Natural oils protect hair from chemicals and colour loss

Globally, men and women are changing the colour of their hair more often than ever. The range of hair colours and shades has increased considerably and colour preferences vary widely across the globe.

Hair that has been damaged by excessive exposure to chemicals often becomes over-processed and, with time, it gets dry, rough, permeable, frizzy, fragile and hard to comb in both dry and wet conditions.

Alkalis used to help precursor pigments to permeate cause the hair fibres to become stiff with opened cuticle scales. When damaged hair becomes negatively charged, it acquires an unhealthy appearance. Over time, coloured hair loses its shine and shimmer.

Colour alteration can be caused by the oxidation of pigments that penetrate the hair shaft due to environmental exposure (pollution, ultraviolet sunlight, chlorine). Thus, the use of antioxidant agents in hair care products for colour treated hair is imperative.

Most of the shine that makes hair look healthy is due to the healthy state of the cuticle. The cuticle formed by overlapping dead cells is responsible for the protection of the hair shaft. Once this layer is damaged, its hydrophobic characteristics change to hydrophilic.

Synthetic substances coming from non-renewable sources like silicones and cationic surfactants can close open scales by smoothing the cuticle's surface. However, those ingredients do not provide some important natural substances needed by hair with severe damage.

The trend in consumer demand is for natural cosmetic products with high performance, good sensory properties and superior aesthetics. Nevertheless, it is a big challenge to develop and achieve active ingredients with high consumer acceptance using natural substances and delivering similar performance to that of products composed of synthetic substances.

Raw materials obtained from acai berry, murumuru nuts and pracaxi seeds harvested manually in a sustainable manner by local communities play an important economic role in the Brazilian Amazon. The preservation of the world's biodiversity is more and more supported by sustainable initiatives coming from cosmetic manufacturers and the use of sustainably sourced natural raw materials in cosmetic products.

The use of natural oils in the hair care segment has been increasing as well as the number of products manufactured with vegetable active ingredients designed to recover damaged and chemically-treated hair.

Treating chemically and colour treated hair with vegetables oils

The treatment of chemically damaged hair with natural vegetable oils aims to keep hair fibres protected from external aggressions, while restoring the hydrophobic characteristics of the hair shaft with fatty acids that participate in the fraction of the human skin surface lipid content such as stearic, myristic and palmitic acids accumulated on the scalp and also found in hair bulbs, being responsible for the hair fibre natural protection and conditioning.

Beracare Stilb Touch HDE System (Beracare Stilb Touch HDE- W and Beracare Stilb Touch HDE-O) is composed

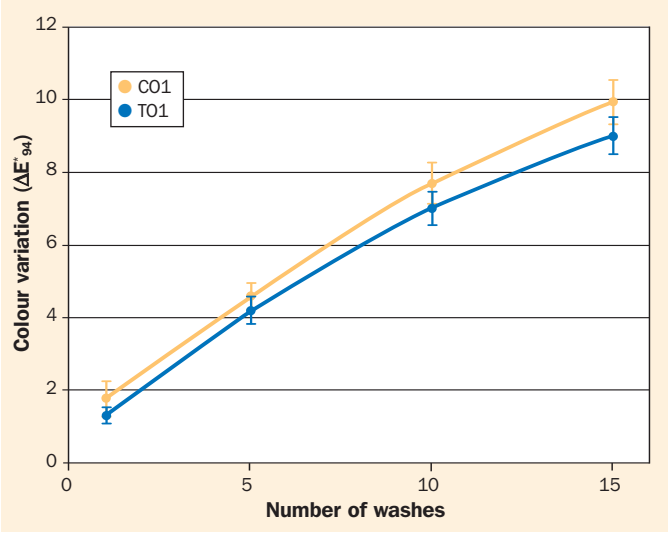

Figure 1: *Colour variation after 15 hair washes – Beracare Stilb Touch HDE-W vs. Control (Shampoo); C01) Control Shampoo, T01) Shampoo with Beracare Stilb Touch HDE-W.*

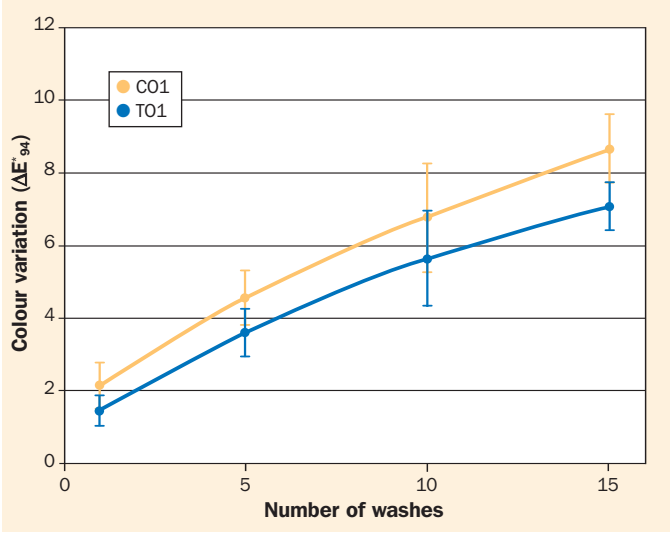

Figure 2: *Colour variation after 15 hair washes – Beracare Stilb Touch HDE system (Beracare Stilb Touch HDE-W + Beracare Stilb Touch HDE-O) vs. Control (Shampoo + Conditioner); C02) Control Shampoo + Control Conditioner, T02) Shampoo with Beracare Stilb Touch HDE-W + Conditioner with Beracare Stilb Touch HDE-O.*

of water-soluble and oil soluble ingredients for hair care cosmetic products. It can be added into shampoos, rinse-off conditioners, hair masks, styling products and other hair care products.

Beracare Stilb Touch HDE-W (now referred to as 'the natural hair protector') is composed of natural acai extract with antioxidant properties containing anthocyanin and various polyphenols; a natural saponin allowing the development of mild shampoos with low irritation profile and improved foam properties; and a liquid starch, as a re-fatting agent that forms a protective layer on the hair shaft minimising the mechanical damage caused by friction during the washing process and gives resistance against moisture pick-up of dry and porous hair.

The ingredient contains a highly emollient butter: murumuru butter, produced by an Amazonian oil palm tree with expressive quantities of lauric, myrystic, palmitic, stearic, linoleic and oleic acids. It is combined to the oil obtained from the seeds of pracaxi tree (oil bean tree), containing expressive quantities of oleic and linoleic acids and high concentration of behenic acid if compared to other vegetable oils. Broccoli seed oil and jojoba oil have also been added, thus guaranteeing greater combing ease, manageability, shine improvement and frizz control. Isoamyl laurate, an ester oil obtained from natural sources, has also been added to achieve weightless, non-greasy hair and high spreading properties, providing a natural silicone-like feel without the use of silicones.

Efficacy assessment

The efficacy of cosmetic products containing Beracare Stilb Touch HDE System applied to hair fibre regarding gloss attributes was assessed along with the effects of their continuous use on colour degradation of dyed hair.

Colour degradation

Colour retention is assessed using colourimetric measurements, a technique used to assess colour loss on the surface of the hair fibre.

Measurements are performed on hair tresses subjected to aggressive agents (hair care products) and solar radiation, causing hair colour loss.

Hair gloss effect

Hair gloss is one of the most important attributes related to hair care products. Two hair samples of the same colour but with different glossiness do not provide the same visual perception. When light hits the hair fibres, it is spread on the irregular surface and reflects at different angles.

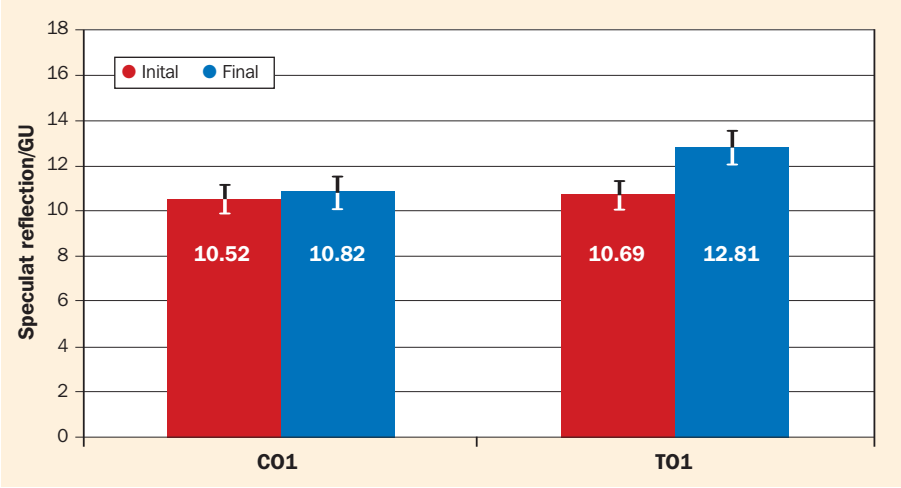

Figure 3: *Gloss measurements results after shampoo – Control vs. Beracare Stilb Touch HDE–W; C01 Control Shampoo, T01 Shampoo with Beracare Stilb Touch HDE-W.*

However, part of the light is reflected towards the observer at the same angle, thus providing greater luminous intensity. This phenomenon is known as specular reflection or gloss, and it is enhanced in reduced, diffuse light, i.e. with increased regularity of the surface.

Materials and methods

Colour degradation

Spectrophotometer readings were made by Byk-Gardner Spectro-Guide Sphere Gloss and CIE-$L^*a^*b^*$ (CIE94) Colour Space using 20 double-bleached tresses of straight Caucasian hair (DeMeoBrothers Inc, NY-USA). These tresses were then dyed using 5 g of a permanent hair colorant (Cor & Ton, Dark blond red n°6.66 – Niely).

Hair tresses were submitted to washings followed by UV radiation (for 4 hours – 2 hours for each side), using a solar ultraviolet radiation simulator Atlas Wheater-Ometer, model 65 XW-WR, equipped with xenon lamp. Colourimetric readings (five readings for each tress) were performed after one, five, 10 and 15 consecutive washes.

Measurement of hair gloss enhancement

In this study, a Glossmeter (BYK Gardner) equipment was used, with a fixed incidence angle of 85°C. In this equipment, the intensity of the reflected light at an angle of 85°C in relation to the normal reflected light of a standard smooth surface is taken as zero or reference for a non-dimensional scale of relative gloss values.

Twenty dark brown naturally straight Caucasian hair (De MeoBrothers INC., NY-USA), weighing 5.0 g each and 25 cm long were pre-cleaned and dried (24 hours before testing) before baseline Gloss Measurements (initial) by a Glossmeter – BYK Gardner were taken. Washing treatments were done, tresses were dyed (24 hours before measuring) and post treatment Gloss Measurements* (final) were taken.

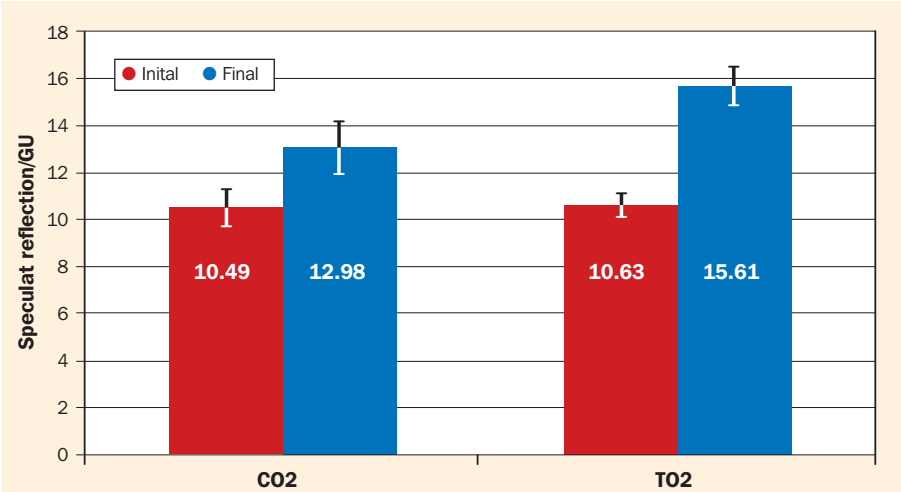

Figure 4: *Gloss Measurements results after Shampoo + Conditioner – Control vs. Beracare Stilb Touch HDE; C02 texto texto, T02 Shampoo with Beracare Stilb Touch HDE-W + Conditioner with Beracare Stilb Touch HDE-O.*

Results and discussion

Tresses treated with shampoo containing the natural hair protector were protected against colour degradation by >12% compared to controls after extended washings (15x), even when formulated with low cost strong surfactants. The treatment consisted of the shampoo plus conditioner containing the active ingredient. This showed greater protection (of >14%) against colour degradation than the shampoo treatment alone when compared to controls.

Tresses washed with a shampoo containing the natural hair protector gloss measurements obtained were >19% higher than baseline readings. The treatment of shampoo plus conditioner containing both active ingredients resulted in gloss measurements >46% higher compared to baseline readings.

In the colour system CIE94 (International colour system CIE-L*a*b*) developed by CIE (Commission Internationale de L'Eclairage), the colour difference, called DE*94, is considered as visually perceptible by human eyesight when it reaches values above 1.0. Using this system, colour can be defined as being vector E, resulting from L*, a* and b*.

Figure 1 represents total colour variation (DE) of dyed tresses, after successive washes, compared to initial colour.

Tresses submitted to treatment with the natural hair protector (T01) showed values of colour variation 12% lower when compared to control (C01). Tresses remain significantly more colourful than the control showing colour maintenance of 1.1 times higher than control (T01).

Figure 2 shows the gloss results obtained after 15 washes: tresses treated with Beracare Stilb Touch HDE system (T02) were significantly more colourful when compared to the tresses treated with control (C02). After 15 washes, tresses treated with Beracare Stilb Touch HDE system showed values of colour variation 14% lower when compared to control (tresses remain significantly more colourful than control).

According to the results in Figure 3, hair tresses submitted to treatment with the natural hair protector (T01) showed significantly higher gloss values when compared to their initial status and compared to controls (C01).

For this study, five consecutive readings were performed in different positions in the centre of each tress to get average gloss value for each tress.

Tresses that were treated with the Beracare System showed gloss values of >46% higher compared to baseline condition (untreated hair) and significantly higher than control (23% higher than baseline condition).

Conclusion

Especially formulated with natural raw materials that improve shine and maintenance of coloured hair, Beracare Stilb Touch HDE System has superior conditioning properties, protecting hair against external damage and achieving greater combing properties, manageability, shine improvement and frizz control. The system recovers chemically treated and dyed hair, resulting in shiny, healthy, natural-looking hair.

Hair colour can be protected by as much as 14% using Beracare Stilb Touch HDE System and its shine can be improved by as much as 47%.

Future studies can be performed to determine the oxidative damage that has been inflicted on the hair using the thiobarbituric acid test (TBA) which determines the levels of the amino acid tryptophan by fluorescence test.

In most cases natural raw materials have excellent skin and hair compatibility. Continuous investments in R&D are needed to develop sustainable raw materials with equal or better performance when compared to synthetic products. PC

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