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(54) Title : PEPTIDE COMPOSITION AND USES THEREOF

(54) Título : COMPOSIÇÃO PEPTÍDICA E RESPETIVOS USOS

(57) Abstract : The present application relates to a composition comprising at least one peptide with a size of 6-12 amino acids, wherein 2-5 of said amino acids are cysteines, which can be used for treatment and grooming products for animal hair, preferably for treatment and cosmetics for human hair. Several methods are available for styling hair which involve breaking and re-establishing new disulphide bonds, allowing the hair to be relaxed and straightened. However, the currently more effective methods for styling hair use harmful chemical products. There is therefore a continuing need for formulations that can be used for effectively styling hair fibres without damaging same. The present invention therefore intends to provide a composition for treating animal hair, including human hair, without the use of chemicals that are harmful to hair fibres and to the health of the user, and uses of said compositions as a shampoo, lotion, serum, cream, conditioner, foam, elixir, oil, aerosol or mask.

(57) Resumo : O presente pedido diz respeito a uma composição que compreende, pelo menos um péptido com tamanho de 6-12 aminoácidos, em que 2-5 dos referidos aminoácidos são cisteínas para fins de tratamento e de cosmética de pelo animal, preferencialmente cabelo humano. Existem diversos métodos disponíveis para estilizar o cabelo envolvendo quebra e restabelecimento de novas pontes dissulfídicas, permitindo o relaxamento e alisamento do cabelo. No entanto, os métodos que atualmente alteram de forma mais eficaz usam produtos químicos nocivos. Deste modo há uma procura constante por formulações que modelem eficientemente a fibra do cabelo sem a danificar. Deste modo, a presente invenção pretende fornecer uma composição para o tratamento de pelo animal, incluindo cabelo humano, sem o uso de químicos nocivos à fibra do cabelo e à saúde do consumidor, e usos das referidas composições como champô, loção, sérum, creme, condicionador, espuma, elixir, óleo, aerossol ou mascara.

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DESCRIPTION

Peptide composition and respective uses

Technical Domain

[0001] The current application corresponds to a composition that comprises at least one peptide, based on keratin and keratin associated proteins, containing 2 to 5 cysteines with the purpose of treatment and cosmetics of animal hair, in preference human hair.

Prior Art

[0002] Human hair has a significant social role in most of the various world cultures, particularly for female population. Thus, there is a constant desire to improve and change hair characteristics, such as its natural texture.[0003] There are several differences in hair characteristics between different human ethnicities, as well as between individuals of the same ethnicity, such as length, thickness, color and texture.

[0004] Hair is composed of approximately 65% to 95% protein. The remaining constituents include water, lipids, pigments and trace elements. The majority of the proteins present in human hair correspond to keratin and keratin-associated proteins.

[0005] Human hair fibers structure consists of cuticle, cortex and medulla. The cuticle constitutes about 15% by weight of the hair and consists of overlapping layers of cells, similar to a system of scales, with high content of cysteine. It provides a protective character to the hair fiber. The cortex is the middle region of the hair being responsible for the strength, elasticity and hair color. It is composed of several cell types and represents about 80% of the weight of the hair. The medulla corresponds to a central beam of cells, and is absent in some hairs.

[0006] Keratins and mainly keratin-associated proteins have high sulfur content, present in the cysteine amino acid. The presence of sulfur is essential to the hair

structure, as it allows the formation of disulfide bonds between amino acids of the polypeptide chains, due to oxidation of cysteine. The existence of these bonds is largely responsible for the structure and texture of the hair.

[0007] There are several hair styling methods that involve breakage and reestablishment of disulfide bonds, allowing relaxation and straightening of the hair. However, the most effective methods currently used to modulate hair contain harmful chemicals such as sodium hydroxide, potassium hydroxide, lithium hydroxide, guanidine hydroxide, ammonium thioglycolate or sodium sulfate. These methods can damage the scalp and the hair fiber, leading to its weakening and reducing its tensile strength. Formaldehyde, an extremely toxic chemical, is also used in hair straightening products. Other hair treatments that do not involve so much damage to the hair and the consumer are usually very expensive, time-consuming and/or have low efficacy. Thus there is a constant demand for formulations that efficiently model the hair fiber without damage.

[0008] Peptides, proteins, amino acids and its derivatives have also been used in compositions for personal care products, namely hair conditioning and strengthening. For example, the document WO 00/23039 discloses a composition for hair treatment containing intermediate filament proteins, namely artificial keratin. The document EP 0488242 discloses a hair treating agent containing 3% to 10% by weight of cysteine and salts thereof, a polyhydric alcohol or a saccharide containing four to twenty carbon atoms, three or more hydroxyl groups in the molecule and no aldehyde or ketone group.

[0009] The current invention is distinguished by the use of peptides, while the other applications refer the use of, respectively, proteins and amino acids in isolation and together with other types of compounds. The peptides in this innovation peptide can penetrate into the human hair in order to improve hair fiber resistance.

[0010] The document WO 00/51556 discloses a hair treatment composition that contains four or more discrete amino acids selected from histidine, lysine, methionine, tyrosine, tryptophan or cysteine. This document describes peptides without referring

sequences and providing a composition essentially based on histidine, lysine, methionine, tyrosine, tryptophan or cysteine.

[0011] The document PT 103484 describes a formulation for cosmetic applications that uses hydrophobic binding domains and/or carbohydrates, in order to enhance its properties and to repair hair damage. The binding domains used are hydrolyzed milk protein, a model of human surfactant protein as well as biologically active and synthetic peptides. The current invention is distinguished by the innovative use of synthetic peptide sequences analogous to keratin proteins instead of surfactant proteins. Furthermore, it does not rely on hydrophobic binding domains and/or carbohydrates, but in other interactions, namely disulfide bonds.

[0012] Enzymes have also been used as activating agents for hair treatment, such as in the document WO 00/64405. The document WO 2012/13593 discloses a cosmetic kit for hair conformational change that acts specifically in the disulfide bonds of the hair keratin, through enzyme activating agents and proteolytic enzymes.

[0013] As described in the last document there are hair treatments that include actions at the level of the hair disulfide bonds. Below we highlight some examples.

[0014] The document WO 97/11672 reports a method for permanent hair processing using tris(2-carboxyethyl)phosphine (TCEP), and other water-soluble tertiary phosphines to break disulfide bonds, whose reaction occurs in acidicic environment. The document US 5635170 discloses a composition for permanent shaping of hair based on a keratin reducing agent, which contains N-glycyl-L-cysteine and/or L-cysteinyl-glycine. The pH range of this composition is 6.5 to 9.0. The document WO 2008/081348 refers a method and composition for permanent modulation of hair, through the use of 1% to 30% of N-alkyl-2-mercapto acetamide as a keratin reducing agent. It also contains at least one cationic surfactant for permanently shaping hair and the resulting process. The document WO 2006/001536 describes an agent for permanent hair processing that contains a derivative of mercaptocarboxylic acid, which allows processing and reduction of hair keratin in the acidic and neutral range of the pH. The document US 2010/0272666 discloses a hair cosmetic composition for hair

treatment, containing 5 to 50 amino acids, without containing cysteine or its derivatives. Thus, this invention is distinguished by the existence of specific amino acid sequences, which contain cysteine, allowing the formation of disulfide bonds that stabilize and protect the hair fiber.

[0015] In a previous article by Fernandes et al. (Fernandes, Lima, Loureiro, Gomes, & Cavaco-Paulo, 2012), it is performed the toxicology evaluation of a peptide sequence for hair care use, containing 13 amino acids with two cysteines in its composition. However, in this article it is not mentioned or suggested that the percentage of cysteine in a peptide sequence may have some effect on the resistance of the hair. Also, in the present innovation, the number of amino acids of each peptide sequence is 6 to 12.

General Description

[0016] Thus, the present invention aims to provide a composition for treatment of the hair, including animal and human hair, without the use of chemicals harmful to the hair fiber and consumer health and that does not present the drawbacks found in the state of the art.

[0017] The compositions described in the current invention, after prolonged use, provide hair with soft, shiny, undamaged texture and with the desired features. The peptide compositions with a specific number of amino acids and cysteines act synergically providing resistance to strength, toughness and elasticity to the hair. Therefore, the compositions of the current invention are particularly relevant for hair treatment, hair dying, hair perms, etc.

[0018] The present application describes a peptide composition for hair treatment, in particular human or animal hair, which comprises at least one peptide with 6-12 amino acids length (namely 6, 7, 8, 9, 10, 11, 12 amino acids), where 2-5 of those amino acids correspond to cysteine, preferably 2, 3, 4 or 5 of those amino acids are cysteines and dermatologically suitable excipients, which penetrates the hair, increasing it resistance and reducing it breakage.

[0019] In the embodiment, for improved results, the peptide (or peptides) of the peptide composition for hair care can comprise 10-11 amino acids.

[0020] In the embodiment of the peptide composition for hair care treatment, the referred peptides can also contain a percentage of hydrophobic amino acids, not higher than 60%, and preferably less than 41% for better results. Preferably, the composition can also comprise at least one hydrophobic amino acid selected from the following list: phenylalanine, alanine, leucine, methionine, isoleucine, tryptophan, proline, valine or their mixtures.

[0021] In yet another embodiment, the amount of cysteine of the peptide composition for hair treatment may vary from 10% to 50% of the total of amino acids of the peptide sequence, preferably 20-30%, and even more preferably 25%.

[0022] In an embodiment of the composition, with better results of the peptide (or peptides) of the peptide composition for hair treatment, the sequence of peptide(s) can comprise at least one sequence of the following list with a with a degree of homology greater than or equal to 90%: SEQ.ID NO:1- SEQ.ID NO:1239, preferably with a degree of homology greater than or equal to 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, 100%.

[0023] In an embodiment, improved results for the peptide (or peptides) of the peptide composition for hair treatment can comprise at least one of the sequences of the following list with a degree of homology equal or greater than 90%: SEQ.ID NO:5, SEQ.ID NO:75; SEQ.ID NO:94; SEQ.ID NO: 409; SEQ.ID NO:411; SEQ.ID NO:412; SEQ ID. NO:432; SEQ.ID NO:618; SEQ.ID NO:717; SEQ.ID NO:951;SEQ.ID NO:1088; SEQ.ID NO:1131; SEQ.ID NO:1149, preferably with a degree of homology equal or greater than 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99%, 100%.

[0024] In other embodiment, the concentration of the peptide of the peptide composition for hair treatment can vary between 0.001%-20% (w/w), preferably 0.01-5% (w/w).

[0025] In yet other embodiment, the peptide composition for hair treatment can comprise at least one excipient, selected from the following list: surfactants,

emulsifiers, preservatives, thickeners, organic polymers, humectants, silicones, oils, fragrances, vitamins, buffers.

[0026] In another embodiment, the peptide composition for hair treatment can comprise at least one anionic surfactant selected from the following list: alkylbenzene sulfonates, ammonium lauryl sulfate, ammonium lauryl sulfate, ammonium xylenesulfonate, sodium C14-16 olefin sulfonate, sodium cocoyl sarcosinate, sodium laureth sulfate, sodium lauryl sulfate, sodium lauryl sulfoacetate, sodium myreth sulfate, sodium xylenesulfonate, TEA-dodecylbenzenesulfonate, ethyl PEG-15 cocamine sulfate, dioctyl sodium sulfosuccinate, or any mixture thereof.

[0027] In an embodiment, the peptide composition for hair treatment can comprise at least one amphoteric surfactant selected from the following list: cocamidopropyl betaine, coco betaine, cocoamphoacetate, cocoamphodipropionate, disodium cocoamphodiacetate, disodium cocoamphodipropionate, lauroamphoacetate, sodium cocoyl isethionate, or any mixture thereof.

[0028] In other embodiment, the peptide composition for hair treatment can comprise at least one cationic surfactant selected from the following list: quaternary ammonium compounds, behentrimonium chloride, behentrimonium methosulfate, benzalkonium chloride, betrimonium chloride, binnamidopropyltrimonium chloride, cocotrimonium chloride, dicetyldimonium chloride, dicocodimonium chloride, dihydrogenated tallow dimethylammonium chloride, hydrogenated Palm trimethylammonium chloride, laurtrimonium chloride, quaternium-15, quaternium-18 bentonite, quaternium-22 hectonite, , stearalkonium chloride, tallowtrimonium chloride, tricetyldimonium chloride, or any mixture thereof.

[0029] In yet other embodiment, the peptide composition for hair treatment can comprise at least one non-ionic surfactant selected from the following list: decyl glucoside, laureth-10 (lauryl ether 10), laureth-23, Laureth-4, PEG-10 sorbitan laurate, polysorbate-(20, 21, 40, 60, 61, 65, 80, 81), PPG-1 trideceth-6, sorbitol, steareth-(2, 10, 15, 20), C11-21 pareth-(3-30), C12-20 acid PEG-8 ester, or their mixtures.

[0030] In yet other embodiment, the peptide composition for hair treatment can comprise at least one emulsifier selected from the following list: caprylic/capric/diglyceryl succinate, C10-15 pareth-(2,4,6,8) phosphate, C14-16 glycol palmitate, C18-20 glycol isostearate, ceteareth-(4-60), cocamidopropyl lauryl ether, deceth-(3-10), DIPA-hydrogenated cocoate, dipentaerythrityl hydroxystearate, dipentaerythrityl hydroxyisostearate, dipentaerythrityl hexacaprate/caprylate, dodoxynol-(5,6,7,9,12), nonoxynol-(1-35), octoxynol-(1-70), Octyldodeceth-(2,5,16,20,25), Palm kernel glycerides, or any mixture thereof.

[0031] In other embodiment, the peptide composition for hair treatment can comprise at least one preservative selected from the following list: butyl paraben, diazolidinyl urea, DMDM hydantoin, ethyl paraben, imidazolidinyl urea, iodopropynyl butylcarbamate, isobutyl paraben, methyl paraben, methylchloroisothiazolinone, methylisothiazolinone, phenoxyethanol, propyl paraben, sodium benzoate, or any mixture thereof.

[0032] In other embodiment, the peptide composition for hair treatment can comprise at least one thickner selected from the following list: aluminum stearates / isostearates / myristates / laurates / palmitates, glycol distearate, hydrogenated castor oil, hydrogenated castor oil hydroxystearate, hydrogenated castor oil isostearate, hydrogenated castor oil stearate, hydrogenated castor PEG-8 esters, PEG-150 distearate, or any mixture thereof.

[0033] In other embodiment, the peptide composition for hair treatment can comprise at least one natural polymer derived selected from the following list: carboxymethyl hydroxyethyl celulose, carboxymethyl hydroxypropyl guar, cellulose, ethyl celulose, hydroxybutyl methylcellulose, hydroxyethylcellulose, hydroxymethylcellulose, lauryl polyglucose, or any mixture thereof.

[0034] In other embodiment, the peptide composition for hair treatment can comprise at least one humectant selected from the following list: 1,2,6 hexanetriol, dipropylene glycol, glycerin, hexylene glycol, panthenol, phytantriol, propylene glycol, sodium PCA, sorbitol, triethylene glycol, polyglyceryl sorbitol, glucose, fructose, polydextrose, potassium PCA, hydrogenated honey, hyaluronic acid, inositol, hexanediol beeswax,

hexanetriol beeswax, hydrolyzed elastin, hydrolyzed collagen, hydrolyzed silk, hydrolyzed keratin, erythritol, capryl glycol, isoceteth-(3-10, 20, 30), isolaureth-(3-10, 20, 30), laneth-(5-50), laureth-(1-30), steareth-(4-20), trideceth-(5-50), or any mixture thereof.

[0035] In other embodiment, the peptide composition for hair treatment can comprise at least one cationic polymer selected from the following list: polyquaternium-10, polyquaternium-7, polyquaternium-11m guar hydroxypropyltrimonium chloride, or any mixture thereof.

[0036] In other embodiment, the peptide composition for hair treatment can comprise at least one silicone selected from the following list: amodimethicone, amodimethicone, trideceth-12, cetrimonium, chloride mixture, behenoxy , dimethicone sparingly, cetearyl methicone, cetyl dimethicone, cyclomethicone, cyclopentasiloxane, dimethicone, dimethicone copolyol, dimethicone copolyol, dimethiconol, hydrolyzed wheat protein hydroxypropyl polysiloxane, stearoxy dimethicone sparingly, stearyl dimethicone, trimethylsilylamodimethicone, lauryl methicone copolyol, or any mixture thereof.

[0037] In yet other embodiment, the peptide composition for hair treatment can comprise at least one organic oil selected from the following list: mineral oil, paraffin, petrolatum, or any mixture thereof.

[0038] In yet other embodiment, the peptide composition for hair treatment can comprise at least one protein selected from the following list: cocodimonium hydroxypropyl hydrolyzed casein, cocodimonium hydroxypropyl hydrolyzed collagen, cocodimonium hydroxypropyl hydrolyzed hair keratin, cocodimonium hydroxypropyl hydrolyzed keratin, cocodimonium hydroxypropyl hydrolyzed rice protein, cocodimonium hydroxypropyl hydrolyzed silk, cocodimonium hydroxypropyl hydrolyzed soy protein, cocodimonium hydroxypropyl hydrolyzed wheat protein, cocodimonium hydroxypropyl silk amino acids, cocoyl hydrolyzed collagen, cocoyl hydrolyzed keratin, hydrolyzed keratin, hydrolyzed oat flour, hydrolyzed silk, hydrolyzed silk protein, hydrolyzed soy protein, hydrolyzed wheat protein, hydrolyzed

wheat protein, keratin, potassium cocoyl hydrolyzed collagen, TEA-cocoyl hydrolyzed collagen, TEA-cocoyl hydrolyzed soy protein, or any mixture thereof.

[0039] In other embodiment, the peptide composition for hair treatment can comprise at least one vitamin selected from the following list: retinol, retinyl palmitate tocopherol acetate, or any mixture thereof.

[0040] In other embodiment, the peptide composition for hair treatment can comprise at least one ester emollient selected from the following list: butyl myristate, butyl stearate, C12-15 alkyl benzoate, caprylic/capric triglyceride, cetyl octanoate, cetyl stearate, cetearyl stearate, decyl oleate, dimethyl lauramine isostearate, glyceryl stearate, glyceryl adipate, glyceryl arachidate, glyceryl arachidonate, glyceryl behenate, glyceryl caprate, glyceryl caprylate, glyceryl caprylate/caprate, glyceryl citrate/lactate/linoleate/oleate, glyceryl cocoate, glyceryl diarachidate, glyceryl dibehenate, glyceryl dierucate, glyceryl dihydroxystearate, glyceryl diisopalmitate, glyceryl diisostearate, glyceryl dilaurate, glyceryl dilinoleate, glyceryl dimyristate, glyceryl dioleate, glyceryl dipalmitate, glyceryl dipalmitoleate, glyceryl diricinoleate, glyceryl distearate, glyceryl erucate, glycol stearate, isocetyl stearate, isopropyl myristate, isopropyl palmitate, isopropyl stearate, isostearyl stearate, octyl palmitate, octyl stearate, propylene glycol dicaprylate/dicaprate, sorbitan benzoate, sorbitan caprylate, sorbitan isostearate, Sorbitan laurate, sorbitan tristearate, stearyl stearate, tocopheryl linoleate, or any mixture thereof.

[0041] In other embodiment, the peptide composition for hair treatment can comprise at least one alkanolamide selected from the following list: acetamide MEA, cocamide DEA, cocamide MEA, lactamide MEA, lauramide DEA, lauramide DEA, propylene glycol, lauramide MEA, lecithinamide DEA, linoleamide DEA, linoleamide MEA, linoleamide MIPA, myristamide DEA, myristamide MEA, myristamide MIPA, oleamide DEA, oleamide DEA, oleamide MEA, oleamide MIPA, soyamide DEA, stearamide MEA, or any mixture thereof.

[0042] In yet other embodiment, the peptide composition for hair treatment can comprise at least one amine selected from the following list: behentamidopropyl

dimethylamine, cocamidopropyl dimethylamine, isostearamidopropyl dimethylamine, lauramidopropyl dimethylamine, myristamidopropyl dimethylamine, oleamidopropyl dimethylamine, palmitamidopropyl dimethylamine, stearamidopropyl dimethylamine, tallamidopropyl dimethylamine, or any mixture thereof.

[0043] In yet other embodiment, the peptide composition for hair treatment can comprise at least one pH adjuster selected from the following list: ascorbic acid, citric acid, sodium hydroxide, triethanolamine, or any mixture thereof.

[0044] In yet other embodiment, the peptide composition for hair treatment can comprise at least one salt selected from the following list: calcium chloride, magnesium chloride, magnesium sulfate, potassium chloride, potassium glycol sulfate, sodium chloride, or any mixture thereof.

[0045] In yet other embodiment, the peptide composition for hair treatment can comprise at least one aliphatic alcohol selected from the following list: behenyl alcohol, cetearyl alcohol, cetyl alcohol, isocetyl alcohol, isostearyl alcohol, lauryl alcohol, myristyl alcohol, stearyl alcohol, C30-50 alcohols, lanolin alcohol, or any mixture thereof.

[0046] In another embodiment, the peptide composition for hair treatment can comprise at least one UV filter/sunscreen selected from the following list: benzophenone-(2, 3, 4, 5, 6, 7, 8, 9, or 10), benzophenone-4, benzyl salicylate, benzylidene camphor sulfonic acid, bornelone, ethyl cinnamate, ethylhexyl methoxycinnamate (octyl methoxycinnamate), octoxynol-40, octoxynol-20, octyl methoxycinnamate, octyl salicylate, oxybenzone, phenyl ketone, PEG-25 PABA, polyacrylamidomethyl benzylidene camphor, or any mixture thereof.

[0047] In other embodiment, the peptide composition for hair treatment can comprise at least one natural oil selected from the following list: coconut oil, jojoba oil, olive oil, palm Oil, safflower oil, sesame seed oil, shea butter, sweet almond oil, wheat germ oil, or any mixture thereof.

[0048] In yet other embodiment, the peptide composition for hair treatment can comprise at least one amine oxide selected from the following list: cocamine oxide, lauramine oxide, or any mixture thereof.

[0049] In other embodiment, the peptide composition for hair treatment can comprise at least one chelate selected from the following list: diiospropyl oxalate, disodium EDTA, disodium EDTA-copper, HEDTA, oxalic acid, potassium citrate, sodium citrate, dodium oxalate, TEA-EDTA, tetrasodium EDTA, trisodium EDTA, trisodium HEDTA, or any mixture thereof.

[0050] In other embodiment, the peptide composition for hair treatment can comprise at least one fatty acid selected from the following list: arichidonic acid, capric acid, coconut fatty acid, lauric acid, linoleic acid, linolenic acid, myristic acid, palmitic acid, pantothenic acid, stearic acid, caproic acid, capryleth-(4, 6, 9) carboxylic acid, isostearic acid, or any mixture thereof.

[0051] In other embodiment, the peptide composition for hair treatment can comprise at least one agent antimicrobial/antibacterial selected from the following list: glyoxal, triclosan, or any mixture thereof.

[0052] In other embodiment, the peptide composition for hair treatment can comprise at least one PEG-modified material selected from the following list: PEG-150 pentaerythirtyl tetrastearate, PEG-(-2, -3, -4, -6, -8, -12, -20, -32, -50, -150, -175) distearate, PEG-10 castor oil, PEG-10 cocamine, PEG-10 cocoate, PEG-10 coconut oil esters, PEG-10 glyceryl oleate, PEG-10 glyceryl pibsa tallate, PEG-10 glyceryl stearate, PEG-10 hydrogenated lanolin, PEG-10 hydrogenated tallow amine, PEG-10 isolauryl thioether, PEG-10 isostearate, PEG-10 lanolate, PEG-10 lanolin, PEG-10 laurate, PEG-10 oleate, PEG-10 olive glycerides, PEG-10 polyglyceryl-2 laurate, PEG-10 propylene glycol, PEG-10 sorbitan laurate, PEG-10 soya sterol, PEG-10 soyamine, PEG-10 stearamine, PEG-10 stearate, PEG-10 stearyl benzonium chloride, PEG-10 tallate, PEG-10 tallow aminopropylamine, PEG-100, PEG-100 castor oil, PEG-100 hydrogenated castor oil, PEG-100 lanolin, PEG-100 stearate, PEG-40 hydrogenated castor Oil, PEG-60, PEG-55 propylene glycol distearate, or any mixture thereof.

[0053] In other embodiment, the peptide composition for hair treatment can comprise at least one polymer selected from the following list: carbomer, dodecanedioic acid/cetearyl alcohol/glycol copolymer, hydrogenated C6-14 olefin polymers, hydrogenated ethylene/propylene/styrene copolymer: polyacrylic acid, polymethyl methacrylate: polymer, polyvinyl acetate, polyvinyl alcohol, PPG, PPG-25-laureth-25, PPG-5 pentaerithrityl ether, PPG-75-PEG-300-hexylene glycol, polyvinylpyrrolidone, PVP/VA (polyvinylpyrrolidone/vinyl acetate copolymer), sodium carbomer, TEA-carbomer, poloxamer (100-407), poloxamine, polyacrylamidomethylpropane sulfonic acid, polyethylene terephthalate, or any mixture thereof.

[0054] In other embodiment, the peptide composition for hair treatment can comprise at least one antistatic agent selected from the following list: apricotamidopropyl ethyldimonium ethosulfate, apricotamidopropyl ethyldimonium lactate, cocamidopropyl ethyldimonium ethosulfate, cocamidopropyl ethyldimonium lactate, lauramidopropyl ethyldimonium ethosulfate, lauramidopropyl ethyldimonium lactate, linoleamidopropyl ethyldimonium ethosulfate, linoleamidopropyl ethyldimonium lactate, myristamidopropyl ethyldimonium ethosulfate, myristamidopropyl ethyldimonium lactate, oleamidopropyl ethyldimonium ethosulfate, oleamidopropyl ethyldimonium lactate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl ethyldimonium lactate, or any mixture thereof.

[0055] In other embodiment, the peptide composition for hair treatment can comprise at least one alcohol selected from the following list: SD alcohol 40, witch hazel, isopropanol, or any mixture thereof.

[0056] In yet other embodiment, the peptide composition for hair treatment can comprise fragrances, oils or any mixture thereof.

[0057] In other embodiment, the peptide composition for hair treatment can be used in medicine, veterinary and/or for cosmetics, preferably for the treatment of hair, mainly for animal or human, particularly for treating diseases of the scalp, particularly scalp irritation, alopecia areata, lichen planus, folliculitis keloid of the neck, trichorrhexis nodosa, tricodistrophy, pili torti, tricorrexis invaginata, moniletrix,

uncombable hair syndrome.[0058] In other embodiment, the composition may comprise a dye agent linked to the N or C-terminal of the referred peptides.

[0059] In yet other embodiment is the use of the described composition for hair coloring.

[0060] Other aspect of the embodiment is the use of the described composition as a hair strengthener or as fixer of perms and/or curly hairs.

[0061] It is also described in this application shampoo, lotion, serum, cream, conditioner, foam, elixir, oil, aerosol or mask comprising the composition presented in this application.

[0062] The present application discloses a composition for hair treatment that comprise, in whole or in part, one or more peptide sequences of 6 to 12 amino acid residues based on keratin and keratin-associated proteins having 2 to 5 cysteine residues, preferably having 3 to 5 residues of cysteine, for treatment and cosmetics of the hair, preferably human hair, chemically pre-treated or not. Thus the presence of cysteine in the peptide sequence (higher than 10%, preferably more than 15%) in combination with a percentage of hydrophobic amino acids ensures that the peptides can have a lasting fixation in the hair, improving the human hair properties such as elasticity and strength.

[0063] Surprisingly, the described peptide compositions in which the peptide(s) comprising 2 to 5 cysteines allow penetration of the peptide(s) and enhance the properties of hair, preferably 3-5 cysteines. Thus, described peptide(s) containing 2-5 cysteine in order to allow hair penetration and enrichment of the hair properties, such as elasticity, resistance, reduce eventual hair damage, as well as improve and change hair characteristics.

[0064] The peptide compositions described in the present application surprisingly enrich and improve the properties and characteristics of the hair, such as elasticity, strength and appearance, repairing damaged keratinous fiber. Therefore, formulation's high cysteine content is used to improve and/or change its characteristics, such as hair curl or uncurl. The sequence of peptides can have also preferably a percentage of hydrophobic amino acids not exceeding 60%, improving

even further the results. Examples of hydrophobic amino acids are phenylalanine, alanine, leucine, methionine, isoleucine, tryptophan, proline, valine, and others.

[0065] In the context of the present description, the peptide composition can also be applied to the hair and in particular to the human hair as, but not limited to, aqueous solution or conventional shampoo or conditioner. It can also be used as a lotion, foam, aerosol, gel, mask, and application formulation with or without subsequent rinsing.

[0066] The concentration of peptide to be used depends on several features such as the condition of the hair, the origin and the formulation of the hair care product.

Detailed Description

[0067] It should be understood that the detailed description and specific examples are indicative of preferred embodiments of the invention and are provided to be illustrative only. This patent is not limited to those mentioned applications.

[0068] The present application describes a composition for hair treatment that comprises different peptides, which are based in the structure of keratin and keratin associated proteins.

[0069] The compositions described in the present application allow surprisingly the dermo-cosmetic treatment of animal hair, including human hair, chemically pre-treated or not. The composition described in the present invention, through the use of specific peptides, allows the preparation of keratinous fiber damages, due to the high binding capacity of the keratin peptides, including through disulfide bridges.

[0070] The described compositions improve the properties and characteristics of the hair, such as elasticity, resistance and appearance, repairing putative damages of the hair.

[0071] The peptides here defined are peptide sequences which bind with a certain affinity to the hair. The peptides used in this invention are composed by 6 to 12 amino acids, and are constituted by a minimum of 2 and a maximum of 5 cysteines, preferably 3-5 cysteines.

[0072] The peptide composition for hair treatment described allows a resistance increase due to the presence of the cysteine-rich peptide, which leads to the resistance of the hair even after several rinsing.

[0073] Every peptide can be used together or separately, as well as all or part of the peptide sequence in the hair composition. Each peptide sequence contains amino acids with sulfur, specifically cysteine, which interacts with the hair and allows the formation of intermolecular cross-linking, stabilizing the keratinous fiber.

[0074] The peptide composition described uses a high content on cysteine in order to enrich the hair properties, such as improve elasticity and resistance, reduce putative damage of the hair, improve and/or change hair characteristics. Regarding the interaction with the keratinous fibers, the cysteine is 10% to 50% of the total amount of amino acids of the peptide sequence. Additionally, the number of amino acids of the peptide sequence is preferable from 6 to 12.

[0075] The peptides can be used separately or in combination of two or more peptides. The concentration of the peptide to be used depends on several characteristics, such as hair condition, origin and the formulation of the product for hair treatment. The content of the hair composition of the present invention is as example 1-0.001% (w/w) in mass.

[0076] The peptides of the present invention can be prepared by conventional methods of peptide synthesis, well known in the state of the art.

[0077] Additionally many companies provide customized services for peptide synthesis.

[0078] An embodiment of the current invention describes peptides that link to the hair, and which sequence of amino acids includes cysteines where the sequence is selected from the group between the sequences ID NO:1 to sequence ID NO:1239.

[0079] The sequence of the 1239 peptides referred is listed in the table of the figure 1.

[0080] As example of hair, it was used virgin human hair tresses, acquired from the International Hair Importers and Products, Inc. (New York). The term virgin hair is applied to all the hair that was never subject or was at least 10 years without making any chemical treatment. Several different hair samples such as African, Asian and

Caucasian hair are commercially available in several companies, such as the company mentioned above. Optionally, the hair samples can be treated, for example, using hydrogen peroxide to bleach the hair, needed for techniques such as hair dying.

[0081] In the context of this invention, the peptides can be applied to the hair, such as the human hair in the form of, but not limited to, aqueous or conventional preparation of shampoo or conditioner. It can also be in the form of lotion, foam, spray, gel, mask, formulation applied with or without subsequent rinsing.

[0082] This invention can be prepared by peptide coupling with an agent of these preparations directly or via a spacer.

[0083] This coupling interaction can be performed by covalent or non-covalent bonds, such as hydrogen bond, electrostatic interactions, hydrophobic interactions or van der Waals interactions. The spacer can be used to separate the peptide from the preparation agent, ensuring that the agent does not interfere with the peptide linkage to the hair.

[0084] The present invention can be understood more clearly and accurately by reading the following examples, which are indicative of preferred embodiments of the invention. They are provided for illustration in greater detail of the present invention, without introducing any limitation and without being limited to those applications.

Examples of applications

[0085] The examples that are within the scope of the claims represent different embodiments of the invention; all other examples are comparative examples.

Example 1:

[0086] The present application treats human hair through several commercial formulations with and without the use of the peptides from the sequence ID NO: 5. As The hair was supplied from International Hair Importers and Products, Inc. (New York).

[0087] The tests were performed with in human hair after 8 treatments of bleaching, at 50ºC in 0.1 M Na_2CO_3/$NaHCO_3$ buffer, at pH=9, 10% H_2O_2, for 1 hour.

[0088] Several formulations were tested:

- hair serum with 15% PG;
- hair mask.

[0089] The mask used in this application was a basic commercial formulation with water, denaturing alcohol, propylene glycol, ether dicaprylic, cetylstearyl alcohol, behentrimonium chloride, cetyl ester, polysorbate 20, hydrolyzed wheat protein, hydrolyzed wheat starch, benzyl alcohol and fragrance.

[0090] The hair serum used in this application was a basic commercial formulation with water, denaturing alcohol, propylene glycol, polysorbate 20, hydrolyzed wheat protein, hydrolyzed wheat starch, crosslinked polymer alkyl acrylate/C10-30, triethanolamine, benzyl alcohol, fragrance.

[0091] Each of the formulations was tested with and without the peptide sequence ID NO:5, which contains in the sequence 15% of cysteine. The formulations containing the peptide SEQ ID NO:5 had a concentration of peptide of 0.1mg/mL, in a ratio 1:1 (v/v).

[0092] To demonstrate the effect was also tested:

- a peptide whose sequence does not contain cysteine, with approximately 41% hydrophobic amino acids;
- a peptide which contains in it sequence 8% cysteine, with approximately 58% hydrophobic amino acids.

[0093] The hair mask was applied to the hair after 8 bleaching treatments, being left to act for 15 minutes, mimicking the procedure indicated in commercial masks. Posteriorly, the hair was washed. The serum was applied to the hair after 8 bleaching treatments, being left to act for 1 hour at 37ºC. Posteriorly, the hair was not washed, as in typical commercial procedures the serum should be applied in dry hair. The hair was also tested after 5 applications.

[0094] The peptide from the sequence ID NO: 5 was able to penetrate in the hair fiber for all the formulations.

[0095] After the treatment, mechanical tests were performed, using a cell with 2.5 N maximum load and a deformation rate of 1.5 mm/min. Each hair was individually mounted in the tensile jig by means of a paper template with a fixed gauge length of 20 mm.

[0096] Table 1 – Young modulus of virgin hair without treatments and after 8 times bleaching treatments.

Hair type	Young modulus (MPa)
Virgin hair	6579
Hair after 8 time bleaching	5294
Serum(with a 15% cysteine and 50% hydrophobic amino acids peptide)	7149
Serum for comparison(with a 41% hydrophobic amino acid without cysteine peptide)	6180
Serum for comparison (with a 8% cysteine and 58% hydrophobic amino acid peptide)	6456
Serum for comparison (without peptide)	6034

[0097] Table 2 – Young modulus for different types of hair treatment. The peptide in these treatments is the peptide from sequence ID NO: 5.

Type of treatment	Young modulus after 1 application (MPa)	Young modulus after 5 applications (MPa)
Serum (with a 15% cysteine and 50% hydrophobic amino acid peptide)	7149	7318
Serum for comparison (without peptide)	6034	6112
Mask (with a 15% cysteine and 50% hydrophobic amino acid peptide)	6175	7075
Mask for comparison(without peptide)	5514	5685

[0098] The formulations which contain the sequence ID NO:5 induce an increase in mechanical resistance of the damaged hair. After 5 applications, the hair treated with the sequence ID NO: 5 maintain the high resistance, having a higher increase in the resistance than without the peptide.

Example 2:

[0099] This example discloses the treatment of human hair with peptides containing cysteine, and in this case the peptide containing the sequence ID NO: 409, based in the assumption that small peptides are able to penetrate in the hair fiber cuticle.

[00100] The hair was supplied from International Hair Importers and Products, Inc. (New York). Hair fibers were pre-treated by bleaching. The formulation was tested in different hair types:

- virgin hair washed, with the cuticle intact and absence of chemical damages;
- hair after 8 bleaching treatments, at 50ºC in 0.1 M Na_2CO_3/$NaHCO_3$ buffer, at pH=9, 10% H_2O_2, for 1 hour.

[00101] The incorporation of the peptides was performed by direct application in the hair surface. The mechanical resistance tests were performed after the treatment of the hair with the peptide.

[00102] The measurements of mechanical resistance were performed using a cell with 2.5 N maximum load and a deformation rate of 1.5 mm/min. Each hair was individually mounted in the tensile jig by means of a paper template with a fixed gauge length of 20 mm.

[00103] As for the results obtained for the mechanical test showed that compared to the control, i.e., virgin hair without bleaching or peptide treatment (Young modulus: 4142 ± 590 MPa), bleaching reduced the Young modulus (2478± 567 MPa), while the treatment with the peptide sequence ID NO: 409 after bleaching increased the Young modulus to higher valued than the virgin hair with no treatment (5649 ± 1022 MPa).

Example 3:

[00104] This example discloses the treatment of human hair with a composition comprising peptides. In this example, the peptide with the sequence ID NO: 412 was tested. The hair was supplied from International Hair Importers and Products, Inc. (New York).

[00105] The formulation was tested in different hair types:

- virgin hair washed, with the cuticle intact and absence of chemical damages;
- hair after reduction treatment, at 37ºC in phosphate buffer at pH=8, with 3M GndHCl and 0.05M DTT for 2 hours.

[00106] For the treatment with the peptide SEQ ID NO: 412, concentrations of 0.01% (w/w) were used.

[00107] The average of the Young modulus for relaxed hair is 3002 MPa, while for relaxed hair fiber after peptide treatment at 0.01% is 4190 MPa. The Young modulus value for virgin hair without treatment is 5214 MPa.

[00108] In the maximum load test, for the relaxed hair fiber, the maximum of resistance were 96 MPa, while for the hair fiber relaxed after peptide treatment 126 MPa and for the virgin hair with no treatment 203 MPa.

[00109] Regarding hair stretching, the relaxed hair has an average of 51%, while after treatment with the peptide sequence ID NO: 412, has a stretching of 72%. For virgin hair, the average of hair stretching is 58%.

[00110] Therefore, it is evident that the peptides are capable to prevent the hair surface degradation and consequently, the hair treated with these peptides has a longer life span.

Example 4

[00111] In order to assess the interactions between the keratin and some peptides, a keratin solution was prepared. This procedure was performed by immersing African hair, acquired from the International Hair Importers and Products, Inc. (New York), in a solution containing 8 M urea, 0.2 M sodium dodecyl sulfate and 0.5 M sodium bisulfite. The mixture was heated to 50 °C for 24h in a shaker bath. The solution was dialyzed for several days against double-distilled water. The keratin solution was then concentrated using AMICON with a 3 kDa cut-off. The keratin was then conjugated with Alexa Fluor 647 carboxylic acid, succinimidyl ester in DMSO anhydrous 5%.

[00112] The reaction was incubated for 1h30min at room temperature and in the dark. The Alexa Fluor 647 that did not link to the keratin solution was separated by centrifugation in AMICON with a 3 kDa cut-off for 1h at 25ºC and 5000xg.

[00113] The keratin was then diluted to 1□g/mL in blocking buffer (3% BSA in tris-buffered saline (TBS) with 0.05% Tween 20). The peptides tested were SEQ.ID NO:179, SEQ.ID NO:75, SEQ.ID NO:432, SEQ.ID NO:951, SEQ.ID NO:1108, SEQ.ID NO:1131 and a peptide containing 13 amino acids, including 2 cysteines ($X_3CX_5CX_3$), where X represents one of known amino acid residues, with the exception of cysteine residue that is represented by the letter C. This peptide is similar to the one tested in Fernandes et al. (Fernandes, Lima, Loureiro, Gomes, & Cavaco-Paulo, 2012).

[00114] Several peptides in a concentration of 15fmol/mm^2, were attached to a glass through a hydrophilic linked moiety, and were then incubated with the keratin, marked with Alexa Fluor 647, for 2 hours at 37ºC.

[00115] After incubation, the glasses were rinsed in successive washing solutions: TBS + 0.1% Tween 20 and blocking buffer with 3%BSA in TBS + 0.1% Tween 20, for 3 minutes in each solution.

[00116] The imaging of the glasses was performed in Agilent G2565CA Microarray Scanner System. Three replicas of the each peptide incubation were performed and analyzed.

[00117] Table 1 – Normalized intensity levels of peptide sequences.

Sequence	Number of amino acids	Cysteine content	Hydrophobic amino acids content	Intensity level (average ± standard deviation)
SEQ.ID NO:179	10	20%	50%	0.990 ± 0.014
SEQ.ID NO:75	10	30%	60%	1.000 ± 0.000
SEQ.ID NO:432	10	30%	40%	1.000 ± 0.000
SEQ.ID NO:951	10	40%	30%	1.000 ± 0.000
SEQ.ID NO:1108	11	46%	18%	1.000 ± 0.000
SEQ.ID NO:1131	11	46%	9%	1.000 ± 0.000

$X_3CX_5CX_3$	13	15%	38%	0.184 ± 0.084

[00118] The peptides SEQ.ID NO:75, SEQ.ID NO:432, SEQ.ID NO:951, SEQ.ID NO:1108, SEQ.ID NO:1131, with percentage of cysteine ranging from 30% to 46%, such as and percentage of hydrophobic amino acids ranging from 9% to 60% were able to obtain an intensity of 1, indicating a very high affinity to keratin. The peptide SEQ.ID NO:179, with 20% and 50% of cysteine and hydrophobic content, respectively showed an slightly inferior but still very high intensity (0.990±0.014). These peptides were compared with a peptide similar to the one described in Fernandes et al. (Fernandes, Lima, Loureiro, Gomes, & Cavaco-Paulo, 2012) containing 2 cysteines in a 13 amino acids sequence. The reduced percentage of cysteine (15%) and higher number of amino acids in the sequence (13 amino acids) lead to a decrease in the intensity to 0.184±0.084, showing an inferior affinity to keratin. This suggests that the higher number of amino acids difficult the reaction of the peptide with the hair keratins. This inferior affinity to keratin leads to less fixation of the peptides in the hair in posterior treatments and consequently providing less improvements in the recovery of the hair characteristics.

List of peptide sequences

The sequences of peptides are described by one letter code of amino acids. The code is as follows:

Amino acid – One Letter Code

Histidine – H
Arginine – R
Lysine – K
Isoleucine - I
Phenylalanine – F
Leucine – L
Tryptophan – W
Alanine – A
Methionine – M
Proline – P
Valine - V

Cysteine – C
Asparagine – N
Glycine – G
Serine – S
Glutamine – Q
Tyrosine – Y
Threonine – T
Aspartic acid – D
Glutamic acid - E

SEQ.ID NO:1	APCAPRPSCG
SEQ.ID NO:2	EACVPSVPCP
SEQ.ID NO:3	ESCGTASGCA
SEQ.ID NO:4	GLCAGTSACL
SEQ.ID NO:5	GVCGPSPPCI
SEQ.ID NO:6	HGCTLPGACN
SEQ.ID NO:7	HSCTLPGACN
SEQ.ID NO:8	KDCLQNSLCE
SEQ.ID NO:9	LPCLPAASCG
SEQ.ID NO:10	LPCYFTGSCN
SEQ.ID NO:11	NFCLPSLSCR
SEQ.ID NO:12	NPCATTNACD
SEQ.ID NO:13	NPCATTNACE
SEQ.ID NO:14	NPCATTNACS
SEQ.ID NO:15	NPCGLRARCG
SEQ.ID NO:16	NPCGPRSRCG
SEQ.ID NO:17	NPCSTPASCT
SEQ.ID NO:18	NPCSTSPSCV
SEQ.ID NO:19	PACTSSSPCS
SEQ.ID NO:20	SKCHESTVCP
SEQ.ID NO:21	SPCVPRTVCV
SEQ.ID NO:22	SSCSVETACL
SEQ.ID NO:23	SVCSSGVNCR
SEQ.ID NO:24	TACPLPGTCH
SEQ.ID NO:25	TNCSPRPICV
SEQ.ID NO:26	TSCVPPAPCT
SEQ.ID NO:27	TTCTSSNTCE
SEQ.ID NO:28	VPCVPSVPCT
SEQ.ID NO:29	ATCGPSACIT
SEQ.ID NO:30	GPCISNPCGL
SEQ.ID NO:31	GPCLSNPCTS
SEQ.ID NO:32	GSCVTNPCGP
SEQ.ID NO:33	LTCFSITCSS
SEQ.ID NO:34	NPCSTPSCTT
SEQ.ID NO:35	PSCVTAPCAP

SEQ.ID NO:36	SDCSSTHCSP
SEQ.ID NO:37	SLCLPPTCHT
SEQ.ID NO:38	SLCNLGSCGP
SEQ.ID NO:39	SPCLVGNCAW
SEQ.ID NO:40	TACLPGTCAT
SEQ.ID NO:41	TSCLPALCLP
SEQ.ID NO:42	TSCSSRPCVP
SEQ.ID NO:43	TTCGGGSCGV
SEQ.ID NO:44	VNCRPELCLG
SEQ.ID NO:45	YVCQPMACLP
SEQ.ID NO:46	AFSCISACGP
SEQ.ID NO:47	GSVCSAPCNG
SEQ.ID NO:48	GVVCGDLCAS
SEQ.ID NO:49	GVVCGDLCVS
SEQ.ID NO:50	LTGCLLPCYF
SEQ.ID NO:51	NEDCKLPCNP
SEQ.ID NO:52	NFSCVSACGP
SEQ.ID NO:53	PPTCHTACPL
SEQ.ID NO:54	PQPCATACKP
SEQ.ID NO:55	SEDCKLPCNP
SEQ.ID NO:56	SLGCRTSCSS
SEQ.ID NO:57	SLSCRTSCSS
SEQ.ID NO:58	SSSCPLGCTM
SEQ.ID NO:59	TGSCNSPCLV
SEQ.ID NO:60	TSSCPLGCTM
SEQ.ID NO:61	VGSCGSSCRK
SEQ.ID NO:62	VGVCGGSCKR
SEQ.ID NO:63	VSNCNWFCEG
SEQ.ID NO:64	ACGPRPGRCC
SEQ.ID NO:65	ACGPRPSRCC
SEQ.ID NO:66	CAPRPSCGPC
SEQ.ID NO:67	CEPCSAYVIC
SEQ.ID NO:68	CGLRARCGPC
SEQ.ID NO:69	CGPRPGRCCI
SEQ.ID NO:70	CGPRPSRCCI
SEQ.ID NO:71	CGPRSRCGPC
SEQ.ID NO:72	CGTSQKGCCN
SEQ.ID NO:73	CHGCTLPGAC
SEQ.ID NO:74	CHSCTLPGAC
SEQ.ID NO:75	CLPCLPAASC
SEQ.ID NO:76	CLPPTCHTAC
SEQ.ID NO:77	CLSNPCTSCV
SEQ.ID NO:78	CLVGNCAWCE
SEQ.ID NO:79	CNPCSTPASC

SEQ.ID NO:80	CNPCSTPSCT
SEQ.ID NO:81	CNPCSTSPSC
SEQ.ID NO:82	CNSPCLVGNC
SEQ.ID NO:83	CRTSCSSRPC
SEQ.ID NO:84	CSLKEHCSAC
SEQ.ID NO:85	CSPRPICVPC
SEQ.ID NO:86	CSSTMSYSCC
SEQ.ID NO:87	CSTPASCTSC
SEQ.ID NO:88	CSTPSCTTCV
SEQ.ID NO:89	CTSCVPPAPC
SEQ.ID NO:90	CTSSNTCEPC
SEQ.ID NO:91	CVPPAPCTPC
SEQ.ID NO:92	CVPPSCHGCT
SEQ.ID NO:93	CVPPSCHSCT
SEQ.ID NO:94	DCKLPCNPCA
SEQ.ID NO:95	DCKLPCNPCS
SEQ.ID NO:96	PCGTSQKGCC
SEQ.ID NO:97	PCLSNPCTSC
SEQ.ID NO:98	PCLVGNCAWC
SEQ.ID NO:99	PCNPCSTPSC
SEQ.ID NO:100	PCSTPSCTTC
SEQ.ID NO:101	PCTTCGPTCG
SEQ.ID NO:102	PCVPPSCHGC
SEQ.ID NO:103	PCVPPSCHSC
SEQ.ID NO:104	SCCLPSLGCR
SEQ.ID NO:105	SCSEELQCCQ
SEQ.ID NO:106	SCSPCSTTCT
SEQ.ID NO:107	ASCSTSGTCG
SEQ.ID NO:108	ASCYIPVGCQ
SEQ.ID NO:109	ASCYVPVSCQ
SEQ.ID NO:110	AVCTLPSSCQ
SEQ.ID NO:111	DLCPTSVSCG
SEQ.ID NO:112	EICWEPTSCQ
SEQ.ID NO:113	ETCGEPTSCQ
SEQ.ID NO:114	ETCNETTSCQ
SEQ.ID NO:115	ETCWRPNSCQ
SEQ.ID NO:116	GYCGYRPFCF
SEQ.ID NO:117	KTCWEPASCQ
SEQ.ID NO:118	KTCWEPTSCQ
SEQ.ID NO:119	LDCVDTTPCK
SEQ.ID NO:120	LGCGYGSFCG
SEQ.ID NO:121	NSCGYGSGCG
SEQ.ID NO:122	NYCPSNTMCE
SEQ.ID NO:123	PACVTSYSCR

SEQ.ID NO:124 PDCHVEGTCL
SEQ.ID NO:125 PDCRVEGTCL
SEQ.ID NO:126 PICSEPSPCS
SEQ.ID NO:127 PICYIFKPCQ
SEQ.ID NO:128 PLCYISNSCQ
SEQ.ID NO:129 PPCGQPTPCS
SEQ.ID NO:130 PPCHIPQPCV
SEQ.ID NO:131 PSCGRLASCG
SEQ.ID NO:132 PSCSESSICQ
SEQ.ID NO:133 PSCSEVTSCP
SEQ.ID NO:134 PSCSTSGTCG
SEQ.ID NO:135 PSCSVSSGCQ
SEQ.ID NO:136 PSCTESDSCK
SEQ.ID NO:137 PSCYQTSSCG
SEQ.ID NO:138 PTCFLLNSCQ
SEQ.ID NO:139 PTCSVTSSCQ
SEQ.ID NO:140 PTCWLLNNCH
SEQ.ID NO:141 PTCYQRTSCV
SEQ.ID NO:142 PTCYRRTSCV
SEQ.ID NO:143 PTCYVVKRCP
SEQ.ID NO:144 PVCFEATICE
SEQ.ID NO:145 PVCFEATVCE
SEQ.ID NO:146 PVCSRPASCS
SEQ.ID NO:147 PVCSWVPACS
SEQ.ID NO:148 QTCNESSYCL
SEQ.ID NO:149 QTCWEPTSCQ
SEQ.ID NO:150 SFCRLGYGCG
SEQ.ID NO:151 SFCRRGSGCG
SEQ.ID NO:152 SLCGYGYGCG
SEQ.ID NO:153 SLCSTEVSCG
SEQ.ID NO:154 SNCFGQLNCL
SEQ.ID NO:155 SPCGQPTPCS
SEQ.ID NO:156 SSCDQSSSCA
SEQ.ID NO:157 SSCGQSSSCA
SEQ.ID NO:158 SVCPEPVSCP
SEQ.ID NO:159 TFCSFDKSCR
SEQ.ID NO:160 TICSSDKSCR
SEQ.ID NO:161 TLCVESSPCH
SEQ.ID NO:162 TPCYQQSSCQ
SEQ.ID NO:163 VTCSRQTTCI
SEQ.ID NO:164 YGCGYGSGCG
SEQ.ID NO:165 YGCGYGSGCR
SEQ.ID NO:166 YGCIHSTHCG
SEQ.ID NO:167 AACEPSACQS

SEQ.ID NO:168 AACEPSPCQS
SEQ.ID NO:169 AACTMSVCSS
SEQ.ID NO:170 ADCLGGICLP
SEQ.ID NO:171 ALCLPSSCHS
SEQ.ID NO:172 ALCSPSTCQL
SEQ.ID NO:173 APCLALVCAP
SEQ.ID NO:174 APCLSLVCTP
SEQ.ID NO:175 APCLTLVCTP
SEQ.ID NO:176 APCVALLCRP
SEQ.ID NO:177 ASCGSLLCRP
SEQ.ID NO:178 ASCLSFLCRP
SEQ.ID NO:179 ASCVSLLCRP
SEQ.ID NO:180 AVCEPSPCQS
SEQ.ID NO:181 AVCLPVSCQS
SEQ.ID NO:182 AVCVPVRCQS
SEQ.ID NO:183 AVCVPVSCQS
SEQ.ID NO:184 DLCSPSTCQL
SEQ.ID NO:185 DSCGSSSCGP
SEQ.ID NO:186 DSCVQSNCFP
SEQ.ID NO:187 FNCSTRNCSS
SEQ.ID NO:188 GGCGSYGCSQ
SEQ.ID NO:189 GSCGFGSCYG
SEQ.ID NO:190 GSCSSRKCFS
SEQ.ID NO:191 GVCLPSTCPH
SEQ.ID NO:192 HSCEGYLCYS
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[00119] The present invention is of course in any way restricted to the embodiments herein described and one with ordinary skill in the area can provide many possibilities to modifications and substitutions of technical characteristics by equivalent ones, depending on each situation, as defined in the claims.

[00120] The preferred embodiments described above may obviously be combined. The following claims define further preferred embodiments.

15th October 2014.

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CLAIMS

1. Peptide composition for hair treatment comprising at least one peptide with a sequence length of 6-12 amino acids, where 2-5 of those amino acids are cysteines, and dermatologically adequate excipients,
wherein the peptides comprise at least one of the sequences of the group consisting of SEQ ID NO:75, SEQ ID NO:412, SEQ.ID NO:1131 and a sequence with a degree of homology equal or higher than 90% of any of the foregoing, as a hair strengthener of human hair or of animal hair.

2. The composition according to claim 1, wherein said peptide has a sequence length of 10-11 amino acids.

3. The composition according to claim 1 or claim 2, wherein said peptide containing 3-5 cysteines.

4. The composition according to any one of the previous claims, wherein the peptide comprises a percentage of hydrophobic amino acid(s) not higher than 60%, preferably less than 41%.

5. The composition according to any one of the previous claims, wherein the peptide comprises at least one hydrophobic amino acid selected from the group consisting of phenylalanine, alanine, leucine, methionine, isoleucine, tryptophan, proline, valine and a mixture of any of the foregoing.

6. The composition according to any one of the previous claims, wherein the peptide comprises from 10% to 50% of cysteine in the total of amino acids of the peptide sequence.

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7. The composition according to any one of the previous claims, wherein the concentration of the peptide in the composition is from 0.001% to 20% (w/w).

8. The composition according to claim 7, wherein the concentration of the peptide in the composition is from 0.01% to 5% (w/w).

9. The composition according to any one of the previous claims comprising at least one of the excipients selected from the group consisting of surfactants, emulsifiers, preservatives, thickeners, organic polymers, humectants, silicones, oils, fragrances, vitamins, buffers, antimicrobial agents, antibacterial agents, disinfectants agents, and a mixture of any of the foregoing.

10. The composition according to any one of the previous claims comprising at least one of the excipients selected from the group consisting of an anionic surfactant, an amphoteric surfactant, a cationic surfactant, a non-ionic surfactant, an emulsifier, a preservative, a thickener, a natural polymer derived, a humectant, silicone, an organic oil, a protein, a fragrance, a vitamin, an emollient ester, an alkanolamide, amine, a buffer, a pH adjustor, a salt, an aliphatic alcohol, a UV filter, an amine oxide, a chelate, a fatty acid, an antimicrobial / antibacterial agent, a PEG material, a polymer, an anti-static agent, an alcohol, and a mixture of any of the foregoing.

11. The composition according to any one of the previous claims comprising at least one surfactant selected from the group consisting of an anionic surfactant, an amphoteric surfactant, a cationic surfactant and a non-ionic surfactant.

12. The composition according to any one of the previous claims comprising at least one compound selected from the group consisting of an emulsifier, a preservative, a thickener, a natural polymer derived, a humectant, a silicone, an

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organic oil, a protein, a fragrance, a vitamin, an emollient ester, an alkanolamide, an amine, a buffer, a pH adjustor, a salt, an aliphatic alcohol, a UV filter, an amine oxide, a chelate, a fatty acid, an antimicrobial agent, an antibacterial agent, a PEG material, a polymer, an anti-static agent, an alcohol, and a mixture of any of the foregoing.

13. The composition according to any one of the previous claims comprising a fragrance, an oil or a mixture thereof.

14. The composition according to any one of the previous claims comprising a dying agent/dye linked to the N or C terminal of the peptide.

15. The composition according to any one of the previous claims for use in medicine and/or veterinary.

16. The composition according to any one of the previous claims for use in hair treatment.

17. The composition according to any one of the previous claims for treatment of hair scalp diseases, particularly scalp irritation, alopecia areata, lichen planus, folliculitis keloid of the neck, trichorrhexis nodosa, tricodistrophy, pili torti, tricorrexis invaginata, moniletrix or uncombable hair syndrome.

18. Use of the composition according to any one of the previous claims in cosmetics.

19. Use of the composition according to any one of the previous claims as a hair strengthener of human hair or of animal hair.

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20. Use of the composition according to any one of the previous claims as hair curl or uncurl agent or as hair coloring.

21. A shampoo, lotion, serum, cream, conditioner, foam, elixir, oil, aerosol or mask comprising a composition according to any one of the previous claims.

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