# METHODS, COMPOSITIONS AND USES RELATING THERETO

The present invention relates to a method of treating a dyed material, to compositions for use in such methods and to uses relating thereto. In particular the present invention relates to a method of treating a dyed keratinous material, especially hair. The method is especially useful for reducing, inhibiting or preventing the loss of colour from dyed materials, especially dyed hair.

Procedures for dyeing materials, especially hair and other keratinous materials, have been in existence for many years. However the dyed materials lose colour intensity and vibrancy after dyeing. One cause of this loss of colour is believed to be leaching of dye molecules from the materials when in contact with water or other solvents which can dissolve/solubilise the dyes and cause them to diffuse out of the material. This colour loss can thus occur during processes such as washing of the material (or shampooing in the case of hair) or during other processes where the material comes into contact with water or other solvents that can leach dyes from the material. The problem is greater in the case of small dye molecules as these are more mobile and can thus be leached from the material at a faster rate than larger dye molecules. As a result, repeated washing of materials can lead to colour loss over time. This can also cause a colour shift, for example whereby one or more dye compounds present in a mixture used to colour a material are leached from the material to a greater extent than the others during washing.

For textile materials and fabrics colour loss can occur during washing of the material, either in a hand washing process or in an automatic washing machine.

One effective means by which colour loss can be prevented or inhibited is by treatment with formaldehyde. However formaldehyde is a suspected carcinogen and thus its use in cosmetic compositions is strictly regulated and highly undesirable. There have been several attempts to provide alternative means for combatting colour loss from hair. However to date none of these have been completely satisfactory and there therefore exists a need to develop further alternative strategies.

It is an aim of the present invention to provide means for reducing, inhibiting or preventing colour loss from dyed materials.

## SUMMARY

In one aspect, there is provided a method of combatting colour loss from a dyed material, the method comprising contacting the material with a composition comprising a hydroxy-substituted aldehyde comprising one hydroxy substituent.

In another aspect, there is provided a hair care composition an aliphatic hydroxy-substituted aldehyde comprising one hydroxy substituent at the 2, 3 or 4 position.

In yet another aspect, there is provided a method of colouring hair, the method comprising contacting the hair with a colouring composition; and contacting the hair with a composition comprising an aliphatic hydroxy-substituted aldehyde comprising one hydroxyl substituent.

In a further aspect, there is provided the use of a hydroxy-substituted aldehyde comprising one hydroxyl substituent to combat colour loss from dyed hair.

In another aspect, there is provided a packaged hair colouring product comprising one or more compositions wherein the one or more compositions together comprise at least one dye compound and/or one dye precursor compound and an aliphatic hydroxy-substituted aldehyde comprising one hydroxyl substituent at the 2, 3 or 4 position.

**DETAILED DESCRIPTION**

According to a first aspect of the present invention there is provided a method of combating colour loss from a dyed material, the method comprising contacting the material with a composition comprising a hydroxy-substituted aldehyde.

**Claims**

1. A method of combatting colour loss from a dyed material, the method comprising contacting the material with a composition comprising a hydroxy-substituted aldehyde comprising one hydroxy substituent.

2. The method according to claim 1 wherein the material is a keratinous material.

3. The method according to claim 1 or claim 2 wherein the material is human hair or animal hair, preferably human hair.

4. The method according to claim 3 wherein the material is growing human hair or animal hair, preferably growing human hair.

5. A hair care composition comprising an aliphatic hydroxy-substituted aldehyde comprising one hydroxy substituent at the 2, 3 or 4 position.

6. The hair care composition according to claim 5 comprising two or more hydroxy-substituted aldehydes.

7. The method according to claims 1-4 or composition according to claims 5-6 wherein the composition comprising the hydroxy substituted aldehyde is selected from a shampoo composition, a conditioning composition, a hair styling composition, a hair permanent waving composition, a hair relaxing composition, a hair permanent straightening composition or a hair colouring composition.

8. The method according to claims 1-4 or 7 or composition according to claims 5-7 wherein the composition comprising the amine salt further comprises 1 to 30 wt% of one or more surfactants, preferably one or more anionic surfactants.

9. A method of colouring hair, the method comprising:
   (a) contacting the hair with a colouring composition; and
   (b) contacting the hair with a composition comprising an aliphatic hydroxy-substituted aldehyde comprising one hydroxy substituent.

10. The method according to claims 1-4 or 7-9 or composition according to claims 5-8 wherein the aldehyde is an $\alpha$-hydroxy aldehyde.

11. The method according to claims 1-4 or 7-10 or composition according to claims 5-8 or 10 wherein the aldehyde is selected from 2-hydroxypropanal, 2-hydroxyhexanal or 2-hydroxyoctanal.

12. The method according to claims 1-4 or 7-11 or composition according to claims 5-8 or 10-11 comprising a first hydroxy-substituted aldehyde having less than 10 carbon atoms and a second hydroxy-substituted aldehyde having 10 or more carbon atoms.

13. The method or composition according to claim 12 wherein the second hydroxy-substituted aldehyde is selected from 2-hydroxydecanal, 2-hydroxydodecanal and 2-hydroxytetradecanal.

14. The method or composition according to claim 12 wherein the first hydroxy-substituted aldehyde is selected from 2-hydroxypropanal, 2-hydroxyhexanal or 2-hydroxyoctanal and the second hydroxy-substituted aldehyde is selected from 2-hydroxydecanal, 2-hydroxydodecanal and 2-hydroxytetradecanal.

15. The method according to claims 1-4 or 7-14 or composition according to claims 5-8 or 10-14 wherein the composition comprising the aldehyde further comprises an amine salt of a carboxylic acid.

16. The method according to claims 1-4 or 7-15 or composition according to claims 5-8 or 10-15 wherein the composition comprising the aldehyde further comprises a polycarboxylic acid derived chelating agent.

17. The method according to claims 1-4 or 7-16 or composition according to claims 5-8 or 10-16 wherein the composition comprising the aldehyde further comprises a succinimidyl ester.

18. The method according to claims 1-4 or 7-17 or composition according to claims 5-8 or 10-17 wherein the comprising the aldehyde further comprises a crosslinking agent comprising two or more maleic acid derived reactive moieties and a linker having two or more amino groups.

19. The method according to any of claims 9 to 18 wherein steps (a) and (b) are carried out simultaneously and the method involves contacting the hair with a colouring composition comprising a hydroxy aldehyde.

20. The method according to any of claims 9 to 18 wherein step (b) is carried out before step (a).

21. The method according to any of claims 9 to 18 wherein step (b) is carried out after step (a).

22. The method according to claims 1-4 or 7-21 or composition according to claims 5-8 or 10-18 which provides a significant reduction in colour loss after 1 to 3 washes such that the colour is visibly more intense compared with hair dyed by an equivalent method excluding the hydroxy substituted aldehyde.

23. The method according to claims 1-4 or 7-21 or composition according to claims 5-8 or 10-18 or 22 which provides a reduction in colour loss of at least 10% after three washes compared with hair dyed by an equivalent method excluding the hydroxy substituted aldehyde.

24. Use of a hydroxy-substituted aldehyde comprising one hydroxy substituent to combat colour loss from dyed hair.

25. The use according to claim 25 of two or more hydroxy-substituted aldehydes to combat colour loss from dyed hair.

26. The method according to claims 1-4 or 7-23 or use according to any of claims 24-25 which reduces colour loss by at least 20 %.

27. A packaged hair colouring product comprising one or more compositions wherein the one or more compositions together comprise at least one dye compound and/or one dye precursor compound and an aliphatic hydroxy-substituted aldehyde comprising one hydroxy substituent at the 2, 3 or 4 position.

28. The method according to claim 1 wherein the dyed material is a textile material, preferably a textile material comprising wool.

29. The method according to claim 1 or claim 28 which combats colour loss resulting from washing a dyed textile material in a laundry washing process.