasy look.

A further object of the invention is to provide compositions and means to thicken thin hair by providing bulkiness and body to the hair.

Still another object of the invention is to provide compositions and means to elasticize hair, helping the hair so-treated to take a set that will hold.

DESCRIPTION OF THE INVENTION

These valuable objects and all others readily apparent to those skilled in the art are achieved with the preparation of the present invention which is, in its broadest aspect:

A non-alkaline composition to thicken thin hair, to mold thick hair or to elasticize hair which comprises:

- a. glyoxal;
- b. thiourea, urea or a mixture thereof; and
- c. an inert cosmetic carrier.

A preferred composition will contain:

- a. from about 0.08 to about 4 percent by weight of glyoxal;
- b. from about 0.2 to about 9 percent by weight of thiourea or urea; and
- c. as said inert carrier, water, a lower alkanol, or a mixture of water and a lower alkanol.

Another preferred composition will also contain a minor proportion of benzyl alcohol.

Still another preferred composition will contain a minor proportion of diethylene glycol monoethyl ether.

Especially preferred compositions will contain minor proportions of both benzyl alcohol and diethylene glycol monoethyl ether.

Such compositions will preferably contain:

- d. from about 0.1 to about 4 percent by weight of benzyl alcohol; and
- e. from about 0.1 to about 4 percent by weight of diethylene glycol monoethyl ether.

Preferred compositions are those wherein the pH is from about 4 to about 6.

Also contemplated by this invention is a means to beautify hair which is, in essence:

A process to thicken thin hair, to mold thick hair or to elasticize hair which comprises applying to said thin hair, unmolded thick hair or unelasticized hair a non-alkaline composition according to this invention in an amount sufficient to impart after drying the desired degree of thickening, molding or elasticizing of said hair.

Special mention is made of a number of valuable embodiments within the process aspect of this invention. These are, respectively:

A process to thicken thin hair which comprises applying to said thin hair a composition according to this invention in an amount sufficient to impart the desired degree of thickening; drying the so-treated hair; and grooming the dried, treated hair into the form desired.

A process to mold thick hair which comprises applying to unmolded thick hair a composition according to this invention in an amount sufficient to impart the desired degree of moldability; drying the so-treated hair; and grooming the dried, treated hair into the form desired.

A process to elasticize hair which comprises applying to the hair a composition according to this invention in an amount sufficient to impart after drying the desired degree of elasticization to said hair.

A process as next above defined including the steps of grooming or setting the dried, treated hair into the form desired.

When used herein and in the appended claims, the term "non-alkaline" contemplates compositions in which the pH is from neutrality to acidic, i.e., about pH 7 or below. Excluded, of course, are media too acidic to be employed on the hair or skin without imparting damage. In any event, alkaline media, i.e., those of above pH 7 are excluded, and especially those alkaline pH's used commonly in hair waving compositions (wherein the optimum seems to be about pH 9.2). In the present non-alkaline compositions, the optimum pH for most purposes appears to be from about 4 to about 6.

"Molding" of thick hair, for example, is a term well-understood by stylists. It contemplates treating the hair to cause it to conform to a generally predetermined, but more desirable configuration than the unmolded hair assumes.

"Thickening" thin hair is used in the sense described above to contemplate changing the hair in such a way that there is added the appearance of heavier body and fullness.

"Elasticizing" hair which lacks elasticity means to cause such a change in the hair that it will easily take a set, and afterwards the "springy" feel of hair is evident.

"Grooming" means the usual and customary operations such as combing, recombining, brushing, and the like, employed to arrange hair. "Setting" contemplates operations commonly employed to style hair and includes waving, arranging, and the like.

The thiourea or urea and glyoxal ingredients in the present compositions, are items of commerce. They have been found to be essential. It is not possible to use either thiourea, urea or glyoxal alone to obtain the desired results. Only a marginal effect will be seen with each used alone. However, a remarkable penetrating, swelling and surrounding of the outer structure of hair is seen if the hair is treated with thiourea or urea and glyoxal used together under non-alkaline conditions in an inert cosmetic carrier.

Suitable carriers comprise a class of nonirritating liquids which may be safely applied to the skin and hair of mammals, such as water, alcohols, especially lower alcohols of from two to six carbon atoms, e.g., ethanol, isopropanol, etc., mixtures of water and lower alcohols, fats, such as lanolin, and the like.

The ratio of amount of thiourea or urea and glyoxal combined to the amount of carrier used is not particularly critical. Suitable formulations depending on the end use contemplated can be prepared easily by those skilled in the art. Generally, for economic reasons, and for ease of application, the composition will contain a minor proportion, i.e., less than 50 percent by weight of thiourea or urea, and glyoxal, and a major proportion of carrier. For most purposes, the ratio of glyoxal to thiourea or urea will not be critical, the advantages being secured at ratios ranging from about 1:10 to about 10:1 by weight of each. For thickening thin hair, for molding thick hair or for elasticizing hair, however, generally preferred ratios will comprise for each part by weight of glyoxal, from about 1 to about 10 parts by weight of thiourea or urea, and especially from about 2.5 to about 3.5 parts by weight of thiourea or urea. For most purposes, the best properties will be obtained with compositions containing from about 0.04 to about 8 percent and preferably from about 0.08 to about 4 percent by weight of glyoxal and from about 0.1 to about the solubility limit in water, but preferably from about 0.20 to about 9 percent of thiourea or urea.

If either benzyl alcohol, or diethylene glycol monoethyl ether, or both is added to the basic formulation, in minor proportions, e.g., either or both together providing less than 50 percent by weight of the final composition, there is a preferred enhancement in the properties of the instant compositions. Compositions containing either of these ingredients or, preferably both of them, are important embodiments hereof. While the reasons for their contribution to enhanced properties are not clearly understood at this time, benzyl alcohol and diethylene glycol monoethyl ether in minor proportions, e.g., especially from about 0.1 to about 4 percent by weight, and preferably from about 0.1 to about 2 percent by weight of each in the composition seem to facilitate penetration and reduce the time required to obtain the desired results.

Of course, as will be obvious to those skilled in the art, a variety of conventional additives may be used in the instant compositions to secure additional objectives. For example, small amounts of stabilizers and sequestrants, e.g., sorbic acid or its salts; gelling agents, such as polyethers; opacifiers; hydrolyzed proteins; perfumes and the like, may be used. Also, pigments and antiseptics and the like can be added. These additives will comprise generally a minor proportion of the compositions, e.g., up to about 2 percent by weight in the most preferred formulations.

There is nothing critical about the manner in which the present compositions are prepared. Those skilled in the art of formulating cosmetics will be well aware of the manipulative techniques needed to provide the composition in the form of solutions, dispersions, lotions, gels, creams and the like. Preferred formulations will be exemplified in detail hereinafter. In one method, the liquid ingredients are blended, then the solids are mixed in. In another method powdered solids, e.g., thiourea or urea and solid additives are mixed together first, then blended with part of the inert cosmetic carrier, then the liquid components, e.g., glyoxal, and the benzyl alcohol and diethylene glycol monoethyl ether, if used, and opacifier, and other liquid additives, if desired, are blended with the reserved part of the cosmetic carrier, then final blending is made. If necessary, the pH is adjusted to the desired non-alkaline level by adding the required amount of acid, e.g., hydrochloric acid, or alkali, e.g., sodium hydroxide solution.

The present formulations can be applied to hair by any method satisfactory to accomplish the desired beautification purpose. For best results, the hair will be shampooed, then rinsed clean before the first application. After towel drying, the composition will be applied liberally and distributed evenly. The hair then is dried either naturally or with the assistance of external means. The composition at this point appears to have penetrated the hair structure and to have adhered to the outer surface of the hair, to produce thickening, molding and elasticization. After the hair is dry it is combed and brushed in the usual manner.

Whenever additional body, or control or thickening is desired a re-application on the dry hair (applying like any hair dressing) will secure the desired results.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following examples describe the preparation of compositions according to the present invention.

EXAMPLE 1

A composition having the following formulation, expressed as parts by weight, is prepared

glyoxal	1.4
thiourea	4
water	94.6

The thiourea is mixed with the water until dissolved. Then glyoxal is added as a 40 percent aqueous solution. Finally, the mixture is blended until uniform and the pH is adjusted to 4 to 6, if necessary, with acid or alkali.

Thin hair is shampooed, then rinsed clean and towel dried. A liberal amount of the composition is applied and distributed evenly. The hair then is allowed to dry. It is combed and a thicker, fuller-looking head of hair is obtained.

EXAMPLE 2

Compositions having the following formulations, expressed as parts by weight, are prepared:

Glyoxal	1.4	1.4	1.4	1.4	1.2	1.6
Thiourea	4	4	4	4	4	4
Benzyl alcohol		2		2	2	2
Diethylene glycol monoethyl ether			2	2	2	2
Water (distilled)		92.6	92.6	90.6	90.8	90.4
Isopropanol	94.6					

The pH is adjusted to 4 to 6, if necessary by adding 0.1 N HCl or 0.5 N NaOH.

These formulations are applied liberally to shampooed, towel dried, thin hair. The thin hair is treated with these formulations and allowed to dry. After drying a thicker looking head of hair is obtained after combing and brushing.

These formulations are applied liberally to shampooed, towel dried, unmolded thick hair. The hair is allowed to dry and combed into a well groomed, molded head look.

Hair in which the elasticity is desired to be increased is shampooed and towel dried. It is treated liberally with these formulations and is allowed to dry. The hair then is groomed or set into the desired form.

EXAMPLE 3

A composition having the following formulation, expressed as parts by weight, is prepared

glyoxal	0.4
thiourea	2.0
hydrolyzed protein (Wilson, X-1000)	0.1
Carboxypolymethylene (Union Carbide, Carbopol 940)	1.0
sodium hydroxide	0.175
diethyleneglycol mono ethyl ether	
(Union Carbide, Carbitol)	2.0
benzyl alcohol	2.0
potassium sorbate	0.05
formalin	0.25
perfume	q.s.
opacifier	q.s.
water	100.00
q.s.	

This is used as a cosmetic for hair according to this invention.

EXAMPLE 4

Compositions having the following formulation, expressed as parts by weight, are prepared:

glyoxal	0.33-1.2
urea	1 -4
hydrolyzed protein (Wilson, X-1000)	0.25
polyvinylpyrrolidone (PVP NPK 30)	0.05
diethyleneglycol mono ethyl ether	
(Union Carbide, Carbitol)	1 -2
benzyl alcohol	1 -2
carboxypolymethylene (Union Carbide, Carbopol 940)	0.8 -1.0
sodium hydroxide	0.15-0.2
formalin	0.25
perfume	q.s.
opacifier	q.s.
water	100.00
q.s.	

These compositions, pH 4 to 6, are used as cosmetics for hair according to this invention.

Although specific embodiments of the invention have been described herein, it is obvious that many variations will suggest themselves to those skilled in the art after reading this detailed description. It is intended to include all obvious variations and modifications within the spirit and scope of the appended claims.

What is claimed is:

1. A composition which comprises:

- a. from about 0.08 to about 4 percent by weight of glyoxal;
- b. from about 0.2 to about 9 percent by weight of thiourea or urea; and
- c. as an inert carrier, water, a lower alkanol, or a mixture of water and a lower alkanol.

2. A composition as defined in claim 1 which also includes from about 0.1 to about 4 percent of benzyl alcohol.

3. A composition as defined in claim 1 which also includes from about 0.1 to about 4 percent of diethylene glycol monoethyl ether.

4. A composition as defined in claim 1 which also includes:

- d. from about 0.1 to about 4 percent by weight of benzyl alcohol; and
- e. from about 0.1 to about 4 percent by weight of diethylene glycol monoethyl ether.

5. A composition as defined in claim 4 wherein the pH is from about 4 to 6.

6. A process to thicken thin hair, to mold thick hair or to elasticize hair which comprises applying to said thin hair, unmolded thick hair or unelasticized hair a composition which comprises (a) glyoxal; (b) a compound selected from the group consisting of thiourea, urea and mixtures thereof; and (c) an inert carrier selected from the group consisting of water, lower alkanols and mixtures thereof in an amount sufficient to impart after drying the desired degree of thickening, molding or elasticity to said hair.

7. A process to thicken thin hair which comprises applying to said thin hair a composition as defined in claim 4 in an amount sufficient to impart the desired degree of thickening; drying the so-treated hair; and grooming the dried, treated hair into the form desired.

8. A process to mold thick hair which comprises applying to unmolded thick hair a composition as defined in claim 4 in an amount sufficient to impart the desired degree of moldability; drying the so-treated hair; and combing or brushing the dried, treated hair into the form desired.

9. A process to elasticize hair which comprises applying to said hair a composition as defined in claim 4 in an amount sufficient to impart after drying the desired degree of elasticization to said hair.

10. A process as defined in claim 9 including the steps of combing, brushing or setting the dried, treated hair into the form desired.

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