Abstract:
The subject of the invention is the cosmetic use of an effective amount of at least one pomegranate extract, as an agent for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject, and a cosmetic method for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject.
Use of pomegranate extract for preventing and/or treating symptoms linked to aged hair

The present invention is in the field of hair care, and especially in the field of caring for aged hair.

It is known that age leads to ageing of the hair and that the disorders which result therefrom may be accelerated or induced by certain external factors (such as UV exposure, intense temperatures, chemical attack, etc.).

The hair follicle is formed of perfectly individualized compartments, some of dermal origin (connective sheath and dermal papilla), others of epithelial nature (outer epithelial sheath, inner sheath, hair shaft and sebaceous gland). The connective sheath, synthesized by fibroblasts, is primarily an extracellular matrix formed from collagens of type I and III, and also from proteoglycans. Traversed by a network of blood capillaries in the bottom third, it extends to the base of the follicle, via the dermal papilla, a true aggregate of extracellular matrix.

The dermal extracellular matrix, like that of all the connective tissues of the body, is composed of proteins belonging to several large families: collagens, matrix glycoproteins other than collagens (fibronectin, laminin), elastin and proteoglycans. Also found in the dermal extracellular matrix, like that of all the connective tissues of the body, are glycosaminoglycans in free form (that is to say not bound to a protein).

It is now well established that specific interactions exist between these various classes of proteins to give rise to a functional tissue.

Proteoglycans are complex macromolecules formed from a branched central protein core, or network of proteins, to which very large numbers of polysaccharide side chains, called glycosaminoglycans, are attached.

In the remainder of the present application, proteoglycans will be denoted by the abbreviation PGs and glycosaminoglycans by the abbreviation GAGs.

GAGs have long been referred to by the expression "acid mucopolysaccharides" due to their high water retention capacity, their glucidic nature and their acid character originating from their multiple negative charges.

PGs and GAGs are synthesized by various cells in the dermis and epidermis: fibroblasts, keratinocytes and melanocytes. Fibroblasts predominantly synthesize collagens, matrix glycoproteins other than collagens (fibronectin, laminin), and proteoglycans and elastin. Keratinocytes
predominantly synthesize sulphate-containing GAGs and hyaluronic acid whereas melanocytes produce ostensibly no hyaluronic acid.

When they are combined with a protein, GAGs are bound by anchoring structures to the various polypeptide chains, known as core protein or binding protein, and thus form PG molecules.

GAGs may also exist in the extracellular matrix in free form, that is to say not bound to a matrix protein: this is especially the case for hyaluronic acid.

Generally, the biological roles of PGs are highly diversified, ranging from a passive mechanical support function (for example serglycins) or from an ion barrier role in molecular filtration (for example perlecan and bamacan of the glomerular basement membrane), to more specific effects in cell adhesion, cell spreading, cell proliferation, cell differentiation or morphogenesis, or to very specific effects of PG-protein interactions, such as betaglycan receptor function or the interaction of decorin with collagen.

PGs make up 0.5 to 2% of the dry weight of the dermis, collagen, by itself, representing up to 80% thereof.

The concentration and distribution of GAGs and PGs in human skin vary with age.

At the same time as the mechanisms contributing to the production of these specialized extracellular matrices, continual remodelling processes exist, the regulation of which depends on the balance between synthesis and degradation of the protein elements of the matrix.

Several families of matrix proteases are now described, and also the factors involved in the activation-inactivation thereof.

Among the elements degraded over the course of chronobiological ageing, the PGs and GAGs are also adversely affected. Specifically, over the course of ageing, the fibroblasts and keratinocytes produce fewer and fewer PGs and GAGs and the synthesis thereof is imperfect. This results in significant disorganization: the deposition of GAGs on the protein backbone forming the PG is abnormal, which results in a lower affinity of these PGs for water and therefore a reduction in the hydration and tonicity of the tissues.

The possession of healthy, strong and abundant hair throughout one's life is an ambition of most men and women. Numerous hair products, including hair tonic compositions, are used for combating hair ageing. However, no topical product or
orally-administered composition to date makes it possible to combat all the adverse changes linked to aged hair.

By means of numerous clinical trials carried out in recent years, the Applicant has thus been able to determine the symptoms linked to aged hair. Among these symptoms, mention may be made of the change in the appearance of the fibre rendering the hair dull and lustreless.

Unexpectedly, the inventors have observed that the reduction in GAGs in the dermis was directly linked to the appearance of dull and/or lustreless hair and that pomegranate extracts were able to prove effective for stimulating the neosynthesis of GAGs via fibroblasts and/or keratinocytes and thus combating the deteriorations found in aged hair and especially for combating the appearance of dull hair or lustreless hair.

Pomegranate is the fruit of the pomegranate tree or shrub (*Punica granatum*), a shrub of the Lythraceae family.

This fruit, cultivated for several thousands of years, has many merits, some of which have been known for a very long time. Its beneficial effects with respect to hypertension have been described and also its effects in preventing prostate and breast cancers or in slowing down the deterioration of cartilage for which osteoarthritis is responsible.

Patent US 6,800,292 relates to the use of a dermatological agent, which may contain a pomegranate extract, for treating dermatological disorders among which mention is made of brittle hair, weathering damage, and thinning of the hair.

WO 99/16415 discloses that ellagic acid, one of the antioxidants present in pomegranate, may be used to improve the condition of the hair.

However, none of these documents suggests a possible effect of this extract with respect specifically to the aesthetic disorders linked to aged hair, which are dull hair and/or lustreless hair.

Thus, one subject of the invention is the use of an effective amount of at least one pomegranate extract for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronological ageing of a subject.

Dull and/or lustreless hair is hair whose sheen is diminished or even nonexistent. This sheen, which corresponds to the reflection of light from the keratin material, may be evaluated by simple visual examination of the head of hair or by means of
more complex techniques using, for example, an electron microscope to evaluate the ability of a hair to reflect this light.

For the purposes of the present invention, the expression "effective amount" means an amount that is sufficient to obtain the expected effect.

The expression "pomegranate extract" is understood to mean both *Punica granatum* fruit extracts and seed extracts, and mixtures thereof in any proportion. Advantageously, use is made of a fruit extract - or pomegranate extract - it being possible for this extract to originate from any part of the pomegranate. The preferred pomegranate extract according to the present invention will be a whole fruit extract or more preferably still a whole fruit juice (often referred to as "pomegranate fruit juice extract" by suppliers).

The pomegranate tree or shrub extract may be obtained from any part of the pomegranate tree or shrub and in particular from the fruit including the seed.

The term "extract" is understood to mean both a crude mixture of parts of the plant roughly broken into pieces and of the extraction solvent, and fractions or preparations, which are more or less processed, of active principles solubilized during the extraction. It is possible to use a total extract, that is to say an extract comprising all of the fractions present in the parts of *Punica granatum*, optionally without the cellulose (ligneous) parts. According to another embodiment of the invention, use will be made of at least one extract enriched in certain fractions.

The extract may be obtained by any method for preparing a plant extract known to those skilled in the art. In particular, the extract may be obtained by macerating the part of the plant in water, or in a solvent composed of a mixture of water and an organic solvent, for example water-alcohol, or else water-acetone, or else water-propylene glycol, or else water-butylene glycol. The plant/solvent ratio may vary, for example and with no limitation, from 1/4 to 1/20.

Advantageously, the preparation of the extract starts with the milling of the parts of the plant, followed by a maceration in the extraction solvent for several hours. The extraction may be carried out with stirring in order to improve the performance thereof. The extraction may be carried out at room temperature or by increasing the temperature, for example to 50°C or else to 60°C. Once the extraction has been carried out, the solution is filtered.

The solution thus obtained may be concentrated by any process known to those skilled in the art. Likewise, the solution obtained may be lyophilized by any conventional lyophilization method; a powder is thus obtained.
Extraction from the fruit of the pomegranate tree or shrub, including the seed, may lead, according to one particular embodiment, to the preparation of an essential oil. The extract in the form of a concentrated solution, and also the extract in powder form, and also the extract in the form of an essential oil may be taken up in a medium suitable for oral human consumption.

According to one advantageous embodiment of the invention, the extract is chosen from aqueous extracts and alcoholic or aqueous-alcoholic extracts of *Punica granatum*.

The extract may be introduced in the form of a lyophilized powder, a liquid or an oil and/or, where appropriate, in concentrated form.

Such extracts are for example sold by the company DRACO Natural Products under the trade names "Pomegranate Seed Oil" or "Pomegranate Powdered Extract, 40%" or by the company Naturex under the name "Pomegranate fruit juice extract" or "Pomegranate extract 40%", or by the company MMP Inc. under the trade name "Pomegranate Juice extract E40" or by the company Blue California under the trade name "Pomegranate Extract 70%", or else by the company *Gullln Layn Natural Ingredients* under the trade name "Pomegranate Seed P.E" or registered for example with the CAS number 84961-57-9.

It is understood that the choice of pomegranate extracts is made by taking into account the purpose of the composition containing it, i.e. intended for topical application or for transcutaneous administration or for oral administration.

The term "preventing" is understood to mean "reducing the risk of developing".

The term "treating", unless otherwise indicated, is understood to mean any action that aims to improve the comfort or the well-being of an individual; this term therefore covers both attenuating or relieving and curing.

The compositions according to the invention will be able to be administered topically or orally, subcutaneously, intradermal or parenterally. The preferred administration route is the oral route. The compositions according to the invention may be in any galenical form normally used according to the usage route.

The effective amount of pomegranate extract will preferably be used at a content which may vary from 0.0001 % to 100% by weight, especially from 0.001 % to 20% by weight or 0.01 % to 15% by weight, more particularly from 0.1 % to 10% by weight and more preferably still from 0.5% to 5% by weight relative to the total weight of the composition containing it.
The content of pomegranate extract used for topical application will preferably be from 0.0001 % to 30%, more preferably from 0.01 % to 15% by weight, and more preferably still from 0.1 % to 10% by weight or else from 0.5% to 5% by weight relative to the total weight of the composition containing it.

The content of pomegranate extract used for oral administration will preferably be between 5% and 100% by weight. In oral administration, the composition could therefore be constituted, in one particular embodiment of the invention, solely of pomegranate extract. However, this content of pomegranate extract will more preferably be between 5% and 80% by weight and more preferably still between 5% and 70% by weight or else between 5% and 20% by weight relative to the total weight of the composition containing it.

A "physiologically acceptable support" is, according to the invention, a cosmetically or pharmaceutically acceptable support that is compatible with the skin, the mucous membranes and/or the hair.

The expression "cosmetically acceptable support" is understood to mean a support that has no unpleasant appearance, and that does not cause the user any unacceptable stinging, tautness or redness.

For ingestion, numerous embodiments of oral compositions and especially of food supplements are possible. They are formulated via the usual processes for producing coated tablets, gel capsules, gels, emulsions, tablets, capsules or solutions.

In particular, the active agent(s) according to the invention may be incorporated into any other form of food supplements or enriched foods, for example food bars, or compacted or non-compacted powders. The powders may be diluted with water, in soda, dairy products or soybean derivatives, or may be incorporated into food bars.

Milk, yoghurt, cheese, fermented milks, milk-based fermented products, ice creams, fermented cereal-based products, milk-based powders, infant and baby formulae, animal feed in particular for pets, tablets or lozenges, liquid bacterial suspensions, oral supplements in dry form and oral supplements in liquid form are especially suitable as pharmaceutical or food supports.

In particular, the composition according to the invention may be a food composition for human consumption. This may be, in particular, nutritional complete foods, drinks, mineral waters, soups, dietary supplements and food replacement supplements, nutritional bars, confectionery, milk-based products or
fermented milk-based products, yoghurts, milk-based powders, enteral nutritional products, infant and/or baby compositions, cereal-based products or fermented cereal-based products, ice creams, chocolate, coffee, "culinary" products such as mayonnaise, tomato puree or salad seasonings. The composition according to the invention may also be intended for animals.

The active agents according to the invention may be formulated with the usual excipients and components for such oral compositions or food supplements, i.e. especially fatty and/or aqueous components, humectants, thickeners, preserving agents, texture agents, taste agents and/or coating agents, antioxidants, preserving agents and dyes that are common in the food sector.

The formulating agents and excipients for oral compositions, and especially for food supplements, are known in this field and are not the subject of a detailed description herein.

As regards these compositions that are intended to be applied topically, and especially to the skin and/or the scalp, they may be aqueous, aqueous-alcoholic or oily solutions, dispersions of the solution type or dispersions of the lotion or serum type, emulsions of liquid or semi-liquid consistency of the milk type, suspensions or emulsions of the cream type, aqueous or anhydrous gels, microemulsions, microcapsules, microparticles, or vesicular dispersions of ionic and/or nonionic type.

The cosmetic compositions, more particularly relating to topical application, may especially be in the form of aqueous, aqueous-alcoholic or oily solutions, dispersions of the solution type or dispersions of the lotion or serum type, emulsions of liquid or semi-liquid consistency of the milk type, obtained by dispersing a fatty phase in an aqueous phase (O/W), or vice versa (W/O), or suspensions or emulsions of soft, semi-solid or solid consistency of the cream type, aqueous or anhydrous gels, or alternatively microemulsions, microcapsules, microparticles, or vesicular dispersions of ionic and/or nonionic type. These compositions are prepared according to the usual methods.

They may also be used for the hair in the form of aqueous, alcoholic or aqueous-alcoholic solutions, or in the form of creams, gels, emulsions or mousses, or alternatively in the form of aerosol compositions also containing a pressurized propellant. They will preferably be a lotion or a shampoo.

When the composition of the invention is an emulsion, the proportion of the fatty phase may range from 5% to 80% by weight and preferably from 5% to 50% by weight relative to the total weight of the composition. The oils, emulsifiers and co-emulsifiers used in the composition in emulsion form are chosen from those
conventionally used in cosmetics and/or dermatology. The emulsifier and the co-emulsifier may be present in the composition in a proportion ranging from 0.3% to 30% by weight and preferably from 0.5% to 20% by weight relative to the total weight of the composition.

When the composition of the invention is an oily solution or gel, the fatty phase may represent more than 90% of the total weight of the composition.

In a known manner, the cosmetic composition of the invention may also contain adjuvants that are common in the cosmetic, pharmaceutical and/or dermatological field, such as hydrophilic or lipophilic gelling agents, hydrophilic or lipophilic active agents, preserving agents, antioxidants, solvents, fragrances, fillers, screening agents, bactericides, odour absorbers and colorants. The amounts of these various adjuvants are those conventionally used in the field under consideration, for example from 0.01% to 20% of the total weight of the composition. Depending on their nature, these adjuvants may be introduced into the fatty phase and/or into the aqueous phase.

As fatty substances that may be used in the invention, mention may be made of mineral oils, for instance hydrogenated polyisobutene and liquid petroleum jelly, plant oils, for instance a liquid fraction of shea butter, sunflower oil and apricot kernel oil, animal oils, for instance perhydrosqualene, synthetic oils, especially purcellin oil, isopropyl myristate and ethylhexyl palmitate and fluoro oils, for instance perfluoropolyethers. It is also possible to use fatty alcohols, fatty acids, for instance stearic acid, and, for example, waxes, especially paraffin wax, carnauba wax and beeswax. It is also possible to use silicone compounds, for instance silicone oils and for example cyclomethicone and dimethicone, and silicone waxes, resins and gums. These compounds may or may not be functionalized.

As emulsifiers that may be used in the invention, mention may be made, for example, of glyceryl stearate, polysorbate 60, the mixture of cetylstearyl alcohol/cetylstearyl alcohol oxyethylenated with 33 mol of ethylene oxide sold under the name Sinnowax AO® by the company Henkel, the mixture of PEG-6/PEG-32/glycol stearate sold under the name Tefose® 63 by the company Gattefosse, PPG-3 myristyl ether, silicone emulsifiers such as cetyl dimethicone copolyol, and sorbitan monostearate or tristearate, PEG-40 stearate and oxyethylenated (20 EO) sorbitan monostearate.

As solvents that may be used in the invention, mention may be made of lower alcohols, for instance ethanol, isopropanol and propylene glycol.
Hydrophilic gelling agents that may be mentioned include carboxylic polymers such as carbomer, acrylic copolymers such as acrylate/alkyl acrylate copolymers, polyacrylamides and especially the mixture of polyacrylamide, C13-14 isoparaffin and laureth-7 sold under the name Sepigel 305® by the company SEPPIC, polysaccharides, for instance cellulose derivatives such as hydroxyalkyl celluloses and in particular hydroxypropyl cellulose and hydroxyethyl cellulose, natural gums such as guar gum, locust bean gum and xanthan gum, and clays.

Lipophilic gelling agents that may be mentioned include modified clays, for instance bentones, metal salts of fatty acids, for instance aluminium stearates and hydrophobic silica, or else ethyl cellulose and polyethylene.

Needless to say, the topical compositions or combinations according to the invention may also contain several other active agents.

As active agents that may be used, mention may be made of vitamins B3, B5, B6, B8, C, D, or PP, niacin, retinol (vitamin A) and derivatives thereof and tocopherol (vitamin E) and derivatives thereof.

In particular, use may be made of an antioxidant complex comprising at least one of the following compounds: vitamin C and vitamin E.

According to another of its aspects, one subject of the invention is a cosmetic method for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject, comprising at least one step of topical application, to the hair and/or the scalp of said subject, of an effective amount of at least one pomegranate extract or of a composition containing it.

Preferably, said extract or said composition will be left in contact with the hair and/or the scalp, which will then optionally be rinsed.

The cosmetic treatment method of the invention may especially be performed by applying the cosmetic and/or dermatological compositions or combinations as defined above according to the usual technique for the use of these compositions.

For example: application of creams, gels, serums and lotions to dry hair, application of a hair lotion to wet hair, shampoos.

According to another of its aspects, one subject of the invention is a cosmetic method for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject, comprising at least one step of oral administration of an effective amount of at least one pomegranate extract or of a composition containing it.
The cosmetic method according to the invention may be performed by oral administration or topical application, for example daily, of the extract or the combination according to the invention, which may be formulated, for example, in the form of gels, lotions or emulsions. In the case of oral administration, the daily doses of pomegranate extract are preferably between 0.5 and 2500 mg/day, more specifically between 5 and 500 mg/day.

One or other of these cosmetic methods may comprise a single application or administration. According to another particular embodiment, the application or administration is repeated, for example two to three times daily over one day or more and generally over an extended period of at least 4 weeks, or even 4 to 15 weeks, with, where appropriate, one or more periods of stoppage.

In the description and in the examples that follow, unless otherwise mentioned, the percentages are weight percentages and the ranges of values written in the form "between ... and ..." include the stated lower and upper limits. The ingredients are mixed, before being formed, in the order and under conditions that may be readily determined by those skilled in the art.

The examples below are presented as non-limiting illustrations of the field of the invention.

**Example 1: demonstration of the claimed effect**

1. **Materials and method**

1.1. **Biological model**

- Tissues: Neosynthesis of total GAGs: 36 epidermises of 13 day Episkin™ (D13).

1.2. **Compounds tested and references**

<table>
<thead>
<tr>
<th>Extract tested</th>
<th>Appearance/Storage</th>
<th>Stock solution</th>
<th>Dilution</th>
<th>Concentrations tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1 (Draco) Whole fruit juice extract</td>
<td>Powder Storage at +4°C in the dark</td>
<td>10 mg/ml in DMSO</td>
<td>Differentiation medium or PBS</td>
<td>0.001 mg/ml</td>
</tr>
</tbody>
</table>
1.3. Preliminary test of cytotoxicity

- Plates: 96 wells
- Cells/well: 10000 NHEK in Keratinocyte-SFM medium
- Range of concentrations tested: cf. Table 1
- Number of replicates: 6
- Cells/compound contact: 48 hours
- Evaluation parameters: reduction of MTT and morphological observations using a microscope (x10 lens)

The conversion of the colourless tetrazolium salt (MTT: 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) to blue formazan crystals, soluble in DMSO, is proportional to the activity of the succinate dehydrogenase (a mitochondrial enzyme).

Consequently, the conversion of the MTT to formazan crystals by the succinate dehydrogenase is proportional to the number of living cells.

The cells were incubated in the presence of MTT and then were dissociated and the formazan crystals were solubilized. The optical density (OD) at 540 nm, representative of the number of living cells, was measured on a plate reader (SoftMax, Molecular Devices).

1.4. Synthesis of glycosaminoglycans on Episkin™

- Culture and treatment

On receipt, the Episkin™ reconstructed epidermises were placed in 24-well plates containing 2 ml of differentiation medium and cultured for 24 hours. After incubation, the epidermises were placed in 12-well plates in differentiation medium containing, or not containing (control), the compounds to be tested or the reference and incubated for 72 hours. A 0.5% DMSO control was carried out in parallel. For measuring the neosynthesis of GAGs, [³H]-glucosamine (for the
neosynthesis of total GAGs) was added over the last 24 hours of incubation. All the conditions were carried out in n=3 for the neosynthesis of (total) GAGs and in n=1 for the histological control.

5 - Measure of the incorporation of radioactivity into the GAGs

At the end of treatment, the glycosaminoglycans were extracted separately from the culture media and the epidermises using chaotropic buffer (50 mM Tris/HCl, 4 M guanidine, 5 mM EDTA, pH 8.0) and then purified by ion-exchange chromatography (adsorption of the anionic molecules on beads of Q-Sepharose and desorption of the not very anionic and moderately anionic molecules with a solution of 6 M urea + 0.2 M NaCl). The radioactivity incorporated into the molecules left on the support (GAGs, predominantly) was measured by liquid scintillation.

The results were expressed as percentage variation of the synthesis of total GAGs relative to the control.

1.5. Processing of the data

The raw data was transferred and processed using Microsoft Excel® software. Intergroup comparisons were carried out using the Student's T-test.

Formulae used in this ratio:

The percentage stimulation is calculated according to the following formula:

\[
\text{Stimulation} \% = \left( \frac{\text{Valeur}}{\text{Moyenne du temoin}} \right) \times 100 - 100
\]

The standard error of the mean (sem) represents the deviation of the sample mean relative to the true population mean. The sem is calculated by dividing the Sd by the square root of the sample size.

The percentage viability is obtained according to the following formula: \(= \left( \frac{\text{OD compound}}{\text{OD control}} \right) \times 100.\)

2. Results

2.1 Preliminary test of cytotoxicity

The results of the viability tests using MTT and the observation of the cell layers lead to the concentrations to be tested in the remainder of the study being
selected. No toxicity on the cells was detected at the concentrations tested (see Figure 1).

2.2. Effects of the compounds on the synthesis of epidermal GAGs

- Synthesis of total GAGs on Episkin™

The incorporation of [³H]-glucosamine was measured in the GAGs present in the culture media (Figure 1). At the basal level, the incorporation of [³H]-glucosamine into the GAGs released in the culture medium was almost negligible compared to that measured in the epidermises (4% of the total).

The DMSO control, tested at 0.5%, had a tendency to stimulate the incorporation of [³H]-glucosamine into the GAGs of the intra-epidermal fraction (20% stimulation) whereas no effect was observed in the GAGs released in the culture medium.

The extract corresponding to the pomegranate whole fruit juice E₁, tested at 0.001 mg/ml, significantly stimulated the incorporation of [³H]-glucosamine into the GAGs released in the culture medium (99% stimulation).

The extract corresponding to the whole fruit juice E₂, tested at 0.005 mg/ml, significantly stimulated the incorporation of [³H]-glucosamine into the GAGs released in the culture medium (208% stimulation).

3. Conclusion

The extract E₁, tested at 0.001 mg/ml, stimulated the neosynthesis of the total GAGs released in the culture media (factor of 2 approximately).

The extract E₂, tested at 0.005 mg/ml, stimulated the neosynthesis of the total GAGs released in the culture media.

Through their ability to stimulate the synthesis of glycosaminoglycans, these extracts have the property of strengthening the proteoglycans in the connective sheath of the hair and therefore of correcting the effects of deteriorations of the matrix of aged hair.

Example 2: Composition examples

1. Lotion composition for the hair

Pomegranate extract: pomegranate whole fruit juice 5.00
<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin E</td>
<td>0.05</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>40.00</td>
</tr>
<tr>
<td>Preserving agent</td>
<td>0.35</td>
</tr>
<tr>
<td>Water</td>
<td>qs 100.00</td>
</tr>
</tbody>
</table>

2. Milk composition for hair care (weight %)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pomegranate extract: pomegranate whole fruit juice</td>
<td>5.00</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>0.05</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>40.00</td>
</tr>
<tr>
<td>Glyceryl stearate</td>
<td>1.00</td>
</tr>
<tr>
<td>Cetylstearyl alcohol/cetylstearyl alcohol oxyethylenated with 33 mol of EO (Sinnowax AO sold by the company Henkel)</td>
<td>3.00</td>
</tr>
<tr>
<td>Cetyl alcohol</td>
<td>1.00</td>
</tr>
<tr>
<td>Dimethicone (DC 200 Fluid sold by the company Dow Corning)</td>
<td>1.00</td>
</tr>
<tr>
<td>Liquid petroleum jelly</td>
<td>6.00</td>
</tr>
<tr>
<td>Isopropyl myristate (Estol IPM 1514 sold by Uniqema)</td>
<td>3.00</td>
</tr>
<tr>
<td>Glycerol</td>
<td>20.00</td>
</tr>
<tr>
<td>Preserving agent</td>
<td>0.30</td>
</tr>
<tr>
<td>Water</td>
<td>qs 100.00</td>
</tr>
</tbody>
</table>

3. Gel composition for hair care (weight %)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pomegranate extract: pomegranate whole fruit juice</td>
<td>5.00</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>0.05</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>2.50</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>40.00</td>
</tr>
<tr>
<td>Preserving agent</td>
<td>0.30</td>
</tr>
<tr>
<td>Water</td>
<td>qs 100.00</td>
</tr>
</tbody>
</table>

4. Lotion composition for hair care (weight %)

<table>
<thead>
<tr>
<th>Ingredient</th>
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<tr>
<td>Pomegranate extract: pomegranate whole fruit juice</td>
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</tr>
<tr>
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<td>0.30</td>
</tr>
<tr>
<td>Water</td>
<td>qs 100.00</td>
</tr>
</tbody>
</table>
CLAIMS

1. Cosmetic use of an effective amount of at least one pomegranate extract, as an agent for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronological ageing.

2. Use according to the preceding claim, characterized in that the extract is present, in a composition comprising a physiologically acceptable support, in an amount from 0.0001 % to 80% by weight relative to the total weight of said composition.

3. Use according to either one of the preceding claims, characterized in that the pomegranate extract is a whole fruit juice.

4. Use according to any one of the preceding claims, characterized in that said extract is combined with at least one compound chosen from vitamins B3, B5, B6, B8, C, D, or PP, niacin, retinol and derivatives thereof and tocopherol and derivatives thereof.

5. Cosmetic method for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject, comprising at least one step of topical application, to the hair and/or the scalp of said subject, of an effective amount of at least one pomegranate extract or of a composition containing it.

6. Method according to the preceding claim, characterized in that said extract or said composition is left in contact with the hair and/or the scalp, which are then optionally rinsed.

7. Cosmetic method for preventing and/or treating the appearance of dull hair and/or lustreless hair due to chronobiological ageing of a subject, comprising at least one step of oral administration of an effective amount of at least one pomegranate extract or of a composition containing it.
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<th>Concentrations</th>
<th>Mean ppm</th>
<th>esm</th>
<th>% stimulation (normalized data)</th>
<th>esm (%)</th>
<th>p</th>
<th>Cell viability (MTT): % of reference</th>
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<td>496</td>
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Figure 1
**A. CLASSIFICATION OF SUBJECT MATTER**

**INV.** A61K8/97 A61Q5/00

**ADD.**

According to International Patent Classification (IPC) or to both national classification and IPC

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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<td>5, 6</td>
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* Special categories of cited documents:

- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier document but published on or after the international filing date
- **L** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **O** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed
- **T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- **X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- **S** document member of the same patent family

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Date of the actual completion of the international search

12 December 2011

Date of mailing of the international search report

20/12/2011

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016

Authorized officer

Uryga-Polowy, V
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<td>EP 1 291 012 AI (HAARMANN &amp; REIMER S A [FR]) 12 March 2003 (2003-03-12) claims 5, 18-20</td>
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<td>TAYLOR WILLIAM H ET AL: &quot;Primers of glycosaminoglycan biosynthesis from Peruvian rain forest plants&quot;, JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 273, no. 35, 28 August 1998 (1998-08-28), pages 22260-22265, XP002643667, ISSN: 0021-9258 abstract figures 3, 4; compounds 1, 2 page 22263, column 1, paragraph 1</td>
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<td>US 6 630 163 BI (MURAD HOWARD [US]) 7 October 2003 (2003-10-07) column 8, line 25 - line 29</td>
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## INTERNATIONAL SEARCH REPORT

### Information on patent family members

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