

**FORMULATIONS FOR THE REPAIR, RESTRUCTURING AND
RECONSTRUCTION OF DAMAGED HAIR**

* * * * *

Technical field

5 The present invention relates to cosmetic formulations for repairing, restoring and reconstructing damaged hair. In particular, the present invention describes a composition, hereinafter referred to as restructuring blend, to be used in combination with known excipients for the formulation of products suitable for hair and scalp care.

10 **State of the art**

Hair is a protein-like filament produced by hair follicles located on the dermis of the skull. They perform many functions, comprising regulating body temperature and protecting us from the penetration of external agents, both chemical and biological.

15 Hair is essentially made up of long polypeptide chains of a fibrous nature and rich in cysteine. These amino acid polymers have highly organized structures and tend to assemble together to form fibrous filaments that give resistance, shape, structure and protection to hair. Spatial aggregations between protein molecules occur through the formation of intermolecular
20 interactions, both covalent and non-covalent. These interactions govern many structural parameters of hair such as shape, fold, combability, texture and in the absence of which, hair can weaken, damage, break or lose vigour and vitality.

Non-covalent and therefore reversible interactions comprise hydrogen
25 bridge bonds, hydrophobic interactions triggered by lipophilic residues on the polypeptide chain and salt bridges. As proof of this, a simple wash with water, for instance, temporarily breaks down the hydrogen bonds between the protein chains of hair loosening its structural rigidity and favouring remodelling and elasticity. This allows to rearrange the wet hair taking the
30 desired hair style so that, once water is evaporated, the restoration of hydrogen bonds will take place in positions different from the original and will allow to maintain the new shape.

The covalent bonds formed between the protein filaments are more relevant for structural purposes. These linkers are disulfide bridges, i.e. sulphur-sulphur bonds obtained by the mutual anchoring of two thioyl functions belonging to the side chains of cysteine residues. Unlike the
5 interactions guided by electric charge or lipophilicity, bridges between cystines as covalent bonds, and therefore stronger and more stable, delineate and define the structural tissue and the true skeleton of hair.

Repeated treatments with formulations having an alkaline pH, e.g. around a value of 8.5 or higher, cause a progressive rupture of disulfide bridges
10 and considerably damage hair. In particular, the hair damage occurs at the cuticle or the most superficial layer and therefore more exposed to the action of external agents and causes the lifting of cuticular scales that make hair wrinkled and abraded. The consequence of this is an overall tangling and frizzing of hair. Thus, once dried, hair appears dry, frizzy,
15 catches light in an uneven way, loses shine and becomes opaque, dull and damaged. This structural damage of hair is one of the main causes of split ends.

Among the alkaline treatments mainly responsible for hair damage are oxidation hair dyes and bleaching treatments.

20 In addition, during drying, hair can become overloaded with static electricity, causing resistance to combing and giving rise to the phenomenon of "flying hair".

Other factors contributing to the breakdown of disulfide bonds are exposure to heat and the use of reducing agents. Many treatments to
25 obtain straightened, straight, wavy or curly hair involve the use of reducing substances (for instance, ammonium thioglycolate) which break the sulphur-sulphur bridges and weaken the firmness and resistance of hair. The latter, now deprived of the structural constraints that offered them rigidity and strength, can be remodelled according to a new pleasing shape
30 and then subjected to an oxidative operation to restore the bonds between the thiol groups. Oxidation can occur simply by leaving hair exposed to air so as to allow atmospheric oxygen to promote the regeneration of disulfide bridges, but it generally requires prolonged times. It is therefore

established practice to use oxidizing chemicals such as hydrogen peroxide (H₂O₂).

However, the new network of disulfide bridges just obtained with the aforementioned oxidative treatment binds hair in a non-natural and non-spontaneous position, subjecting it to a purely mechanical stress. Over time, therefore, the tension suffered by hair causes a progressive and inevitable breakdown of the sulphur-sulphur bonds, leading to the restoration of the original ones and bringing hair back to its natural shape.

Not only that, it is necessary to take into account that this treatment also tends to damage the structure and alter the natural color of hair. In fact, cysteines that are not in a suitable position to promote the formation of disulfide bridges, in the presence of oxidizing agents (hydrogen peroxide *in primis*), undergo oxidation of the side chain. More precisely, mercaptan groups (-SH) oxidize to acidic sulfonic groups (-SO₃H).

These treatments can also affect the health of the skin and scalp which, being made up of the same fibrous protein as hair, i.e. keratin, undergo the same structural weakening with consequent formation of cracks, skin cracks and global redness.

Numerous products have been developed to prevent and treat this state of poor health of hair and underlying skin, comprising, for instance, post-shampoo treatments or hair conditioners, which can be applied and then removed by rinsing.

The conditioning treatments that are performed after cleansing with shampoo coat hair fiber with a protective film that facilitates the closure of the superficial keratin cuticles. This process aims to achieve a smooth surface, thus increasing its shine, silkiness and the sliding of the comb. However, the frequent use of conditioning treatments, especially if they are not specific to your hair type, can lead to undesirable effects, such as hair heaviness, oiliness and residue deposit, with a progressive build-up which, over time, can compromise the desired results. In addition, these products are generally unable to modify the covalent bonds of keratin, thus lacking the ability to restore the disulfide bridges between free thiols in hair proteins.

Unless specifically excluded in the detailed description below, what is described in this chapter is to be considered as an integral part of the detailed description of the invention.

Summary of the invention

- 5 The main purpose of the present invention is to describe a new cosmetic composition that allows to overcome the drawbacks and problems raised in known art, which allows an efficient repair and restructuring of the damaged hair fiber and a protection and hydration of the underlying skin.

This and other purposes described below can be achieved by creating a
10 composition, called a restructuring *blend*, comprising hydrolysed glycosaminoglycans, amino acids and low molecular weight hyaluronic acid for use in combination with at least one excipient as described in the claims.

Another purpose of the present invention are the formulations of the final
15 products to be applied to hair and its scalp containing said *restructuring blend* and at least one excipient, such as pre-shampoo, shampoo and conditioner.

A further purpose of the invention is the creation of a kit comprising at least one among pre-shampoo, shampoo and conditioner, and related
20 instructions for use.

Additional purpose of the invention is a method of restructuring hair that comprises at least one of the following steps:

- Applying the pre-shampoo from roots to ends to damp, towel-dried hair. Combing once and leaving on for more than 1 minute,
25 preferably more than 2 minutes, preferably between 2 and 15 minutes. Rinsing.
- Applying the shampoo to damp hair. Massaging the product all over hair for more than 1 minute, preferably more than 2 minutes, preferably between 2 and 15 minutes. Rinsing.
- 30 • Applying the conditioner after rinsing off the shampoo, applying from the scalp to the tip of hair. Leaving on for more than 1 minute,

preferably more than 2 minutes, preferably between 2 and 15 minutes, then rinsing.

Yet another purpose is the use of the *restructuring blend*, alone or in combination with at least one cosmetically acceptable excipient, for the repair/reconstruction of damaged hair and for the hydration/protection of the skin.

Further aims and advantages will be evident from the detailed description of the present invention.

Brief description of the Figures

The invention will be described below in at least one preferred embodiment for the sole purpose of explanatory and not limiting scope of the present invention with the help of the figures in the annex, wherein:

Figure 1: Detail of the sediment of hydrolysed glycosaminoglycans at room temperature.

Definitions

- In this document, the terms, "comprises", "includes", "has", "having", "bearing", "contains", "containing", "characterized in that", or any other variation of these terms, are intended to cover a non-exclusive inclusion, subject to any explicitly stated limitations. For instance, a composition, mixture, process, or method that comprises a list of elements is not necessarily limited to these elements but may comprise other elements not expressly listed or inherent in that composition, mixture, process, or method.
- In the context of the present invention, the term "about" means a numerical value equal to the value reported $\pm$ its standard deviation.
- The percentages with which the quantitative ranges of the individual elements comprised in the compositions of the present invention are to be understood in mass (m/m%).
- The values that define the extremes of the above-mentioned intervals are to be understood as comprised in the intervals themselves.

- The term excipient defines a substance that is not active in the reconstruction and regeneration of damaged hair or dermis, wherein the restructuring blend is dissolved or incorporated to facilitate the administration, use or application of the product.
- 5 - Room temperature is defined as a temperature between 15-25°C.
- The terms "*blend*" and "*restructuring blend*" refer identically to the same composition according to the present invention, as defined in the description. So, they are to be used indistinctly without alluding to or referring to different compositions.
- 10 - In this document, the expression "treatment set", or more simply "set", refers to the sequential use of two or three products/formulations, aimed at giving a result of repair/reconstruction of disulfide bridges and combability. For instance, pre-shampoo + shampoo or pre-shampoo + shampoo + conditioner
- 15 - In this document, "low molecular weight" hyaluronic acid is defined as a hyaluronic acid whose molecular weight is between 5-100 KDa, preferably between 8-50 KDa, preferably between 8-12 KDa, determined by gel permeation chromatography (GPC) analysis with a Multi-Angle Light Scattering (MALS) detector.
- 20 - In this document, "*complete treatment*" means a consecutive application of pre-shampoos, shampoos and conditioners to hair and scalp.
- In this document, "*one-step treatment*" means a complete treatment wherein only the pre-shampoo comprises the *restructuring blend*
- 25 according to the present invention.
- In this document, the term "*three-step treatment*" refers to a complete treatment wherein pre-shampoo, shampoo and conditioner comprise the *restructuring blend* according to the present invention.

Detailed description

- 30 The present invention relates to a composition comprising hydrolysed glycosaminoglycans, which in association with amino acids and low

molecular weight hyaluronic acid, performs a repairing and restructuring function of hair, and protection of the skin.

This composition, henceforth defined as a *restructuring blend* or simply *blend*, is therefore a mixture comprising hydrolysed glycosaminoglycans
5 that has restructuring properties, which performs a function of restoring damaged disulfide bridges of hair and which moisturizes and protects the skin.

The *restructuring blend* according to the present invention is to be understood as a homogeneous mixture with repairing and restructuring
10 properties to be used in combination with other ingredients, e.g. excipients, in order to formulate finished products that can be applied to hair and scalp.

The *restructuring blend* according to the present invention is to be considered as a basic ingredient, containing binding agents that assist in
15 the repair of sulphur-sulphur bridges, from which it is possible to start for the creation of different final formulations, which can in turn meet the different needs of hair.

The subject of the present invention are therefore also the final formulations, such as pre-shampoos, shampoos and conditioners,
20 comprising within them said *restructuring blend*.

The *blend* according to the present invention comprised in the final formulations also object of the present invention performs a repairing and restructuring action on damaged and/or abraded and/or coarse and/or
25 fragile hair due to natural and non-natural causes, which by way of non-limiting example comprise prolonged sun exposure, unbalanced diet or deficiencies of nutrients essential for hair maturation, psychological stress, pathologies such as but not limited to endogenous imbalances and genetic diseases, environmental pollution, aggressive and/or frequent cosmetic treatments, exposure to radiation, intake of anticancer agents,
30 excessive or violent brushing, improper use of rough towels for drying and exposure to thermal styling tools such as straighteners and curling irons.

Preferably, the repairing and restructuring action carried out by the *blend*

according to the present invention comprised in the formulations also object of the present invention operates on the free thiols (-SH) of cysteine residues that have remained "decoupled" or "released" following damage to hair due to one or more of the aforementioned causes. This composition
5 performs a repairing action on damaged disulfide bridges, allowing the restoration of sulphur-sulphur bonds (-S-S-) between the polypeptide chains so as to restore strength, resistance and vigour to hair.

Preferably, the composition of the *restructuring blend* according to the present invention comprised in the formulations also object of the present
10 invention, in addition to strengthening hair by restoring damaged disulfide bridges, promotes hydration and softness of the scalp and the underlying dermis, facilitates combability, reduces the probability of hair breakage, improves the appearance of hair by offering greater shine and a reduction of frizz.

15 *Restructuring blend*

The object of this invention is the *restructuring blend*, a specific composition that comprises a plurality of ingredients and that can be used for the creation of new finished formulations in the cosmetic field.

The composition of the *restructuring blend* object of the present invention
20 comprises glycerine (CAS 56-81-5), hydrolysed glycosaminoglycans (CAS 156715-51-4), low molecular weight hyaluronic acid (CAS 9004-61-9) and cysteine, the latter preferably in salted form, preferably as hydrochloride (CAS 52-89-1).

Preferably, this composition comprises:

- 25 a. glycerine in an amount between 40.0% and 60.0%
- b. hydrolysed glycosaminoglycans in an amount between 20.0% and 60.0%
- c. low molecular weight hyaluronic acid in an amount between 0.4% and 3.0%
- 30 d. cysteine in an amount between 0.05% and 2.00%

In a preferred embodiment, said composition comprises:

- a. glycerine in an amount between 40.0% and 60.0%
- b. hydrolysed glycosaminoglycans in an amount between 38.0% and 58.0%
- c. low molecular weight hyaluronic acid in an amount between 0.4% and 2.0%
- d. cysteine in an amount between 0.05% and 0.15%.

In a preferred embodiment, this composition consists of:

- a) glycerine in an amount between 40.0% and 60.0%
- b) hydrolysed glycosaminoglycans in an amount between 20.0% and 60.0%
- c) low molecular weight hyaluronic acid in an amount between 0.4% and 3.0%
- d) cysteine in an amount between 0.05% and 2.00%

In particular, the composition according to the invention appears to be rather sensitive to the percentage amount of hydrolysed glycosaminoglycans (GAGs) used. Exceeding the described range (20-60%), in fact, the composition of the invention either cannot be chemically prepared or shows a decrease in effectiveness in the regeneration of damaged hair. More in detail, and as reported in figure 1, it has been experimentally observed that the composition of the invention is not able to stabilize a quantity of hydrolysed glycosaminoglycans greater than about 60%. It follows that once the saturation of the solution is reached, the excess of GAG present sediments on the bottom of the container in the form of a white crystalline precipitate, "de-mixing" from the solution. Conversely, falling below the threshold described and as reported in the Examples Section of this document (Example 5), the *restructuring blend* according to the present invention proves to be less effective in the reconstruction of bleached strands.

Such a composition may further comprise or consist of at least one more amino acid in addition to cysteine, at least one hydrolysed vegetable protein and at least one source of zinc.

The at least other amino acid further comprised in the composition of the *blend* object of the present invention can be chosen among the natural and non-natural amino acids, preferably natural, preferably chosen among leucine, lysine, glycine, serine, proline.

5 Preferably, the at least other amino acid additionally comprised in the composition of the *blend* object of the present invention can be chosen in neutral form, in salted form (e.g. as hydrochloride), as an enantio-pure, as a raceme, as an enantio-enriched or in any other pharmaceutically acceptable form.

10 Preferably, the at least one hydrolysed vegetable protein additionally comprised in the composition of the *blend* covered by this invention may be chosen as a non-limiting example from hydrolysed proteins from broad beans, soybeans, oats, wheat, rice and peas.

Hydrolysed vegetable proteins can be easily found on the market or easily
15 obtained from natural sources according to processes known to an expert in the field.

Preferably, the at least one source of zinc additionally comprised in the composition of the *blend* covered by this invention can be chosen as a non-limiting example among all sources of dietary zinc such as zinc
20 acetate, zinc gluconate, zinc oxide and zinc PCA (L-pyrrolidone-carboxylic acid anion).

Preferably, the *blend* according to the present invention additionally comprises:

- the at least another amino acid in an amount between 0.1% and
25 0.4%
- the at least one hydrolysed vegetable protein in an amount between 0.05% and 0.15%
- the at least one source of zinc in an amount between 0.05% and 0.15%

30 Preferably, the *restructuring blend* according to the present invention has a pH between 2.00 and 3.50.

Preferably, the *restructuring blend* according to the present invention has a density between 1.100 g/mL and 1.200 g/mL.

Preferably, this *restructuring blend* is in the form of a homogeneous liquid at room temperature.

- 5 The *restructuring blend* according to the present invention is to be understood as a composition that can be used for the formulation of final products that can meet the different needs of hair.

Precisely for this reason, this *blend* can be mixed with additional ingredients, e.g. excipients, so that it can correctly and effectively exert its
10 repairing, restructuring and protective action when comprised in products such as pre-shampoo, shampoo and conditioner.

Formulations

The object of the present invention are also formulations made from the *restructuring blend* according to the present invention.

- 15 The formulations according to the present invention comprising the *restructuring blend* can be made for different cosmetic purposes (e.g., shampoo, conditioner, pre-shampoo) by modulating the quality and quantity of the additive ingredients to be combined with the *blend*.

These formulations comprising the *blend* according to the present
20 invention are therefore to be understood as final products to be applied to hair and scalp according to specific needs.

These formulations object of the present invention contain the *restructuring blend* object of the present invention and at least one excipient.

- 25 This excipient comprised in the formulations covered by this invention can be chosen among among the excipients compatible with cosmetics such as, but not limited to, water, antioxidants, preservatives, vitamins, chelating agents, dyes, proteins, amino acids, natural extracts such as plant extracts, humectants, fragrances, perfumes, oils, essential oils,
30 softeners, lubricants, thickeners, viscosity modifiers, polymers, resins, hair fixers, surfactants, detergents, emulsifiers, matting agents, volatile

agents, salts, polymers, resins, hair fixers, surfactants, detergents, emulsifiers, pH modifiers such as but not limited to citric acid, neutralizing agents, hair conditioning agents, antistatic agents, anti-frizz agents, anti-dandruff agents, absorbents and combinations thereof.

5 *Surfactants*

Formulations according to the present invention may comprise at least one surfactant.

This surfactant additionally added to the *restructuring blend*, thanks to its amphiphilic nature, allows to drastically reduce the interfacial energy
10 between lipophilic and hydrophilic substances. The attenuation of these forces limits the physical separation of the components, favouring intimate contact and homogeneous mixing. In addition, the addition of at least one surfactant makes it possible to promote contact and interaction with the skin and hair, facilitating the activity of the *blend* in the reconstruction of
15 disulfide bridges of damaged hair.

The at least one surfactant additionally comprised in the formulations object of the present invention may be chosen among anionic, cationic, nonionic (neutral) and amphoteric (zwitterionic) surfactants.

Preferably, the at least one surfactant can be chosen among anionic
20 surfactants, suitable for cosmetics, which comprise, but are not limited to, surfactants containing carboxylate, sulfonated or sulphate ions.

These anionic surfactants comprise sodium, potassium and ammonium ions as a counter-cation but are not limited to them.

The at least one surfactant additionally comprised in the formulations
25 covered by this invention may be chosen by way of non-limiting example from among anionic surfactants such as long-chain alkyl-sulfonates such as sodium lauryl sulphate, alkyl-aryl-sulfonates such as sodium dodecylbenzene sulfonate, dialkyl sulfosuccinates such as sodium dioctyl-sulfosuccinate.

30 Preferably, the at least one surfactant can be chosen among cationic surfactants, suitable for cosmetics, which comprise, but are not limited to,

surfactants containing quaternary ammonium groups.

These cationic surfactants comprise chloride and bromide ions as counter-anion but are not limited to them.

The at least one surfactant additionally comprised in the formulations covered by this invention may be chosen by way of non-limiting example from cationic surfactants such as benzalkonium chloride, benzethonium chloride, dimethylbenzylammonium chloride, cetrimonium bromide, cetrimonium chloride.

Preferably, the at least one surfactant can be chosen among non-ionic surfactants, suitable for cosmetics, which comprise, but are not limited to, ethylene glycol monostearate (EGMS), propylene glycol myristate, glyceryl monostearate, glyceryl stearate, polyglyceryl-4-oleate, PEG-150 laurate, PEG-400 monolaurate, polyoxyethylene monolaurate, polysorbates, polyoxyethylene octyl phenyl ether, PEG-1000 cetyl ether, polyoxyethylene tridecyl ether, polypropylene glycol butyl ether, Poloxamer 401 and stearyl mono isopropanol amide.

Preferably, the at least one surfactant can be chosen among amphoteric (zwitterionic) surfactants, suitable for cosmetics, which comprise, but are not limited to, sodium beta-alanine N-(2-carboxyethyl)-N-dodecylate, sodium N-lauryl- β -imino dipropionate, lauryl betaine and lauryl sulfobetaine.

Preferably, the formulations object of the present invention and comprising the *restructuring blend* may additionally comprise more than one surfactant.

25 Softeners

Formulations according to the present invention may additionally comprise at least one softener. This softener added to the formulation comprising the *restructuring blend* object of the present invention has a softening action on the outermost layers of hair and skin, making the surface soft and elastic, and allowing to soothe signs of irritation. Additional benefits offered by the softener additionally added to the formulations object of the present invention comprise the ability to lubricate, coat, moisturize, protect

and/or cleanse the skin.

The at least one softener additionally comprised in the formulations of the present invention may be chosen by way of non-limiting example from among silicone-based compounds (e.g., dimethicone, cyclomethicone, dimethicone co-polyol or a mixture of cyclopentasiloxane and dimethicone/vinyl dimethicone copolymer, cyclopentasiloxane polysilicon, PEG-40/PPG-8 methylamino propyl/hydroxypropyl dimethicone copolymer), polyols such as sorbitol, glycerine, propylene glycol, dipropylene glycol, ethylene glycol, polyethylene glycol, caprylyl glycol, polypropylene glycol, 1,3-butanediol, pentylene glycol, hexylene glycol, isoprene glycol, xylitol, capric and caprylic triglyceride, ethylhexyl palmitate or a combination thereof.

Emulsifiers

Formulations according to the present invention may additionally comprise at least one emulsifier. This emulsifier, additionally added to the formulations object of the present invention, allows to increase the affinity between the aqueous and fatty phases, keeping them together, so as to prevent spontaneous phase separation.

Preferably, the at least one emulsifier further comprised in the formulations according to the present invention comprising the *restructuring blend* object of the invention may be chosen as a non-limiting example from copolymers of an unsaturated ester and a monomer of styrene sulfonate, cetearyl alcohol, glyceryl ester, polyoxyethylene glycol ether of cetearyl alcohol, stearic acid, polysorbate-20, cetareth-20, lecithin, glycol stearate, polysorbate-60 and polysorbate-80, or combinations of these products.

Preservatives

Formulations according to the present invention may additionally comprise at least one preservative. This preservative, additionally added to the formulations object of the invention, prevents the growth of microorganisms and limits the deterioration of the cosmetic product, thus extending its shelf life and preserving its properties.

Preferably, the at least one preservative further added to formulations according to the present invention comprising the *restructuring blend* object of the invention can be chosen as a non-limiting example from glycerine (e.g., glycerine or ethylhexylglycerin or phenoxyethanol), benzyl
5 alcohol, parabens (methylparaben, ethylparaben, propylparaben, butylparaben, etc.), sodium benzoate, ethylene diamine-tetra acetic acid (EDTA), potassium sorbate and/or grapefruit seed extract, salicylic acid, DMDM hydantoin, triclosan, imidazolidinyl urea, sorbic acid, methylisothiazolinone, methyl chloro isothiazolinone, sodium
10 dehydroacetate, dehydroacetic acid, quaternium-15, stearylalkonium chloride, zinc pyrithione, sodium metabisulfite, 2-bromo-2-nitropropane, chlorhexidine digluconate, polyaminopropyl biguanide, benzalkonium chloride, sodium sulphite, sodium salicylate, citric acid, neem oil, essential oils (various), lactic acid and vitamin E (tocopherol).

15 Conditioning agents

Formulations according to the present invention may additionally comprise at least one conditioning agent. This conditioning agent, additionally added to the formulations object of the invention, improves the combability of hair, reducing the accumulation of electrostatic charges and avoiding post-
20 washing frizz.

Preferably, the at least one conditioning agent additionally comprised in the formulations according to the present invention comprising the *restructuring blend* object of the invention can be chosen by way of non-limiting example among silicone-based agents (e.g., quaternium-8
25 silicone), panthenol, hydrolysed wheat and/or soy proteins, amino acids (e.g., wheat amino acids), rice bran wax, mango seed oil, hydrolysed triticum monococcum seed extract, grapeseed oil, sesame seed oil, jojoba seed oil, sweet almond oil, hydroxyethyl behenammidopropyl diammonium chloride, aloe leaf extract, retinyl palmitate, behentrimonium
30 metoxysulfate, behentrimonium chloride, guar hydroxypropyltrimonium chloride, quaternium-91, stearamidopropyl dimethylamine and combinations thereof.

Diluents

Formulations according to the present invention may additionally comprise at least one diluent. This diluent comprised in the formulations object of the invention has the purpose of diluting the *restructuring blend* to fluidify the physical state of hair care products, so as to improve their use and application.

Preferably, the at least one diluent comprised in the formulations according to the present invention may be chosen among water, ethyl alcohol, isopropyl alcohol, propanediol glycerine, and propylene glycol.

Viscosity modifiers

Formulations according to the present invention may optionally comprise at least one viscosity modifier.

Said viscosity modifier optionally comprised in the formulations object of the invention is precisely intended to alter, modify, improve or correct the ease of sliding of a product on a surface on which it has been applied.

Preferably, the at least one viscosity modifier optionally comprised in the formulations according to the present invention comprising the *restructuring blend* object of the invention can be chosen among polyethylene glycol, semi-synthetic polymers such as semi-synthetic cellulose derivatives, hydroxyethyl cellulose, synthetic polymers such as carbomer, polyethyleneimine (PEI), natural polymers, such as acacia gum, tragacanth gum, alginates (e.g., sodium alginate), carrageenan, vegetable gums, such as xanthan gum, *Cyamopsis tetragonoloba* gum (Guar gum), petroleum or petrolatum gel, waxes, colloids associated with particles, such as bentonite, colloidal silicon dioxide, microcrystalline cellulose, fatty alcohols and combinations thereof.

Antioxidants

Formulations according to the present invention may additionally comprise at least one antioxidant.

This antioxidant, optionally comprised in the formulations object of the invention, makes it possible to counteract oxidative phenomena, commonly mediated by the formation of free radicals, preserving the

integrity of the composition and its properties.

Preferably, the at least one antioxidant further comprised in the formulations according to the present invention comprising the *restructuring blend* object of the invention can be chosen as a non-limiting
5 example from BHT, ascorbic acid, *camellia sinensis* leaf extract, ascorbyl palmitate, ascorbyl magnesium phosphate, carotenoids, resveratrol, triethyl citrate, arbutin, kojic acid, sodium metabisulfite, lycopene, ubiquinone and combinations thereof.

Matting agents

10 Formulations according to the present invention may additionally comprise at least one matting agent.

This matting agent optionally comprised in the formulations object of the invention has the purpose of hiding the shine linked to the appearance of the formulations, making the surface of the product dull, or satin or semi-
15 glossy.

Preferably, the at least one matting agent further comprised in formulations according to the present invention comprising the *restructuring blend* object of the invention can be chosen as a non-limiting example between glycol distearate and ethoxylated fatty alcohols.

20 pH Regulators

Formulations according to the present invention may additionally comprise at least one pH regulator. This pH regulator, added to the formulation comprising the *restructuring blend* that is the subject of the present invention, has an action of control and modification of the acidity of the
25 formulation.

The at least one pH regulator additionally comprised in the formulations of the present invention may be chosen by way of non-limiting example among malic acid, citric acid, lactic acid, ammonium bicarbonate, sodium hydroxide and aminomethylpropanol.

30 Amino acids

Formulations according to the present invention may additionally comprise

at least one amino acid, in addition to the amino acid(s) already contained in the *restructuring blend* object of the present invention. This amino acid added to the formulation comprising the *restructuring blend* object of the present invention can be chosen among natural and non-natural amino acids, such as but not limited to cysteine, leucine, valine, carnitine, taurine, carbocysteine.

Humectants

Formulations according to the present invention may additionally comprise at least one humectant. This humectant added to the formulation comprising the *restructuring blend* object of the present invention, as a hygroscopic agent, allows to bind, capture and retain water inside, ensuring the maintenance of the correct level of humidity.

The at least one humectant additionally comprised in the formulations of the present invention may be chosen by way of non-limiting example from xylityl glucoside, glycerine, propylene glycol, propanediol, hyaluronic acid, sorbitol.

Fragrances and perfumes

Formulations according to the present invention may additionally comprise at least one fragrance and/or perfume.

The at least one fragrance and/or perfume comprised in the formulations of the present invention may be chosen by way of non-limiting example from citronellol, geraniol, limonene, hydroxy citronellal, citral, hexylcinnamal or the like.

Vitamins

Formulations according to the present invention may additionally comprise at least one vitamin.

The at least one vitamin additionally comprised in the formulations of the present invention may be chosen by way of non-limiting example from pantothenic acid, tocopherol, tocopherol acetate, ascorbic acid.

Forms of formulations

The formulations comprising the *restructuring blend* according to the present invention can be made to meet the possible needs of treatment and care of damaged scalp and hair.

Pre-shampoo

- 5 A formulation according to the present invention comprising the *restructuring blend* can be used as a pre-shampoo, i.e. as a treatment for the repair and strengthening of hair by reconstruction of disulfide bridges, to be carried out before the actual wash.

10 This formulation for use as a pre-shampoo comprises the *restructuring blend* and at least one excipient.

In an embodiment, this formulation for use as a pre-shampoo comprises the *restructuring blend*, at least one diluent, at least one conditioning agent, at least one preservative, at least one emulsifier, at least one pH regulator, at least one humectant, at least one softener, at least one amino acid, whether natural or synthetic, at least one viscosity modifier, at least one fragrance/perfume, and at least one vitamin.

The formulation for use as a pre-shampoo comprises the *blend* according to the present invention in an amount between 0.01% and 50%, preferably between 0.1% and 30%, preferably between 0.5% and 15%, preferably between 0.5% and 50%, preferably between 1-50%, preferably between 1-30%, preferably between 1-7%, preferably between 2-7%, preferably between 3-7%, preferably between 4-7%, preferably between 5-7%, preferably between 1-10%, preferably between 5-10%, preferably between 5-20%, preferably between 5-30%, preferably between 5-40%, preferably between 5-50%, preferably between 6-20%, preferably between 6-40%, preferably between 6-50%.

Preferably, the formulation for use as a pre-shampoo comprising the *blend* according to the present invention has a pH between 2 and 7.

Shampoo

- 30 A formulation according to the present invention comprising the *restructuring blend* can be a shampoo, i.e. a product for cleaning hair and

scalp, whose main function is to remove dirt, sebum and any other residues present on hair and scalp.

This shampoo, comprising the *blend*, according to the present invention, can be applied to hair along its entire length and to the scalp, preferably in
5 succession to the pre-shampoo treatment.

This formulation for use as a shampoo comprises the *restructuring blend* and at least one excipient.

In an embodiment, this formulation for use as a shampoo comprises the *restructuring blend*, at least one diluent, at least one conditioning agent, at
10 least one preservative, at least one emulsifier, at least one pH regulator, at least one humectant, at least one softener, at least one amino acid, whether natural or synthetic, at least one viscosity modifier, at least one perfume/fragrance, at least one vitamin, at least one antioxidant and at least one surfactant.

15 The formulation for use as a shampoo comprises the *blend* according to the present invention in an amount between 0.01% and 50%, preferably between 0.1% and 30%, preferably between 0.5% and 15%, preferably between 0.5% and 50%, preferably between 1-50%, preferably between 1-30%, preferably between 1-7%, preferably between 2-7%, preferably
20 between 3-7%, preferably between 4-7%, preferably between 5-7%, preferably between 1-10%, preferably between 5-10%, preferably between 5-20%, preferably between 5-30%, preferably between 5-40%, preferably between 5-50%, preferably between 6-20%, preferably between 6-40%, preferably between 6-50%.

25 Preferably, the formulation for use as a shampoo comprising the *blend* according to the present invention has a pH between 2 and 7.

Conditioner

A form of formulation according to the present invention comprising the *restructuring blend* can be a conditioner, i.e. a product to be applied to hair
30 along its entire length and to the scalp, preferably in succession to shampoo, to make hair easier to comb, to reduce frizz and to give greater softness, shine, smoothness and manageability.

This formulation for use as a conditioner comprises the *restructuring blend* and at least one excipient.

Preferably, this formulation for use as a conditioner comprises the *restructuring blend*, at least one diluent, at least one conditioning agent, at least one preservative, at least one emulsifier, at least one pH regulator, at least one humectant, at least one softener, at least one amino acid, whether natural or synthetic, at least one viscosity modifier, at least one perfume/fragrance, at least one vitamin, at least one antioxidant.

The formulation for use as a conditioner comprises the *blend* according to the present invention in an amount between 0.01% and 50%, preferably between 0.1% and 30%, preferably between 0.5% and 15%, preferably between 0.5% and 50%, preferably between 1-50%, preferably between 1-30%, preferably between 1-7%, preferably between 2-7%, preferably between 3-7%, preferably between 4-7%, preferably between 5-7%, preferably between 1-10%, preferably between 5-10%, preferably between 5-20%, preferably between 5-30%, preferably between 5-40%, preferably between 5-50%, preferably between 6-20%, preferably between 6-40%, preferably between 6-50%.

Preferably, the formulation for use as a conditioner comprising the *blend* according to the present invention has a pH between 2 and 7.

Method for evaluating the effectiveness of cosmetic treatment

The effectiveness of the cosmetic treatment operated by means of the formulations according to the present invention comprising the *restructuring blend* object of the invention has been established by *blind tests* on commercially available hair samples of natural origin, evaluating the ability of the product to repair and rebuild the sulphur-sulphur bridges of damaged proteins. This *ex vivo* evaluation was carried out on hair of human origin, appropriately prepared and treated before the effectiveness test.

Pre-washing

The strand of hair under analysis is carefully weighed and washed with tap water, then sprinkled over its entire extension with neutral shampoo and

rubbed. Afterwards, the strand is rinsed with running water. Once the rinse is complete, hair sample is dabbed with paper towels and dried with a hairdryer.

Induced damage to hair

- 5 The strand of hair, once washed and dried, is subjected to *bleaching*, i.e. a "bleaching" treatment to damage hair structure. This treatment consists of exposing hair for 50 minutes to commercially available products containing 30-volume hydrogen peroxide.

Once the treatment is complete, hair strand is washed again with tap water
10 for 10 seconds, then sprinkled in its entire extension with 1.5 mL of neutral shampoo with the help of a graduated pipette. Afterwards, the strand is rubbed for 20 seconds and finally rinsed with running water for 30 seconds. Once the rinse is complete, hair sample is dabbed with paper towels and dried with a hairdryer.

15 *Application of the cosmetic product*

- On damp and towel-dried hair, apply the pre-shampoo product to the entire length of hair. Comb once and leave on for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes. Rinse thoroughly and proceed with the application of shampoo.
- 20 • After rinsing off the pre-shampoo, apply the shampoo by massaging over the entire length of hair for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes. Rinse thoroughly and proceed with the application of the conditioner.
- After rinsing off the shampoo, apply the conditioner to the entire
25 length of hair. Leave it on for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes, then rinse thoroughly.

Instead, comparison tests are conducted according to the instructions given by the manufacturer of the commercial products used.

30 *Evaluation of the reconstruction of disulfide bridges*

The determination of the repairing, restructuring and reconstructing

capacity of the formulations according to the present invention comprising the *restructuring blend* object of the invention is carried out by evaluating the quantity of free thiol groups (-SH) of cysteine nature present on hair strands. This quantification is achieved by means of the Ellman test, an analytical method known to the expert in the field that exploits the ability of free thiol groups to induce a colorimetric reaction by chemical reaction with Ellman's reagent (2,2'-dinitro-5,5'-dithiodibenzoic acid, DTNB). The outcome of the colorimetric reaction is then measured and quantified using a spectrophotometer.

10 MATERIALS AND METHODS

The compositions reported in the subsequent embodiments have been formulated starting from commercial products.

In particular, in the examples below, the low-molecular weight hyaluronic acid used (CAS 9004-61-9) has an average molecular weight (Mw) of approx. 25 KDa, determined by gel permeation chromatography (GPC) analysis. An expert in the field will be perfectly able to identify the operating conditions to perform this technique of determining the Mw.

Instrumentation used

The following instruments were used to carry out the reconstruction tests of the disulfide bridges and the combability of hair:

- Biotek Epoch Spectrophotometer (BioTek Instruments, Highland Par, 05404 Winooski, US).
- Fibra.one (Dia-Stron Limited, Andover, Hampshire, UK)

EXAMPLES

The contents of this paragraph and the examples given are to be understood as purely illustrative embodiments, which have no intention of limiting the scope of the present invention. In the following examples, in order to compare the compositions according to the invention in an equivalent way with the market formulations (see. *Olaplex®*), the list of ingredients of the products has been reported in the order provided for by the European legislation on cosmetics (Regulation 1223/2009).

Method

- *Pre-washing*

For each individual experiment, a sample of brown hair is washed with water, then sprinkled over its entire extension with neutral shampoo, rubbed thoroughly and finally rinsed with running water. Once the rinse is complete, hair sample is dabbed with paper towels and dried with a hairdryer.

- *Induced damage to hair*

The strand of hair, once washed and dried, is subjected to *bleaching*. This treatment consists of exposing hair for 50 minutes to commercial products containing hydrogen peroxide at 30 volumes.

Once the *bleaching* is complete, the pre-wash treatment is repeated exactly.

- *Application of the cosmetic product*

Treatments according to the present invention are tested following the following procedure:

- On damp and towel-dried hair, apply the pre-shampoo product to the entire length of hair. Comb once and leave on for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes. Rinse thoroughly and proceed with the application of shampoo.
- After rinsing off the pre-shampoo, apply the shampoo by massaging over the entire length of hair for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes. Rinse thoroughly and proceed with the application of the conditioner.
- After rinsing off the shampoo, apply the conditioner to the entire length of hair. Leave it on for more than 1 minute, preferably 2 minutes, preferably between 2 and 15 minutes, then rinse thoroughly.

Instead, comparison tests are conducted according to the instructions given by the manufacturer of the commercial products used.

- *Evaluation of the reconstruction of disulfide bridges*

The test for the evaluation of the reconstruction of disulfide bridges on hair sample previously subjected to *bleaching* is carried out by means of the Ellman test, an analytical method known to the expert of the art that exploits the ability of free thiol groups to induce a colorimetric reaction by chemical reaction with the Ellman reagent (2,2'-dinitro-5,5'-dithiodibenzoic acid, DTNB). The outcome of the colorimetric reaction is then measured and quantified using a spectrophotometer.

- *Evaluation of the total amount of sulphur*

To evaluate the total amount of sulphur in the strand of hair under examination, an overall reduction of the disulfide bridges with a commercial hydride is first carried out and then the total amount of thiol groups is measured by Ellman test and subsequent spectrophotometric analysis.

- **Example 1**

Comparison in the reconstruction of disulfide bridges between the Olaplex® pre-shampoo (Olaplex N°3 Hair Perfector) and the pre-shampoo comprising 5% restructuring blend according to the present invention.

Pre-shampoo composition comprising 5% restructuring blend: WATER, GLYCERIN, BEHENTRIMONIUM CHLORIDE, CETEARYL ALCOHOL, HYDROLYZED GLYCOSAMINOGLYCANS, SERINE, CAPRYLIC/CAPRIC TRIGLYCERIDE, GLUTAMIC ACID, THREONINE, GLYCINE, ARGININE, PEG-40/PPG-8 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE COPOLYMER, SESAMUM INDICUM SEED OIL (SESAME), HYDROXYETHYL CELLULOSE, FRAGRANCE, CARBOCYSTEINE, PHENOXYETHANOL, TAURINE, CALCIUM PANTOTHENATE, GUAR HYDROXYPROPYLTRIMONIUM CHLORIDE, DIPROPYLENE GLYCOL, HYALURONIC ACID, LACTIC ACID, HYDROLYSED TRITICUM MONOCOCCUM SEED EXTRACT, SORBITOL, LECITHIN, LEUCINE, CREATINE, CYSTEINE HCL, HYDROLYSED RICE PROTEIN, ZINC PCA, ISOLEUCINE, VALINE, XYLYLGLUCOSIDE, OLEA EUROPAEA

CALLUS CULTURE LYSATE, XANTHAN GUM, LYSINE HCL, PROLINE,
ANHIDROXYLITOL, MALTITOL, XYLITOL,
METHYLCHLOROISOTHIAZOLINONE, PENTYLENE GLYCOL,
METHYLISOTHIAZOLINONE, CYCLODEXTRIN, CITRIC ACID,
5 CYAMOPSIS TETRAGONOLOBA GUM (GUAR), PHYTIC ACID,
TOCOPHEROL, PELVETIA CANALICULATA EXTRACT.

Composition (INCI) Olaplex N°3 Hair Perfector: WATER, BIS-
AMINOPROPYL DIGLYCOL DIMALEATE, PROPYLENE GLYCOL,
CETEARYL ALCOHOL, BEHENTRIMONIUM METOSULFATE, CETYL
10 ALCOHOL, PHENOXYETHANOL, GLYCERIN,
HYDROXYETHYLCELLULOSE, STEARAMIDOPROPYL
DIMETHYLAMINE, QUATERNIUM-91, SODIUM BENZOATE,
CETRIMONIUM METOSULFATE, CETRIMONIUM CHLORIDE,
FRAGRANCE, POLYQUATERNIUM-37, TETRASODIUM EDTA,
15 BUTYLPHENYL METHYLPROPIONAL, ETIDRONIC ACID, ASCORBIC
ACID, PHYTANTRIOL, TOCOPHERYL ACETATE, ALOE
BARBADENSIS LEAF JUICE, PANTHENOL, SIMMONDSIA CHINENSIS
(JOJOBA) SEED OIL, CITRIC ACID, POTASSIUM SORBATE.

Method

20 Two hair samples, after washing, *bleaching* and rinsing as per the
procedure above, were respectively subjected to treatment with the
Olaplex® pre-shampoo (Olaplex N°3 Hair Perfector) and with the pre-
shampoo formulation comprising 5% *restructuring blend* according to the
present invention. Subsequently, both samples underwent treatment with
25 a commercially available neutral shampoo.

The evaluation of thiol groups and disulfide bridges was performed by
Ellman test and spectrophotometer measurement, as per the procedure
previously described.

Result

30 The pre-shampoo formulation comprising 5% *restructuring blend* has a
superior disulfide bridge repair effect compared to *Olaplex®* pre-shampoo
(Olaplex N°3 Hair Perfector) after a single application, with an increase in

the number of sulphide bridges of 7.1%.

- **Example 2**

Comparison of the combability between the Olaplex® pre-shampoo (Olaplex N°3 Hair Perfector) single product and the pre-shampoo comprising the 5% *restructuring blend* according to the present invention.

Pre-shampoo composition comprising 5% restructuring blend: WATER, GLYCERIN, BEHENTRIMONIUM CHLORIDE, CETEARYL ALCOHOL, HYDROLYZED GLYCOSAMINOGLYCANS, SERINE, CAPRYLIC/CAPRIC TRIGLYCERIDE, GLUTAMIC ACID, THREONINE, GLYCINE, ARGININE, PEG-40/PPG-8 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE COPOLYMER, SESAMUM INDICUM SEED OIL (SESAME), HYDROXYETHYL CELLULOSE, FRAGRANCE, CARBOCYSTEINE, PHENOXYETHANOL, TAURINE, CALCIUM PANTOTHENATE, GUAR HYDROXYPROPYLTRIMONIUM CHLORIDE, DIPROPYLENE GLYCOL, HYALURONIC ACID, LACTIC ACID, HYDROLYZED TRITICUM MONOCOCCUM SEED EXTRACT, SORBITOL, LECITHIN, LEUCINE, CREATINE, CYSTEINE HCL, HYDROLYZED RICE PROTEIN, ZINC PCA, ISOLEUCINE, VALINE, XYLYLGLUCOSIDE, OLEA EUROPAEA CALLUS CULTURE LYSATE, XANTHAN GUM, LYSINE HCL, PROLINE, ANHYDROXYLITOL, MALTITOL, XYLITOL, METHYLCHLOROISOTHIAZOLINONE, PENTYLENE GLYCOL, METHYLISOTHIAZOLINONE, CYCLODEXTRIN, CITRIC ACID, CYAMOPSIS TETRAGONOLOBA GUM (GUAR), PHYTIC ACID, TOCOPHEROL, PELVETIA CANALICULATA EXTRACT.

Composition (INCI) Olaplex N°3 Hair Perfector: WATER, BIS-AMINOPROPYL DIGLYCOL DIMALEATE, PROPYLENE GLYCOL, CETEARYL ALCOHOL, BEHENTRIMONIUM METOSULFATE, CETYL ALCOHOL, PHENOXYETHANOL, GLYCERIN, HYDROXYETHYLCELLULOSE, STEARAMIDOPROPYL DIMETHYLAMINE, QUATERNIUM-91, SODIUM BENZOATE, CETRIMONIUM METOSULFATE, CETRIMONIUM CHLORIDE,

FRAGRANCE, POLYQUATERNIUM-37, TETRASODIUM EDTA, BUTYLPHENYL METHYLPROPIONAL, ETIDRONIC ACID, ASCORBIC ACID, PHYTANTRIOL, TOCOPHERYL ACETATE, ALOE BARBADENSIS LEAF JUICE, PANTHENOL, SIMMONDSIA CHINENSIS (JOJOBA) SEED OIL, CITRIC ACID, POTASSIUM SORBATE.

Method

Two hair samples, after washing, *bleaching* and rinsing as per the procedure above, were subjected respectively to the treatment with *Olaplex® pre-shampoo* (Olaplex N°3 Hair Perfector) and with the pre-shampoo formulation comprising 5% *restructuring blend*. Subsequently, both samples underwent treatment with a commercially available neutral shampoo.

The evaluation of combability was performed using the DIA-STRON fibra.one instrument.

Result

The pre-shampoo formulation comprising 5% *restructuring blend* as a single product showed a superior performance to the *Olaplex® pre-shampoo* (Olaplex N°3 Hair Perfector) with respect to hair combability parameter, after a single application.

• Example 3

Comparison in the reconstruction of disulfide bridges between two complete treatments, specified below:

1. *Complete treatment*: Medavita® Prodige Fortifying Protein Cream, Medavita® Prodige Restoring Shampoo and Medavita® Prodige Ultimate Deep Recovering Mask (conditioner).
2. *Three steps treatment*: Pre-shampoo comprising the *restructuring blend*, Shampoo comprising the *restructuring blend* and Conditioner comprising the *restructuring blend*.

Composition Medavita® Prodige Fortifying Protein Cream: WATER, BEHENTRIMONIUM CHLORIDE, CETEARYL ALCOHOL, CAPRYLIC/CAPRIC TRIGLYCERIDE, SERINE, GLUTAMIC ACID,

THREONINE, GLYCINE, ARGININE, GLYCERIN, PEG-40/PPG-8
 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE
 COPOLYMER, SESAMUM INDICUM (SESAME) SEED OIL,
 HYDROXYETHYLCELLULOSE, CARBOCYSTEINE,
 5 PHENOXYETHANOL, TAURINE, FRAGRANCE, CALCIUM
 PANTOTHENATE, DIPROPYLENE GLYCOL, LACTIC ACID, BENZYL
 SALICYLATE, HYDROLYZED TRITICUM MONOCOCCUM SEED
 EXTRACT, SORBITOL, LECITHIN, LIMONENE, LEUCINE, CREATINE,
 ISOLEUCINE, VALINE, XANTHAN GUM,
 10 METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE.

Composition Medavita® Prodige Restoring Shampoo: WATER, MEA-
 LAURETH SULFATE, SODIUM LAURETH SULFATE, SODIUM MYRETH
 SULFATE, COCAMIDE DEA, COCMMIDOPROPYL BETAINE, PEG-18
 GLYCERYL OLEATE/COCOATE, BIS(C13-15 ALKOXY) PG-
 15 AMODIMETHICONE, DECYL GLUCOSIDE, FRAGRANCE, GLYCERIN,
 PANTHENOL, PPG-26-BUTETH-26, PHENOXYETHANOL,
 POLYQUATERNIUM-10, POLYQUATERNIUM-7, PEG-40
 HYDROGENATED CASTOR OIL, CITRIC ACID, BENZYL SALICYLATE,
 LIMONENE, SESAMUM INDICUM (SESAME) SEED OIL, BHT,
 20 CYPERUS ESCULENTUS ROOT OIL, HYDROLYZED TRITICUM
 MONOCOCCUM SEED EXTRACT, MORINGA OLEIFERA SEED OIL,
 PLUKENETIA VOLUBILIS SEED OIL, SORBITOL, LECITHIN, LINUM
 USITATISSIMUM SEED OIL, LEUCINE, CREATINE, ISOLEUCINE,
 VALINE, METHYLCHLOROISOTHIAZOLINONE, XANTHAN GUM,
 25 METHYLISOTHIAZOLINONE.

Composition Medavita® Prodige Ultimate Deep Recovering Mask:
 WATER, CETEARYL ALCOHOL, PROPYLENE GLYCOL,
 BEHENTRIMONIUM CHLORIDE, CETYL ESTERS, GLYCERYL
 STEARATE, PARAFFIN, AMODIMETHICONE, PHENYL
 30 TRIMETHICONE, SESAMUM INDICUM (SESAME) SEED OIL,
 COPERNICIA CERIFERA WAX [COPERNICIA CERIFERA (CARNAUBA)
 WAX], GLYCERIN, FRAGRANCE, PHENOXYETHANOL, EUPHORBIA
 CERIFERA WAX [EUPHORBIA CERIFERA (CANDELILLA) WAX], PEG-

40/PPG-8 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE
 COPOLYMER, LACTIC ACID, PEG-8, CETRIMONIUM CHLORIDE,
 TRIDECETH-10, BENZYL SALICYLATE, DIPROPYLENE GLYCOL,
 LIMONENE, HYDROLYZED TRITICUM MONOCOCCUM SEED
 5 EXTRACT, SORBITOL, LECITHIN, PEG-8/SMDI COPOLYMER,
 PALMITOYL MYRISTYL SERINATE, SODIUM POLYACRYLATE,
 LEUCINE, CREATINE, ISOLEUCINE, VALINE, XANTHAN GUM,
 METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE.

Composition Pre-shampoo comprising the restructuring blend: WATER,
 10 BEHENTRIMONIUM CHLORIDE, CETEARYL ALCOHOL,
 CAPRYLIC/CAPRIC TRIGLYCERIDE, SERINE, GLUTAMIC ACID,
 GLYCERIN, HYDROLYZED GLYCOSAMINOGLYCANS, THREONINE,
 GLYCINE, ARGININE, PEG-40/PPG-8
 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE
 15 COPOLYMER, SESAME SEED OIL (SESAMUM INDICUM),
 HYDROXYETHYLCELLULOSE, CARBOCYSTEINE,
 PHENOXYETHANOL, TAURINE, FRAGRANCE, CALCIUM
 PANTOTHENATE, GLYCOL DIPROPYLENIC ACID, LACTIC ACID,
 BENZYL SALICYLATE, HYDROLYZED TRITICUM MONOCOCCUM
 20 SEED EXTRACT, SORBITOL, LECITHIN, LIMONENE, LEUCINE,
 CREATINE, ISOLEUCINE, VALINE, XANTHAN GUM,
 METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE,
 HYALURONIC ACID, CYSTEINE HCL, HYDROLYZED RICE PROTEIN,
 ZINC PCA, LYSINE HCL, PROLINE.

25 Composition Shampoo comprising the restructuring blend: WATER, MEA-
 LAURETH SULFATE, SODIUM LAURETH SULFATE, SODIUM MYRETH
 SULFATE, COCAMIDE DEA, COCAMMIDEPROPYL BETAINE,
 GLYCERIN, HYDROLYZED GLYCOSAMINOGLYCANS, PEG-18
 GLYCERYL OLEATE/COCOATE, BIS(C13-15 ALKOXY) PG-
 30 AMODIMETHICONE, DECYL GLUCOSIDE, FRAGRANCE,
 PANTHENOL, PPG-26-BUTETH-26, PHENOXYETHANOL,
 POLYQUATERNIUM-10, POLYQUATERNIUM-7, PEG-40
 HYDROGENATED CASTOR OIL, CITRIC ACID, BENZYL SALICYLATE,

LIMONENE, SESAMUM INDICUM (SESAME) SEED OIL, BHT, CYPERUS ESCULENTUS ROOT OIL, HYDROLYZED TRITICUM MONOCOCCUM SEED EXTRACT, MORINGA OLEIFERA SEED OIL, PLUKENETIA VOLUBILIS SEED OIL, SORBITOL, LECITHIN, LINUM
 5 USITATISSIMUM SEED OIL, LEUCINE, CREATINE, ISOLEUCINE, VALINE, METHYLCHLOROISOTHIAZOLINONE, XANTHAN GUM, METHYLISOTHIAZOLINONE, HYALURONIC ACID, GLYCINE, SERINE, CYSTEINE HCL, HYDROLYZED RICE PROTEIN, ZINC PCA, LYSINE HCL, PROLINE.

10 Composition Conditioner comprising the *restructuring blend*: WATER, CETEARYL ALCOHOL, PROPYLENE GLYCOL, BEHENTRIMONIUM CHLORIDE, CETYL ESTERS, GLYCERYL STEARATE, GLYCERIN, HYDROLYZED GLYCOSAMINOGLYCANS, PARAFFIN, AMODIMETHICONE, PHENYL TRIMETHICONE, SESAMUM INDICUM
 15 (SESAME) SEED OIL, COPERNICIA CERIFERA WAX [COPERNICIA CERIFERA WAX (CARNAUBA)], FRAGRANCE, PHENOXYETHANOL, EUPHORBIA CERIFERA WAX [EUPHORBIA CERIFERA WAX (CANDELILLA)], PEG-40/PPG-8 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE
 20 COPOLYMER, LACTIC ACID, PEG-8, BENZYL SALICYLATE, TRIDECETH-10, DIPROPYLENE GLYCOL, CETRIMONIUM CHLORIDE, LIMONENE, HYDROLYZED TRITICUM MONOCOCCUM SEED EXTRACT, SORBITOL, LECITHIN, PEG-8/SMDI COPOLYMER, PALMITOYL MYRISTYL SERINATE, SODIUM POLYACRYLATE,
 25 LEUCINE, CREATINE, ISOLEUCINE, VALINE, XANTHAN GUM, METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE, HYALURONIC ACID, GLYCINE, SERINE, CYSTEINE HCL, RICE PROTEIN HYDROLYSATE, ZINC PCA, LYSINE HCL, PROLINE.

Method

30 Two hair samples, after washing, *bleaching* and rinsing as per the procedure above, were respectively subjected to the two complete treatments described above.

The evaluation of thiol groups and disulfide bridges was performed by

Ellman test and spectrophotometer measurement, as per the previously described procedure.

Result

After a single application, the *three-step treatment* (treatment set wherein the *restructuring blend* is comprised in all three formulations of pre-shampoo, shampoo and conditioner) showed a markedly better performance in the reconstruction of disulfide bridges than the counterpart without added *blend*, with an increase in the number of sulphide bridges of 40.2%.

10 • Example 4

Comparison between the complete *Olaplex® treatment* (Olaplex N°3 Hair Perfector, Olaplex N°4 Bond Maintenance™ Shampoo and Olaplex N°5 Bond Maintenance™ Conditioner applied according to the manufacturer's recommended instructions) and a *one-step treatment* in the reconstruction of disulfide bridges, wherein this *one-step treatment* consists of the consecutive application of pre-shampoo comprising 5% *restructuring blend*, Medavita® Prodiges Revivifying Shampoo and Medavita® Ultimate Deep Recovering Mask (conditioner).

Olaplex N°3 Hair Perfector Composition: WATER, BIS-AMINOPROPYL DIGLYCOL DIMALEATE, PROPYLENE GLYCOL, CETEARYL ALCOHOL, BEHENTRIMONIUM METOSULFATE, CETYL ALCOHOL, PHENOXYETHANOL, GLYCERIN, HYDROXYETHYLCELLULOSE, STEARAMIDOPROPYL DIMETHYLAMINE, QUATERNIUM-91, SODIUM BENZOATE, CETRIMONIUM METOSULFATE, CETRIMONIUM CHLORIDE, FRAGRANCE, POLYQUATERNIUM-37, TETRASODIUM EDTA, BUTYLPHENYL METHYLPROPIONAL, ETIDRONIC ACID, ASCORBIC ACID, PHYTANTRIOL, TOCOPHERYL ACETATE, ALOE BARBADENSIS LEAF JUICE, PANTHENOL, SIMMONDSIA CHINENSIS (JOJOBA) SEED OIL, CITRIC ACID, POTASSIUM SORBATE.

Composition Olaplex N°4 Bond Maintenance™ Shampoo: WATER, SODIUM LAUROYL METHYL ISETHIONATE, COCAMMIDOPROPYL HYDROXYSULTAINE, POTASSIUM COCOYL GLYCINATE, DISODIUM

COCOYL GLUTAMATE, SODIUM LAUROYL SARCOSINATE,
 POTASSIUM COCOATE, DECYL GLUCOSIDE, GLYCERETH-26, BIS-
 AMINOPROPYL DIGLYCOL DIMALEATE, PROPANEDIOL, EUTERPE
 OLERACEA FRUIT EXTRACT, PUNICA GRANATUM EXTRACT,
 5 ROSMARINUS OFFICINALIS (ROSEMARY) LEAF EXTRACT, MUSA
 SAPIENTUM (BANANA) FRUIT EXTRACT, ORIGANUM VULGARE
 LEAF EXTRACT, MORINDA CITRIFOLIA FRUIT EXTRACT, ARCTIUM
 LAPPA ROOT EXTRACT, FRAGRANCE, COCAMMIDOPROPYLAMINE
 OXIDE, DISODIUM LAURETH SULFOSUCCINATE, PANTHENOL,
 10 GLYCOL DISTEARATE, SODIUM COCOYL GLUTAMATE, METHYL
 GLUCETH-20, ACRYLATE COPOLYMER, PRUNUS ARMENIACA
 (APRICOT) KERNEL OIL, PSEUDOZYMA EPICOLA/ARGANIA
 SPINOSA KERNEL OIL FILTRATE, PSEUDOZYMA
 EPICOLA/CAMELLIA SINENSIS SEED OIL FERMENT EXTRACT
 15 FILTRATE, PEG-120 METHYL GLUCOSE DIOLEATE,
 AMODIMETHICONE, SODIUM LAURYL SULFOACETATE, GUAR
 HYDROXYPROPYLTRIMONIUM CHLORIDE, POLYQUATERNIUM-10,
 DIVINYLDIMETHICONE/DIMETHICONE COPOLYMER,
 POLYQUATERNIUM-11, TRISODIUM ETHYLENEDIAMINE
 20 DISUCCINATE, C11-15 PARETH-7, LAURETH-9, GLYCERIN,
 TRIDECETH-12, HEXYLCINNAMAL, LIMONENE, C12-13 PARETH-23,
 C12-13 PARETH-3, HYDROLYZED VEGETABLE PROTEIN PG-
 PROPYL SYLANETRIOL, ACETIC ACID, CITRAL, BENZOIC ACID,
 TETRASODIUM EDTA, PENTASODIUM TRIPHOSPHATE, SODIUM
 25 POLYACRYLATE, PENTAERYTHRIL TETRA-DI-T-BUTYL
 HYDROXYHYDROCINNAMATE, DISODIUM EDTA, SODIUM
 BENZOATE, POTASSIUM SORBATE, PHENOXYETHANOL,
 CHLORPHENESIN, ETHYLHEXYLGLYCERIN, QUATERNIUM-95, PEG-
 8, PEG-8/SMDI COPOLYMER, PALMITOYL MYRISTYL SERINATE,
 30 CITRIC ACID, SODIUM HYALURONATE, TOCOPHEROL, BIOTIN,
 HELIANTHUS ANNUUS (SUNFLOWER) SEED EXTRACT,
 HELIANTHUS ANNUUS (SUNFLOWER) SEED OIL.

Olaplex N°5 Bond Maintenance™ Conditioner Composition: WATER,

CETEARYL ALCOHOL, PPG-3 BENZYL ETHER MYRISTATE,
 CAPRYLIC/CAPRIC TRIGLYCERIDE, CETYL ALCOHOL,
 OCTYLDODECYL RICINOLEATE, QUATERNIUM-91, CETRIMONIUM
 CHLORIDE, DIVINYLDIMETHICONE/DIMETHICONE COPOLYMER,
 5 BEHENTRIMONIUM CHLORIDE, GLYCERIN, CETYL ESTERS,
 ISODODECANE, BIS-AMINOPROPYL DIGLYCOL DIMALEATE,
 FRAGRANCE, PANTHENOL, PHOSPHOLIPIDS, PEG-7 DIMETHICONE
 ISOSTEARATE, FERMENTED PSEUDOSZYMA EPICOLA/ARGANIA
 SPINOSA SEED OIL FILTRATE, FERMENTED PSEUDOSZYMA
 10 EPICOLA/CAMELLIA SINENSIS SEED OIL FILTRATE, TOCOPHERYL
 LINOLEATE/OLEATE, QUATERNIUM-95, PROPANEDIOL, PUNICA
 GRANATUM EXTRACT, MORINDA CITRIFOLIA FRUIT EXTRACT, PEG-
 8, EUTERPE OLERACEA FRUIT EXTRACT, CAMELLIA SINENSIS
 SEED OIL, CRAMBE ABYSSINICA SEED OIL, HYDROXYPROPYL
 15 CYCLODEXTRIN, PERSEA GRATISSIMA (AVOCADO) OIL, VITIS
 VINIFERA (GRAPE) SEED OIL, DISODIUM EDTA, POLYSILICONE-15,
 C11-15 PARETH-7, HYDROXYPROPYL GUAR, GLYCINE SOJA
 (SOYBEAN) OIL, PEG-45M, PEG-7 AMYMETICONE,
 AMODIMETHICONE, C12-13 PARETH-23, C12-13 PARETH-3,
 20 LAURETH-9, PENTAERYTHRITYL TETRA-DI-T-BUTYL
 HYDROXYHYDROCINNAMATE, PEG-4, PHENOXYETHANOL, HEXYL
 CINNAMAL, LIMONENE, TRIDECETH-12, SODIUM POLYASPARTATE,
 CITRAL, POTASSIUM SORBATE, IODOPROPYNYL
 BUTYLCARBAMATE, SILICA, ACETIC ACID, ETIDRONIC ACID,
 25 SODIUM ACETATE, CHLORPHENESIN, PROPYLENE GLYCOL, PEG-
 4 DILAURATE, PEG-4 LAURATE, BHT, SODIUM DEHYDROACETATE,
 PEG-8/SMDI COPOLYMER, PALMITOYL MYRISTYL SERINATE,
 SODIUM POLYACRYLATE, AHNFEITOPSIS CONCINNA EXTRACT,
 SODIUM BENZOATE, CITRIC ACID, TOCOPHEROL, HYDROLYZED
 30 HYALURONIC ACID, BIOTIN, HELIANTHUS ANNUUS (SUNFLOWER)
 SEED EXTRACT, HELIANTHUS ANNUUS (SUNFLOWER) SEED OIL.

Pre-shampoo composition comprising 5% restructuring blend: WATER,
 GLYCERIN, BEHENTRIMONIUM CHLORIDE, CETEARYL ALCOHOL,

HYDROLYZED GLYCOSAMINOGLYCANS, SERINE,
 CAPRYLIC/CAPRIC TRIGLYCERIDE, GLUTAMIC ACID, THREONINE,
 GLYCINE, ARGININE, PEG-40/PPG-8 METHYLAMINOPROPYL/
 HYDROXYPROPYL DIMETHICONE COPOLYMER, *SESAMUM*
 5 *INDICUM* SEED OIL (SESAME), HYDROXYETHYL CELLULOSE,
 FRAGRANCE, CARBOCYSTEINE, PHENOXYETHANOL, TAURINE,
 CALCIUM PANTOTHENATE, GUAR HYDROXYPROPYLTRIMONIUM
 CHLORIDE, DIPROPYLENE GLYCOL, HYALURONIC ACID, LACTIC
 ACID, HYDROLYZED TRITICUM MONOCOCCUM SEED EXTRACT,
 10 SORBITOL, LECITHIN, LEUCINE, CREATINE, CYSTEINE HCL,
 HYDROLYZED RICE PROTEIN, ZINC PCA, ISOLEUCINE, VALINE,
 XYLYLGLUCOSIDE, OLEA EUROPAEA CALLUS CULTURE LYSATE,
 XANTHAN GUM, LYSINE HCL, PROLINE, ANHYDROXYLITOL,
 MALTITOL, XYLITOL, METHYLCHLOROISOTHIAZOLINONE,
 15 PENTYLENE GLYCOL, METHYLISOTHIAZOLINONE, CYCLODEXTRIN,
 CITRIC ACID, CYAMOPSIS TETRAGONOLOBA GUM (GUAR), PHYTIC
 ACID, TOCOPHEROL, PELVETIA CANALICULATA EXTRACT.

Composition Medavita® Prodiges Revivifying Shampoo: WATER, MEA-
 LAURETH SULFATE, SODIUM LAURETH SULFATE, SODIUM MYRETH
 20 SULFATE, COCAMIDE DEA, COCMMIDOPROPYL BETAINE, PEG-18
 GLYCERYL OLEATE/COCOATE, BIS(C13-15 ALKOXY) PG-
 AMODIMETHICONE, DECYL GLUCOSIDE, FRAGRANCE, GLYCERIN,
 PANTHENOL, PPG-26-BUTETH-26, PHENOXYETHANOL,
 POLYQUATERNIUM-10, POLYQUATERNIUM-7, PEG-40
 25 HYDROGENATED CASTOR OIL, CITRIC ACID, BENZYL SALICYLATE,
 LIMONENE, *SESAMUM INDICUM* (SESAME) SEED OIL, BHT,
 CYPERUS ESCULENTUS ROOT OIL, HYDROLYZED TRITICUM
 MONOCOCCUM SEED EXTRACT, MORINGA OLEIFERA SEED OIL,
 PLUKENETIA VOLUBILIS SEED OIL, SORBITOL, LECITHIN, LINUM
 30 USITATISSIMUM SEED OIL, LEUCINE, CREATINE, ISOLEUCINE,
 VALINE, METHYLCHLOROISOTHIAZOLINONE, XANTHAN GUM,
 METHYLISOTHIAZOLINONE.

Composition Medavita® Prodiges Ultimate Deep Recovering Mask:

WATER, CETEARYL ALCOHOL, PROPYLENE GLYCOL, BEHENTRIMONIUM CHLORIDE, CETYL ESTERS, GLYCERYL STEARATE, PARAFFIN, AMODIMETHICONE, PHENYL TRIMETHICONE, SESAMUM INDICUM (SESAME) SEED OIL, 5 COPERNICIA CERIFERA WAX [COPERNICIA CERIFERA (CARNAUBA) WAX], GLYCERIN, FRAGRANCE, PHENOXYETHANOL, EUPHORBIA CERIFERA WAX [EUPHORBIA CERIFERA (CANDELILLA) WAX], PEG-40/PPG-8 METHYLAMINOPROPYL/HYDROXYPROPYL DIMETHICONE COPOLYMER, LACTIC ACID, PEG-8, TRIDECETH-10, BENZYL 10 SALICYLATE, DIPROPYLENE GLYCOL, CETRIMONIUM CHLORIDE, LIMONENE, HYDROLYZED TRITICUM MONOCOCCUM SEED EXTRACT, SORBITOL, LECITHIN, PEG-8/SMDI COPOLYMER, PALMITOYL MYRISTYL SERINATE, SODIUM POLYACRYLATE, LEUCINE, CREATINE, ISOLEUCINE, VALINE, XANTHAN GUM, 15 METHYLCHLOROISOTHIAZOLINONE, METHYLISOTHIAZOLINONE.

Method

Two hair samples, after washing, *bleaching* and rinsing as per the procedure above, were respectively subjected to a complete *Olaplex® treatment* and a *one-step treatment*, as defined above. The evaluation of 20 thiol groups and disulfide bridges was performed by Ellman test and spectrophotometer measurement, as per the previously described procedure.

Result

The *Olaplex® full treatment* and the *one-step treatment* showed 25 comparable performance with respect to the repair effect of damaged disulfide bridges, after a single application.

• **Example 5**

Evaluation of the performance of the *restructuring blend (blend)* with 30 varying concentration of hydrolysed glycosaminoglycans (GAG) (CAS 156715-51-4). The protective effectiveness of two products to be applied to bleached (damaged) hair was evaluated by measuring the load that must be applied to hair to reach its breakage, when subjected to constant

traction stress.

The measurement of the breaking load was carried out with Lamy Rheology's Texture Analyzer TX-700, equipped with the "Noodle Tensile Fixture" accessory to which hair is fixed.

- 5 The instrument has been set with the following parameters: speed 1 mm/s, distance 40 mm, trigger force 10.2 g. The instrument provides the recorded force values (g) as a function of distance (mm). The data of maximum measured force, at which hair suffers breakage, is then extrapolated. An expert in the field will be able to easily carry out the measurements as described.
- 10

The strands of hair bleached for the execution of the tests derive from braids of "Gold" depigmented hair, about 16 cm long, purchased from the Imhair-Palermo company, and composed of bleached straight hair, blonde in color. Before the tests, the strands were washed with the same base

15 shampoo, containing SLES.

The test was carried out in comparison, comparing untreated hair and hair treated with two products.

The two products tested are as follows:

Lotion 1: *restructuring blend* with 5% GAG.

- 20 Lotion 1 composition: GLYCERINE (CAS 56-81-5), WATER, HYDROLYZED GLYCOSAMINOGLYCANS (CAS 156715-51-4), HYALURONIC ACID (CAS 9004-61-9), GLYCINE (CAS 56-40-6), SERINE (CAS 302-84-1), CYSTEINE HCL (CAS 52-89-1), ZINC PCA (CAS 68107-75-5), HYDROLYZED RICE PROTEIN (CAS 156715-40-1),
- 25 LEUCINE (CAS 61-90-5), LYSINE HCL (CAS 657-27-2), PROLINE (CAS 147-85-3).

Lotion 2: *restructuring blend* with 48% GAG;

- Lotion 2 Composition: GLYCERINE (CAS 56-81-5), HYDROLYZED GLYCOSAMINOGLYCANS (CAS 156715-51-4), HYALURONIC ACID (CAS 9004-61-9), GLYCINE (CAS 56-40-6), SERINE (CAS 302-84-1),
- 30 CYSTEINE HCL (CAS 52-89-1), HYDROLYZED RICE PROTEIN (CAS

156715-40-1), ZINC PCA (CAS 68107-75-5), LEUCINE (CAS 61-90-5),
LYSINE HCL (CAS 657-27-2), PROLINE (CAS 147-85-3).

The effectiveness of the *restructuring blend* at GAG concentrations
exceeding 60% (and therefore outside the range reported in the detailed
5 description) could not be evaluated since beyond this value the hydrolysed
glycosaminoglycans settle down on the bottom precipitating from the
solution (figure 1).

With the exception of GAGs, lotions 1 and 2 were prepared using the same
percentage amounts of each component. The low GAG content in lotion 1
10 (i.e., 5%) was compensated by the addition of WATER as an inactive
ingredient.

Preparation.

From a braid of depigmented "Gold" hair, a total of 3 strands were
prepared, weighing about 2-3 g each. All the strands were washed using
15 a basic shampoo for about 2 minutes, rinsed and dried for 10 minutes
using a common hairdryer (2000 Watt), at maximum speed and at an
intermediate temperature.

The strands were divided as follows:

CONTROL: no treatment is applied to this strand

20 TREATED 1: lotion 1 (GAG 5%) is applied to damp towel-dried hair, left on
for 10 minutes and then rinsed. The strand is dried for 10 minutes using a
common hairdryer (2000 Watt), at maximum speed and at an intermediate
temperature. The tensile strength measurement is performed after a single
application (T1).

25 TREATED 2: lotion 2 (GAG 48%) is applied to damp towel-dried hair, left
on for 10 minutes and then rinsed. The strand is dried for 10 minutes using
a common hairdryer (2000 Watt), at maximum speed and at an
intermediate temperature. The tensile strength measurement is performed
after a single application (T1).

30 The measurements, both for the CONTROL and for each TREATED, were
carried out on 20 hairs taken from each strand. The average of the

measurements was then calculated. Finally, the percentage change ($\Delta\%$) between the mean value obtained for the CONTROL and for the TREATED (1 and 2) at T1 was calculated and compared.

Results.

- 5 After a single application (T1), the following results were obtained (table 1):

Table 1

	TREATED 1	TREATED 2
$\Delta\%$	43.9	49.0

These increases were statistically significant ($p \ll 0.05$).

- TREATED 2, through the use of lotion 2 (GAG 48%) presents a greater
10 increase in tensile strength after a single application than TREATED 1.

CLAIMS

1. A restructuring composition for hair comprising:

- glycerine in an amount between 40.0% and 60.0% by weight
- hydrolysed glycosaminoglycans in an amount between 20.0% and 60.0%
5 by weight
- hyaluronic acid with a molecular weight between 5 and 100 KDa, preferably between 8-50 KDa, preferably between 8-12 KDa, in an amount between 0.4% and 3.0% by weight
- cysteine in an amount between 0.05% and 0.2% by weight.

10 2. The restructuring composition according to claim 1 further comprising at least one amino acid in addition to cysteine, at least one hydrolysed vegetable protein and at least one source of zinc.

3. The restructuring composition according to claim 2 wherein the at least one amino acid is chosen among leucine, lysine, glycine, serine, proline,
15 the at least one vegetable protein is chosen among hydrolysed proteins from broad bean, soy, oats, wheat, rice and peas, and the source of zinc is chosen among zinc acetate, zinc gluconate, zinc oxide and zinc PCA (L-pyrrolidon-carboxylic acid anion).

4. The restructuring composition according to anyone of claims 2-3
20 wherein the hydrolysed plant protein is hydrolysed rice protein, the amino acid is chosen among leucine, lysine, glycine, serine, proline and related mixtures, and the source of zinc is zinc PCA.

5. The restructuring composition according to anyone of claims 2-4 wherein:

- 25 - The at least one hydrolysed vegetable protein is in an amount between 0.05% and 0.15% by weight;
- The at least another amino acid is in an amount between 0.1% and 0.4% by weight;
- The at least one source of zinc is in an amount between 0.05% and
30 0.15% by weight.

6. The restructuring composition according to anyone of claims 2-5 comprising:

- glycerine in an amount between 40.0% and 60.0% by weight,
- hydrolysed glycosaminoglycans in an amount between 38.0% and 58.0%
5 by weight,
- low molecular weight hyaluronic acid in an amount between 0.4% and 2.0% by weight,
- cysteine in an amount between 0.05% and 0.15% by weight,
- the at least one hydrolysed vegetable protein in an amount between
10 0.05% and 0.15% by weight,
- the at least another amino acid in an amount between 0.1% and 0.4% by weight,
- the at least one source of zinc in an amount between 0.05% and 0.15% by weight.

15 7. A pre-shampoo comprising restructuring composition according to anyone of claims 1-6 in an amount between 0.01% and 50% by weight and at least one cosmetically acceptable excipient.

8. A shampoo comprising the restructuring composition according to anyone of claims 1-6 in an amount between 0.01% and 50% by weight and
20 at least one cosmetically acceptable excipient.

9. A conditioner comprising the restructuring composition according to anyone of claims 1-6 in an amount between 0.01% and 50% by weight and at least one cosmetically acceptable excipient.

10. A hair restructuring treatment kit comprising at least one of the
25 following:

- the pre-shampoo according to claim 7;
- the shampoo according to claim 8;
- the conditioner according to claim 9;

and corresponding instructions for use.

11. A hair restructuring method comprising at least 1 of the following steps:

- Applying the pre-shampoo treatment according to claim 7 from roots to ends, on damp and towel-dried hair, combing through and leaving on for more than 1 minute, rinsing;
- 5 • Applying the shampoo according to claim 8 from the scalp to the tip of hair, massaging for more than a minute and rinsing;
- Applying the conditioner according to claim 9 from the scalp to the tip of hair, leaving on for more than 1 minute, then rinsing and proceeding with drying.

10 12. Use of the composition according to anyone of claims 1-6 for the restructuring, repair and reconstruction of damaged hair.

13. Use according to the previous claim wherein the restructuring, repair and reconstruction of damaged hair is carried out with one among: pre-shampoo according to claim 7, shampoo according to claim 8 and
15 conditioner according to claim 9.