A new look on aged, damaged or overly stressed hair
Overview

• Introduction
• External agents that increase damage
• About the invention - ReparAge®
• Efficacy tests
• Conclusion
ReparAge®: A new look on aged, damaged or overly stressed hair

Hair damage is the result of the progression of changes to the hair fiber beyond just breakage and split ends
Damage

- Increase of Protein Loss
- Photo-oxidative discoloration
- Reduction of hair fiber strength
- Provides a rough aspect
- Loss of gloss and stiffness
- Break of the cuticle
- Cortical degradation
- Superoxide formation by melanin degradation
Chemical Process
(Bleaching-Hair dyes)

Damage
• Increase of Protein Loss
• Removal of natural pigments
• Amino acid Oxidation
• Protein loss by oxidation
• Decrease in keratin levels.
• Hair force reduction
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Heat
(Hair Combing)

Damage
• Decomposition of hair chromophores
• Water loss
• Damage to the hair fiber surface $T \geq 103 \degree C$
• Damage of the crystal structure of keratin
• Proteins denaturation.
Mechanical
(Combing)

Damage
• Cuticle Damage
• Cortex exposition
• Excess of negative charges in the hair fiber
• Change on the hair isoelectric point
• Frizz out Effect
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Healthy hair

Damaged hair

Chemical Mechanical Thermal UV
How to treat
or minimize hair
damage?
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ReparAge® is an association of aminoacids that are present in the hair fiber with hydrolyzed vegetable proteins and carbohydrates. This association is carried on a special mixture of polymers with different MW.

*Patent Pending
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- CHEMICAL
- MECHANICAL
- U.V.
- HEAT
Experimental Design

- Caucasian natural hair
- 1 bleach procedure
- 96 hours of exposure to ultraviolet radiation
- 150 combing strokes
- 10 strokes with straightening iron at 180°C
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### Shampoo

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>% CTRL</th>
<th>% TRT</th>
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<tr>
<td>Cocamide DEA</td>
<td>3,00</td>
<td>3,00</td>
</tr>
<tr>
<td>ReparAge®</td>
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<td>1,00</td>
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<tr>
<td>Sodium Laureth Sulfate</td>
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<td>Cocamidopropyl Betaine</td>
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<td>Dissodium EDTA</td>
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<tr>
<td>Water</td>
<td>sqf 100,00</td>
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<td>Methylchloroisothiazolinone (and) Methylisothiazolinone</td>
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<td>Citric Acid</td>
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<tr>
<td>Sodium Chloride</td>
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### Conditioner

<table>
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<tr>
<th>INGREDIENTS</th>
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<tr>
<td>Cetearyl Alcohol</td>
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<tr>
<td>Vegetable Oil</td>
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<tr>
<td>Water</td>
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<td>sqf 100,00</td>
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<tr>
<td>Dissodium EDTA</td>
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<tr>
<td>Cetrimonium Chloride</td>
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</tr>
<tr>
<td>ReparAge®</td>
<td>-</td>
<td>1,00</td>
</tr>
<tr>
<td>Methylchloroisothiazolinone (and) Methylisothiazolinone</td>
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<td>sq</td>
<td>sq</td>
</tr>
</tbody>
</table>
Efficacy Tests

- Investigation on substantivity of human hair – Scanning Fluorescence Microscopy
- Objective hair gloss efficacy assessment
- Assessment of hair diameter
- Damage reduction via scanning electron Microscopy
- Assessment of hair photo-protection
• Investigation on substantivity of human hair – Scanning Fluorescence Microscopy

1 application sh+cond – group CTRL
1 application sh+cond (both 1% ReparAge®) TRT
12% Reduction of Surface Fluorescence Intensity (in percentage and number of times) of the TRT groups in relation to the CTRL group.
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CTRL

TRT

20% Reduction of Cortical Fluorescence Intensity in percentage and number of times of the TRT groups in relation to the CTRL group.
• Objective hair gloss efficacy assessment

• 1 application sh+cond – group CTRL
• 1 application de sh+cond (both 1% ReparAge®) TRT
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According to the obtained results, the damaged tresses submitted to the treatment CTRL e TRT showed significant higher gloss value, when compared to their initial state (untreated tresses).

The damaged tresses submitted to the treated (TRT) showed 27% or 1.3 times more gloss than the CTRL tresses submitted to the treatment.
Assessment of Hair Diameter

According to the obtained results, the damaged hair tresses submitted to 14 applications of the CTRL treatment showed a significant increase of 1% in hair diameter when compared to the tresses before the treatment (initial condition).

The damaged tresses submitted to 14 applications of TRT treatment showed a significant increase of 2% in hair diameter when compared to the tresses before the treatment.

Graph 1. Calculated values of initial and final hair fiber diameter, \( D \) (µm). Mean ± standard deviation.

- 14 application sh+cond – group CTRL
- 14 application sh+cond (both 1% ReparAge®) TRT
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Damage reduction via scanning electron Microscopy

- 1 application sh+cond – group CTRL
- 1 application sh+cond (both 1% ReparAge®) TRT

Illustration of detection of fragments and edges via image analysis
According to the obtained results, the damaged tresses of TRT group showed superficial damage values 10% lower than the damaged tresses of CTRL group.
Assessment of Hair Photo Protection

After treating hair with the products, the tresses were exposed to the ultraviolet radiation (UVA-UVB) for 12 hours.

The procedure was repeated 7 more times to complete 96 hours of exposure to ultraviolet radiation.

The fluorescence spectroscopy technique was used to the study of photo-protection against UVA-UVB ultraviolet rays.

- 1 application sh+cond – group CTRL
- 1 application sh+cond (both 1% ReparAge®) TRT
According to the calculated results, the tresses submitted to the CTRL treatment showed 15% tryptophan degradation, while the tresses submitted to the TRT treatment showed 9% tryptophan degradation after exposure to ultraviolet radiation for 96 hours.
• Others....

• Color degradation of dyed hair

• Assessment of Hair Photo Protection
Color degradation of dyed hair

In this study, tresses of double bleached Caucasian hair were dyed with the colorant mixture Nutrisse Red 6.66 – Garnier®. Next, the tresses were submitted to 15 successive washes with the products:

• Shampoo + Conditioner – group CTRL;

• Shampoo with ReparAge® + Conditioner with ReparAge® – group TRT.

Color readings of the tresses were obtained using a Byk-Gardner Spectro-Guide Sphere Gloss spectrophotometer, after dyeing (0 wash) and after 1, 5, 10 and 15 applications of the products.
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**Graph 1.** Color variation (∆E*ab) after the successive washes. Mean ± standard deviation.

**Figure 4.** Samples of wash water collected during the rinse of the samples, submitted to 15 successive washes.
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Thermal protection of hair – DSC

- 1 application sh+cond – group CTRL
- 1 application sh+cond (both 1% ReparAge®) TRT
According to the obtained results, the tresses submitted to the treatment TRT showed 7% of increase in the potential for thermal protection of the α-keratin, when compared to the tresses submitted to the treatment CTRL.
Conclusions

ReparAge® contains in its composition an Amino Structural Matrix, responsible for the exclusive Pro.FILLER® concept, which is the increase on the diameter of aged hair fiber & repair of existing internal damages.

ReparAge® promotes the repair of macro & micro damages caused by physical, chemical, thermal and environmental stress.

ReparAge® ultimately reverses the damages caused by aging hair.
Thank you for listening
If you need more information, please visit us on stand 6Q74 - Brazilian Pavillion!