IN VITRO STUDY OF DYE LONGEVITY USING COLOR PROTECT SHAMPOO FOR PERMANENT DYED HAIR

S.M Badiul Alam Siddiqui, Rahul Deshkar, Shaikh Nasir

Dabur Research & Development, International Business Development,
P.O.Box. 6399; Dubai, UNITED ARAB EMIRATES.

badiul.alam@dabur.com

ABSTRACT

The hair care industry is experiencing significant growth, particularly in the hair treatment, maintenance, and styling categories. Consumers have different habits and preferences, which have led to the creation of various hair care products with unique ingredients and techniques to promote scalp health and prevent hair damage. While some remedies are traditional, others incorporate superfood ingredients for physical treatments.

One of the most popular hair care products is color protection shampoos and conditioners, which helps maintain hair color and prevent fading or dullness caused by environmental factors and styling. The market for such products is expanding due to the increasing demand for hair coloring and styling options.

Keywords: Color Protect shampoo, Color protect Conditioner

INTRODUCTION

One of the main factors driving the growth of the color protection shampoo and conditioner market is the increasing popularity of hair coloring, especially among younger generations. As people color their hair more frequently, the need for products that can help maintain their color becomes more essential. This has led to the development of a wide range of color protection shampoos and conditioners that are specifically designed to cater to different hair types, colors, and needs.

Another significant factor driving the market growth is the increasing demand for natural and organic products. Consumers are becoming more conscious about the ingredients they put on their hair and skin, and are looking for products that are free from harsh chemicals, sulfates, and parabens. As a result, many hair care brands are launching natural and organic color protection shampoos and conditioners to meet this demand.

In terms of distribution channels, color protection shampoos and conditioners are widely available in supermarkets, drugstores, and specialty beauty stores. E-commerce platforms are also becoming an increasingly popular channel for purchasing these products, as consumers are looking for the convenience of online shopping and the ability to read reviews and compare prices.

Overall, the color protection shampoo and conditioner market is expected to continue to grow in the coming years as more people color their hair and seek out products that can help maintain their color and keep their hair looking healthy and shiny.

Color-protecting shampoo and conditioner markets are segments of the hair care industry that cater to individuals who dye their hair. These products are formulated to help preserve the color of dyed hair for a longer period of time, and also to prevent fading or discoloration. The

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

market for color-protecting shampoo and conditioner has been growing in recent years, as more and more people are dying their hair and seeking ways to maintain the vibrancy of their hair color. This market is expected to continue growing in the future, especially as hair coloring becomes more popular among men and women of all ages.

The key factors driving growth in the color-protecting shampoo and conditioner markets include

Rising demand for hair coloring: As more people dye their hair, the need for products that can help maintain the color of their hair is increasing

Rising demand for hair coloring: As more people dye their hair, the need for products that can help maintain the color of their hair is increasing.

Growing awareness about hair care: Consumers are becoming more knowledgeable about the ingredients in hair care products and the importance of using products that are specifically formulated for their hair type and needs.

Innovative product offerings: Many manufacturers are developing new and innovative color-protecting shampoo and conditioner formulations, which are appealing to consumers looking for latest and best products

E-commerce: The rise of e-commerce platforms has made it easier for consumers to access a wide range of color-protecting shampoo and conditioner products from different brands and manufacturers

Some challenges facing the color-protecting shampoo and conditioner markets include:

Competition: There are many players in the hair care industry, and the color-protecting shampoo and conditioner markets are highly competitive. Brands must work to differentiate themselves and offer unique features or benefits to attract and retain customers.

Price sensitivity: Consumers are often price-sensitive when it comes to hair care products, and may be hesitant to pay a premium for color-protecting shampoo and conditioner. Brands need to strike a balance between offering high-quality products and pricing them competitively..

Sustainability concerns: Many consumers are becoming more environmentally conscious and are looking for hair care products that are sustainably produced and packaged. Brands that can offer eco-friendly options may have an advantage in the market.

Overall, the color-protecting shampoo and conditioner markets are a growing segment of the hair care industry, driven by rising demand for hair coloring and growing awareness about hair care.

However, there are open challenges for the brands to differentiate themselves in a competitive marketplace.

Vatika color protect shampoo is a unique blend of surfactants having very innovative silicone technology to cover dyed hair and protect the shade against wear and tear. Silicone with Alkyl modified amino derivative conditioning agents is a popular choice in hair care products as they offer a wide range of benefits to the hair. When applied to the hair shaft, they create a thin layer of silicone that acts as a protective barrier, providing thermal protection and reducing friction between individual hair fibers

The alkyl modified amino derivative is an important component of the conditioning agent, as it helps to improve the bonding between the silicone and the hair shaft. This results in a more effective deposition of the silicone layer, ensuring that the hair is fully protected and conditioned.

The silicone layer not only provides thermal protection but also acts as a lubricant, making the hair easier to comb and style. This helps to reduce breakage and split ends, leading to healthier, stronger hair over time.

Moreover, the silicone layer can also help to reduce frizz and enhance the shine of the hair by smoothing the cuticle and sealing in moisture. It can also improve the color retention of hair dyes by preventing fading and maintaining vibrancy.

Overall, the use of silicone with alkyl modified amino derivative conditioning agents is a beneficial approach to hair care. By creating a protective layer on the hair shaft, it can improve the manageability, smoothness, and health of hair, making it a popular choice among consumers and hair care professionals alike.

STUDY DESIGN

This was an open-label test in which we used hair swatches.

Blond swatches were coloured with one of the market leader hair colour with shades Black 1.0 and Dark Brown 3.0. We used full end to end instructions as indicated by the pack.

Five sets of swatches were separated for two bundle sets of options below:

Option A: shampoo and conditioner with no active i.e. "**Control"**.

Option B: shampoo and conditioner with 1.0 % active i.e. "**Test"**.

The swatches were washed first as per the below steps.

Washing Steps

1. Rinse the tress under running tap water for 15 seconds.
2. Apply 1g of Shampoo by working fingers from top to bottom of tress 10 times.
3. Flip tress over and again work finger from top to bottom of tress 10 times.
4. Rinse the tress under running water for 60 seconds.
5. Towel dry with Tissue paper.
6. Apply 1g of Conditioner by working fingers from top to bottom of tress 5 times.
7. Flip tress over and again work finger from top to bottom of tress 5 times.
8. Leave for 2 minutes.
9. Rinse the tress under running water for 60 seconds.
10. Blow dry using a regular hair dryer.

Colour Measurement

Measure l, a, b values using Gretag macbath Color eye spectrophotometer.

Colour measurements are done after 1, 5, 10, 15, 20, 25 and 30 washes

The experiment done in all five swatches for same treatment.

Colour values taken by Gretag macbath color eye spectrophotometer.

Study Protocol

Swatches pre-treatment

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

• Blond swatches picked with dimensions having length of 15 cm, breadth of 3 cm and weighing around 4g

• Wash with 1 mL of 10% SLES to remove any previous deposition (same wash protocol described above).

Colour Treatment:

Colour the Hair with Garnier Natural black 1.0 and Garnier Dark Brown 3.0 as per the instructions given in the pack Measure l, a, b values with colour eye spectrophotometer.

Washing protocol:

Same aforementioned washing protocol has been adopted.

Measure l, a, b values using Gretag macbath Colour eye spectrophotometer. (Only after 1, 5, 10, 15, 20, 25 and 30 washes)

The experiment done in triplicate (3 swatches for same treatment)

Instrumentation:

L,a, b values using Gretag macbath Color eye spectrophotometer

The Hair tress was kept in the measuring port at 3 different points root to tip

Then the tress is flipped and take reading at another 3 points root to tip

Then average l, a, b values were obtained in the software

OBSERVATIONS

Table 1. Natural Black 1.0

No.	Washes (Control)			Washes (Test)		
	10	20	30	10	20	30
Δ E	3.11	5.69	8.84	1.08	2.29	3.42

All Δ E values are mean of five swatches.

The difference in the colour is visible from 10th wash and evidently, tress washed with active which offers better colour compared to Control Sample.

Table 2. Dark Brown 3.0

No	Washes (Control)			Washes (Test)		
	10	20	30	10	20	30
Δ E	1.39	5.23	15.47	0.32	1.52	5.05

All Δ E values are mean of five swatches.

The difference in the colour is visible from 10th wash and evidently, tress washed with active which offers better colour compared to Control Sample.

These values clearly shows the colour protection effect of active.

RESULTS

Colour protection effect of active were highly seen in Natural Black and Dark Brown shades basis instrumental data.

Lower Delta E represents less Colour differentiation whereas higher Delta E values shows significant differences in the shades.

Considering three hair wash cycles per week as per consumer habit, above data can be justified for colour protection claim up to 10 weeks considering instrumental data findings.

CONCLUSION

Silicone with Alkyl modified amino derivative conditioning agent involves the deposition of a thin layer of silicone on the hair shaft. This layer of silicone helps to reduce friction between individual hair fibers, which can improve the smoothness and manageability of the hair. Additionally, the silicone layer can provide thermal protection by forming a barrier that helps to prevent damage from heat styling tools.

The pendant amino and terminal alkyl groups on the silicone structure of Silicone conditioning agent are responsible for its conditioning properties. The pendant amino groups have a positive charge and can interact with the negatively charged surface of the hair, helping to improve the overall condition and appearance of the hair. The alkyl groups provide additional hydrophobicity to the silicone molecule, which can help to repel water and reduce frizz in humid conditions.

Alkyl group also helps get dye intact for longer due to repulsion of water.

Overall, the combination of silicone deposition and amino and alkyl group interactions allows Alkyl modified amino group Silicone based conditioning agent to provide enhanced thermal protection, smoothness, shine, softness, and manageability for dry hair. The exact mode of action may vary depending on the specific formulation and application of the product.

Leena and Luna International, Chikusei, Japan.
(株) リナアンドルナインターナショナル, 筑西市,日本
ISSN: 2186-845X ISSN: 2186-8441 Print
www.ajmse. leena-luna.co.jp

REFERENCES

[1]. Yan Zhou, Linda Foltis, David J Moore, Ray Rigoletto (2009). Characterization of hair damage and its effect on hair color fading and the routes for color protection from shampoo stripping. *Journal of Cosmetic Science 60*(5):572-573.

[2]. Yan Zhou, Linda Foltis, David J Moore, Ray Rigoletto (2010). Protection of oxidative hair color fading from shampoo washing by hydrophobically modified cationic polymers. *International Journal of Cosmetic Science 32*(2):158-9.

[3]. Judy Zhu, Isabelle Van Reeth, Bethany K. Johnson. (2018). *The Beauty of Silicone in Hair Care Applications.* The Dow Chemical Company 30023848.

[4]. Cosmetic Ingredient review Dimethicone and others silicones: *International Journal of Toxicology, 22* (Suppl.2): 11-35, 2003; ISSN: 1091-5818 Print/1092-874 Online; DOI: 1-.1080/10915810390294854

[5]. Marchioretto, Sabrina. (2004). The use of silicones as a color-lock aid in rinse-off hair conditioners. *Journal of cosmetic science. 55*. 130-1.

[6]. Michelli Ferrera Dario, Richard Pahl, Jordana Rodrigues de Castro, Fernando Soares de Lima, Telma Mary Kaneko, Claudinéia A.S.O. Pinto, André Rolim Baby, Maria Valéria Robles Velasco (2013). Efficacy of Punica granatum L. hydroalcoholic extract on properties of dyed hair exposed to UVA radiation. *Journal of Photochemistry and Photobiology B: Biology, 120*, 142-147, ISSN 1011-1344.

[7]. Schlosser A. (2004). Silicones used in permanent and semi-permanent hair dyes to reduce the fading and color change process of dyed hair occurred by wash-out or UV radiation. *J Cosmet Sci. 55* Suppl:S123-31. PMID: 15645088.

[8]. S. Herrwerth, H. I., Leidreiter, U., Kortemeier, C., Hartung, B., Grüning, S., Fakhry-Smith, (2008). *Testing Polysilicone-19 for Hair Conditioning and UV Protection Claims, Cosmetics & Toiletries.*

[9]. Kropfgans M, Musiol S, Nienstedt S. (2004). Silicone quats--color retention benefits and influence of structure modifications and blending on conditioning. *J Cosmet Sci. 55* Suppl:S133-41. PMID: 15645089.

[10]. Sargsyan L, Vill V, Hippe T. (2020). Investigations of vegetable tannins as hair dyes and their interactions with pre-bleached hair fibres. *Int J Cosmet Sci. Aug;42(*4):320-327. DOI: 10.1111/ics.12624. Epub 2020 Jul 8. PMID: 32353910.

[11]. Madnani, N., Khan, K.(2013). Hair cosmetics. *Indian J Dermatol Venereol Leprol 79*:654-667.

[12]. Mahajan, Apoorva. (2016). Advancements in polymers used in hair care a review. *International Journal of Research in Cosmetic Science. 6*. 6-16.

[13]. C. R. Robbins,(1994). *Chemical and Physical Behavior of Human Hair*, 3rd ed. Springer-Verlag, New York, 1994, pp. 263–297.

[14]. J. Jachowicz, (2005). Recent Polymer Technologies for Hair Care. *Cosmetic & Toiletries magazine. 120* (2005).

[15]. B. Locke, J. Jachowicz, (2005). Fading of Artificial Hair Colour and its Prevention by Photo filters. *J. Cosmet. Sci. 56*407-425.