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The NPD Group: A Reemergence of Beauty in 2021 and Beyond

Jennifer Famiano, The NPD Group

The beauty industry is highly tied to usage occasions, which began to pick up in parts of the U.S. as COVID-19 vaccines rolled out and some degree of normality returned. With more consumers engaged in activities where they want to put their best face forward, beauty categories including makeup and hair care experienced a surge in sales during 2021.

Makeup was the hardest hit beauty category throughout the pandemic, amplified by more than a year of facial coverings and social distancing. Despite this, makeup maintained its position as the largest beauty category based on revenue and signs are pointing to a rebound. On the other hand, the hair market had thrived throughout the COVID-19 period fueled by self-care trends. The perpetual necessity of hair care products fueled growth during 2020. With hair styling now the fastest-growing area of the hair market today, opportunities are expanding as consumers reemerge into a new normal.

As the year comes to a close, NPD Group beauty industry analyst Jennifer Famiano will share the firm's sales results for brick-and-mortar plus e-commerce with a deep dive into the makeup and hair categories in the context of the broader beauty market, and share trends propelling the industry forward. Jennifer will also share consumer attitudes and growth opportunities within each category, with a glimpse into what 2022 has in store.

About the speaker

As Director, Industry Analyst, Beauty, Jennifer Famiano leads the Beauty Category team that is responsible for insights and market intelligence across the prestige skincare, makeup, fragrance, and hair categories. Jennifer works to identify opportunities and white space and advise marketing strategies for prestige global beauty clients. Prior to joining the Beauty team, Jennifer delivered strategic analyses to beauty retail partners using her unique insight as not only a fan of the category, but someone who has also worked for cosmetic manufacturers.

Before joining The NPD Group in 2006, Jennifer spent several years working for Clarins and Shiseido. She has been able to integrate this experience with her ability to interpret and synthesize insightful findings using NPD's portfolio of point-of-sale (POS) and consumer behavior information and make actionable recommendations to beauty clients.

Innovative protocol to test mask resistance of colored cosmetics

Loviena Mascarenhas; Eurofins, CRL Cosmetics, Inc.

Mike Anthonavage, Yang Gao, Allison Dunn, Marisa Gelb,

Matthieu Jomier; Newtone Inc.

Introduction of research

Facial masks have become a way of life during these unprecedented times. Mask mandates have been implemented worldwide since the onset of the Covid-19 pandemic. However, this has not deterred the consumers from using their color cosmetics. The consumers have been forced to adapt to this new ritual of constantly wearing their masks and taking it off while wearing their color cosmetics. Unfortunately, color cosmetics tend to transfer to fabrics and from the skin to masks rather easily, which reduces product coverage and performance over time. It has quickly become apparent that color cosmetics have not yet encountered this issue where the skin is in constant friction with the mask, whether it be an N95, a paper mask or a simple bandana. With the continuation of the pandemic and the constant ebb and flow of mask mandates, consumers will be looking for products that tackle this issue, which is, a product that can withstand the new challenge of wearing color cosmetics while constantly taking the masks on and off. Hence, a need for understanding the capabilities of a colored make-up and for quantifying the amount of color that gets transferred, over a period, while wearing a mask was initiated.

A protocol was developed to evaluate the long-lasting effects of make-up/foundations, after 2 hours and 4 hours of mask use. The following analysis was performed: 1) In-Vivo with digital photography of the face to evaluate the quantity of product remaining on the face. 2) In-Vitro directly on the mask to evaluate the quantity of residue that has been transferred from the face to the mask. A long wear foundation and a non-long wear foundation were used for this study. We successfully compared the residue transfer and make-up coverage levels of the foundation over a period of four hours on subjects who either wore a mask or did not wear a mask. It was found that the mask had a significant impact on both foundations' coverage levels over a four-hour period.

Methodology

To compare the resistance of the long wear foundation to the non-long wear foundation on the mask, a split face design was used. 10 subjects were enrolled and acclimated for 15 minutes ±5 minutes to ambient temperatures and humidity. Facial photographs were taken with the ColorFace system (Newtone Inc., Princeton NJ) at baseline, 15 minutes post application, 2 hours (with mask on) and 4 hours (with mask on) post application. After15 minutes of post product application, ColorFace images were captured. Post images, 3 ply face masks were distributed to each subject. The subjects were instructed to leave the face masks on, through the 4-hour time point. Images were also captured at the 2 hour post application time point. At the end of the study, the masks were collected, without distorting or changing the appearance of the mask's obtained form and sent out for analysis. Images of each mask were acquired with a specific cross polarized acquisition system developed by Newtone Inc. Mask residue analysis was performed on the masks using an innovative algorithm (Newtone Inc.) to automatically detect and quantify the mask residue. Simultaneously, makeup coverage analysis was performed on the ColorFace images of the subjects using the UV modality.

A similar study was performed to establish each foundation's, long wear and non-long wear capabilities, without interference from the mask. 11 subjects were sequestered at the facility to establish the performance coverage of the makeup over time.

Results

Upon completion of the ColorFace analysis of the subjects' images, it was observed that there was 84.3% foundation coverage remaining for the long wear product after 4 hours of wear and 76.0% coverage of the non-long wear (figure 1). The UV modality ColorFace images also showed a visual decrease in the foundation coverage (figure 2 and figure 3).

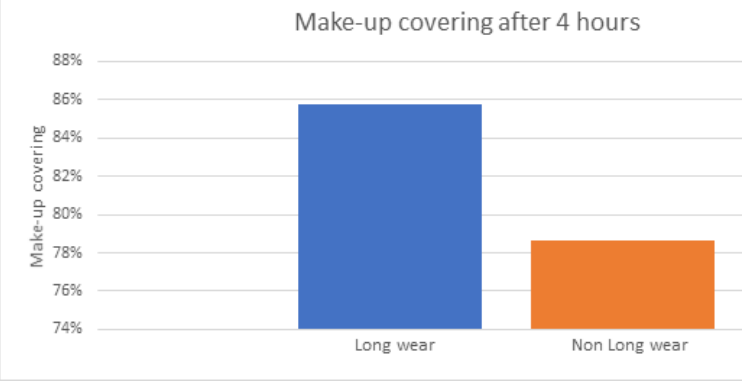

Figure 1: Foundation coverage over 2 and 4 hours per foundation type (non-long wear and long wear).

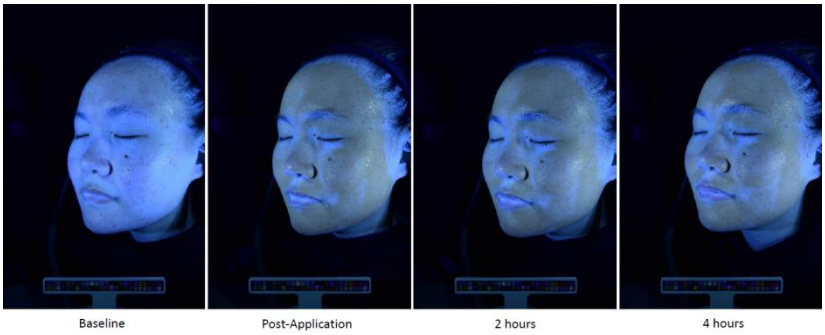

Figure 2: UV modality images of foundation at Baseline, post application, 2 hours and 4 hours (non-long wear).

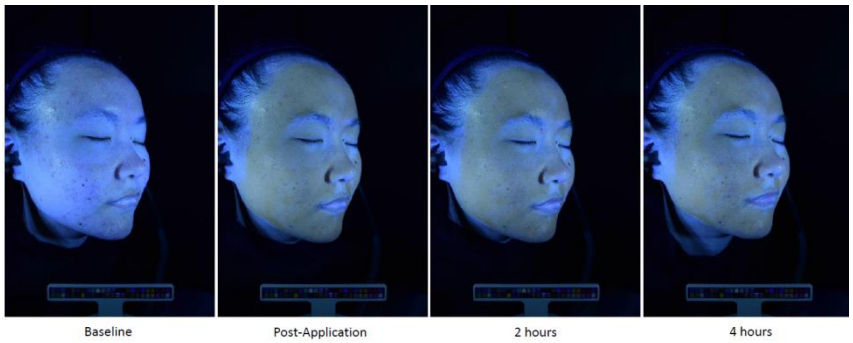

Figure 3: UV modality images of foundation at Baseline, post application, 2 hours and 4 hours (long wear).

This same procedure was conducted with the two foundations, long-wear and non-long wear (no masks), by itslef. It was established that there was no significant difference in coverage for either foundations, at

all timepoints when compared to each other. However, the coverage is better with the Long Wear foundation compared to the non-long wear foundation after 4 hours of product use.

The masks that were collected were sent for analysis to quantify the amount of residue that was left or transferred. The long wear foundation visually, did not present as much residue on the masks as compared to the non-long wear (figure 4). 8.2% of residue was quantified on the masks with non-long wear foundation after a four hour wear period and 5.7% of residue was quantified on the masks with long wear foundation after a four hour wear period. There was also significant makeup residue found on the mask for both foundation wear types after 4 hours of mask wearing (figure 5). Hence, a method for quantifying product residue transfer was established.

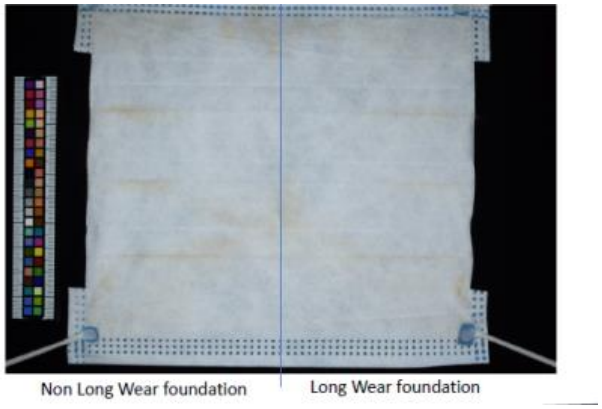

Figure 4: Mask after 4 hours of wear.

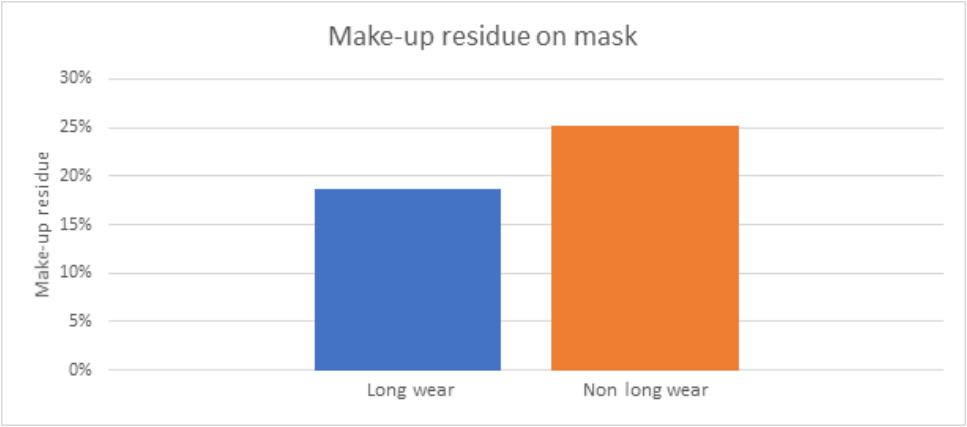

Figure 5: Residue present from non-long wear foundation after four hours of wear.

Conclusion

When looking at the coverage of the two foundations (long wear and non-long wear) after four hours of continuous wear (with masks), there was a signincant decrease in coverage between the long wear and the non-long wear foundations. However, the long wear foundation maintained a better coverage over time.

The coverage of the foundation will decrease as the wear time of the mask increases (figure 1). In addition, there was a substantial amount of residue that was transferred from the face onto the mask. There was a higher amount of residue transferred while using the non-long wear foundation.

When comparing the products by itself, without the masks, the long-wear foundation had better coverage at all time points. By developing a protocol to quantify the amount of color cosmetics transfer onto face

masks, we can successfully conduct clinical evaluations to determine the 'mask resistance' of makeup products. This will allow for the industry to make improvements to the products that can tolerate masks, both for the purpose of the pandemic and for fields that require the constant on/off use of masks.

References

N/A

Loviena Mascarenhas is currently the Director of Clinical Operations at Eurofins, CRL Cosmetics, Inc. (ECRL). Loviena has over a decade of clinical research experience in the cosmetic and personal care industry as a Principal Investigator. She has played an active role in designing customized and innovative protocols at ECRL. Loviena has supervised the conduct of successful clinical research studies for numerous Fortune 500 companies. Loviena stays current with the technological advancements in bioinstrumentation to provide cutting edge testing solutions to the testing industry. She prides herself on the power of positive thinking and creatively works to find solutions to any obstacle.

Evaluating the Environmental Impact of Natural and Synthetic Mica through Life Cycle Assessments

Amy Ethier, Ph.D., Sun Chemical

Introduction of research

In color cosmetics, raw material selection offers an opportunity to balance performance with economics, social and environmental impact. The inorganic ingredients of color cosmetics include fillers, functional materials, and effect pigments. These materials, which are generally minerals or derived minerals provide function, color and effect to a cosmetic product. Effect pigments are a class of ingredients that offer both color and effect through technologies that utilize low and high-refractive index substances.

Mica is a natural occurring mineral that is mined, processed and coated to create effect pigments in various colors for cosmetics and personal care products. Synthetic mica (Synthetic Fluorphlogopite) is a synthetic alternative to natural mica used similarly to natural mica to create effect pigments. Through innovative technologies, effect pigments manufactured with both natural and synthetic mica create a range of color and effect for cosmetics and personal care formulations.

Methodology

Life-cycle assessment is a methodology used to evaluate the environmental impacts resulting from the stages of a product. Life-cycle assessment is also referred to as Life-cycle Analysis, Cradle-to-grave analysis or Cradle-to-gate analysis (depending on the scope). The findings from a Life-cycle assessment allow for the responsible design of products, and eventual reduction in environmental impact.

LCA programs were evaluated for utility and applicability for the presented study. The business-specific tool, EEA6 was used, which provided a basic set of environmental impacts typically found to be most relevant. The assessment was completed by evaluating the (1) scope of analysis, (2) mass / energy use and flow including process inputs and outputs (3) completion of the assessment based on the normalized environmental factors and (4) interpretation of the results.[1] The scope was defined as the raw material input (cradle) to the point of delivery (gate). Use and disposal phases are not considered as no final product is considered. The eight impact categories for the life-cycle assessment of the production of 1000 ton of mica was evaluated for natural and synthetic mica flake.

Results

The overall environmental impact of natural mica was 6.5x less than synthetic mica. The most relevant impact categories following the EEA6 methodology are the Global Warming Potential, Fossil Resource Depletion and Acidification. The overall environmental impact of each impact category is shown in Figure 1 below.

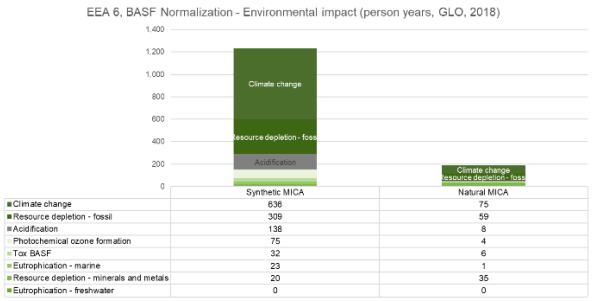

Figure 1. Total environmental impact of Synthetic mica (left) and Natural mica (right)

A significant contributor to the environmental impact of the synthetic mica production is the electricity usage. The electricity mix for U.S. and China can be noted in Figure 2. There is a notable difference between the electricity source mix including hard coal usage between the countries. Energy intensive processes involved with the manufacture of synthetic mica drive fossil resource depletion.

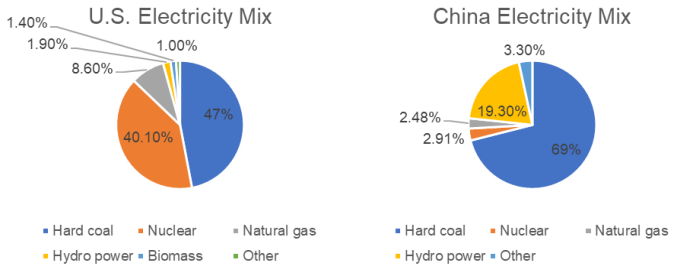

Figure 2. Electricity mix of U.S. (left) and China (right) used in study calculations

For these impact categories, the process that is driving the results is the mica particle size reduction. For the synthetic mica, this is captured in both the sizing down in wet and dry conditions. The electricity for the wet sizing process for natural mica is also a significant contributor to the most impact categories, although the electricity for wet sizing of natural mica is about 15% of the electricity for dry sizing of synthetic mica. For synthetic mica, the next biggest contributors for most of the impact categories are the Electricity for melting, the production of Potassium Hexafluoro-silicate acid and the transportation from China to the United States. The difference in energy mix would also contribute to differences in the global warming potential, fossil resource depletion and acidification.

Generation of waste plays a role in the overall sustainability of a process. Reduction in waste is a key element of the Green Chemistry Principles and is captured through efforts in achieving a circular economy. In a direct comparison of natural vs synthetic mica production, it becomes clear that the generation of waste and by-product formation is notably different. The relatively closed-loop system of natural mica production, namely using recycled process water, and return of non-mica ground composition to the earth is a perceivably less wasteful process than synthetic mica. The process for synthetic mica is generally more complex, and the resulting complexity of the synthetic route to production is captured in the results of the LCA and waste streams. The energy required to produce a coated effect pigment contributes significantly to the LCA values for such a pigment; although as indicated, the energy source is dependent on geographic manufacturing location.

Conclusions

Consumers are becoming increasingly aware of the role cosmetic manufacturers and suppliers have in responsibly sourcing and manufacturing finished cosmetics and their ingredients. Not all natural ingredients are sustainable, thus a systematic quantitative approach to ingredient lifecycle assessment becomes a means to calibrate a formulation through effective ingredient selection. In the presented study, the life cycle assessments of natural and synthetic mica have been reviewed. This assessment included an evaluation of the resources used during manufacture, waste streams, emissions and process efficiency.

References

[1] *Iyyanki V. Muralikrishna, Valli Manickam,* ***Environmental Management, 2017***

About the speaker

Dr. Amy Ethier is the Global Expert Services and Regulatory Manager for the Cosmetic Effect Pigment business at Sun Chemical, previously BASF. Prior to her current role, Amy was a Scientist in the BASF Pharma Solutions business. She joined BASF through the Leadership Development Program (LDP), and has held positions in Manufacturing, R&D and Technical Marketing. Amy holds a Ph.D. in Chemical & Biomolecular Engineering from Georgia Institute of Technology and a B.S. in Chemical Engineering from the University of Connecticut.

A new short palmitoylated peptide to trigger natural hair pigmentation.

Richard LEROUX, *PhD; Sederma.*

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Introduction of research

Hair length, colour, shine and appearance this influences the perception that others have of us, whether for good or bad. Greying hair is an inevitable and universal problem, it varies both in intensity and frequency according to geographical area and ethnic origin of the population [1]. Melanin produced by follicular melanocytes starts to decrease, and eventually stops completely. Then, hair dying is the most widely used solution although it can induce irritations and sensitizations or worse. Another solution is to stimulate melanin synthesis by melanocytes themselves in the hair and to improve activity and synthesis of the tyrosinase, a key enzyme of melanogenesis in the hair.

There are many similarities between the melanocytes found in the epidermis and those that produce hair colour but there are also several differences. In hair follicles, the melanocyte unit consists of 1 melanocyte surrounded by 5 keratinocytes in the hair bulb but this ratio increases to 1:1 near the dermal papilla, whereas in the epidermis the ratio is 1:36-40 [2]. In both systems, melanins are produced then distributed to the surrounding keratinocytes through dendrites in small vesicles called melanosomes. In the epidermis, melanin is produced continuously throughout our lives and is stimulated by sun exposure. Production in the follicles is cyclical and only occurring in the hair bulb during the anagen phase. Once distributed, follicular melanosomes undergo little or no digestion and dilution, as observed in epidermal keratinocytes. As a result, pigmentation of the hair, conversely to the skin, remains very dense. Furthermore, melanocytes in the hair bulb are more sensitive to the effects of ageing and oxidative stress than melanocytes in the skin [1].

The process of greying can also be curbed by providing antioxidant protection for melanocytes. The intense activity of melanocytes throughout the hair growth cycle (3 to 5 years), produces harmful Reactive Oxygen Species (ROS), like hydrogen peroxide. These radicals damage cells and affect pigment function over time.

The objective of this study was to develop an original methodology for identifying and evaluating efficiency of several molecules on melanin synthesis by stimulation of the pigmentation pathways, in particular, by boosting certain intermediates such as MITF, TYRP1 and CREB, which are highly involved in this process. It is also essential to promote communication between follicular melanocytes and the keratinocytes that produce hair, through the dendrites. Finally reducing stress impact by stimulating catalase and reduced glutathione that helps control these radicals could be of interest.

Methodology

48 Lipo-peptides, from 2 to 6 amino acids, were produced by solid phase synthesis with non-CMR solvents. Pure peptides were obtained as acetate salt; their purity was assessed by MS/HPLC.

Melanin production and tyrosinase activity of these peptides were evaluated using first, B16 cells then, human melanocytes (HM) on best candidates. Genes expressions were quantified by qRT-PCR method and immunohistology was performed on isolated human follicles. Dendricity and phagocytosis were evaluated by image analysis with fluorescent stains. These results allowed us to identify a palmitoyl prolyl proline (P3) as the best candidate.

Finally, four independent clinical evaluations with a lotion containing P3 were conducted at four different European sites involving a total of 84 volunteers. The average age of the entire panel of volunteers chosen was 42 years old. The tests were performed on different application sites, using various phototypes and methods. A preliminary study performed on 30 volunteers for 3 months did not show significant reduction in greying of the placebo.

Results

In a preliminary study with B16 cells, we observed and assayed by spectrophotometry, an increase of pigmentation related to the production and storage of melanin (+24 to +79 %, respectively for P3 at 5ppm and 15ppm, $p<0.01$ vs control). In parallel, assays showed that P3, increased the activity of tyrosinase, (+16 % to +39 %, $p<0.01$ vs control, respectively for P3 at 5ppm and 15ppm).

Then, a dose-dependent increase of melanin production was observed into moderately pigmented HM (+48, +123 and +223 %, respectively for 5, 10 and 15ppm, whereas melanin of lightly pigmented HM was increased by +81 to +113%, respectively for 10 and 15ppm; all these results being significant ($p<0.01$ vs control). Similar results were obtained for tyrosinase whose activity was improved at 10ppm by 27% for moderately pigmented cells and by 74% for lightly pigmented HM (all $p<0.01$ vs control). These results indicated that P3 increases melanogenesis in human melanocytes through a tyrosinase activity stimulation.

P3 also positively triggered the transfer of melanin by increasing the dendrite length of HM (+20, +33 and +57% at 5, 10 and 15ppm respectively, all $p<0.01$ vs control), so was the phagocytosis which was increased by 283%; $p<0.01$ vs control, at 10ppm.

A study with known modulators of melanogenesis pathways (H89, PD98059, SB203580, LY294002) identified that P3 acts through the PKA/CREB/MITF pathways. It was observed then, that P3 upregulated MITF, TYRP1 and CREB genes expressions at 10ppm by +39, +42 and +46 % respectively ($p<0.01$ vs control).

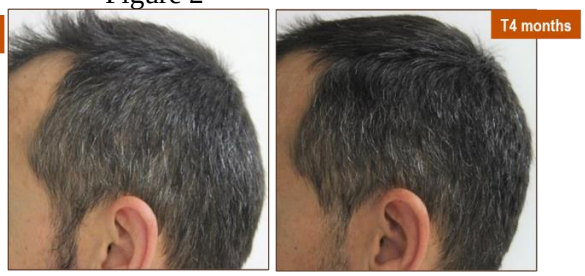
P3 reduced HM ROS production by 25% ($p<0.01$, 10ppm) whereas catalase activity and reduced-glutathione jumped up to 37 and 38%; moreover, Bcl2 gene expression was upregulated by +101 %. All these results were significant ($p<0.01$ vs control, 12.5ppm) underlining that P3 stimulates antioxidant defences.

Immunohistology and image analyses were performed on follicles (female donor, dark blond; 51 years old). Application of P3 at 10ppm demonstrated an increase by 11.7 time; $p<0.01$, of the melanin quantity versus control. In parallel, proteins MITF and MC1R were also increased, substantiating previously results.

Four independent clinical evaluations were performed on 84 volunteers using daily a lotion containing 90ppm of P3. Modifications were assessed using clinical observations, picture analyses to quantify the grey intensity and a TrichoScan® to measure the improvement on the number of pigmented hair. A positive impact of the lotion with P3 was demonstrated on more than 70% of the volunteers. A 32% reduction of the white hair on the nape was observed and of 37% on the temple (Figure 1), in addition, a reduction of 31% was observed on the vertex (all $p<0.01$ vs T0). The TrichoScan® measured a reduction by 27% of pigmented hair after 4 months of application ($p<0.05$ vs T0).

Figure 1

Figure 2



Conclusion

Screenings allowed us to identify the peptide P3 that stimulates melanin production into melanocytes and follicles through upregulation of proteins MITF and TYRP1, and of tyrosinase activity. P3 also protects hair cells and follicle from oxidative stress through catalase and glutathione pathway and by reduction of ROS production. Four independent evaluations on volunteers confirmed the preclinical results. P3 represents an alternative to hair dye for recovering natural hair colour and reducing hair greying.

References

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2. Xiao L., Zhang R-Z. and Zhu W-Y., *Micron.*, **119**, 109–116 (*2019*).

About the speaker

Richard Leroux is the Scientific and Technology Manager for SEDERMA, in charge of the promotion of SEDERMA's scientific and technology capabilities and for open innovation projects with the commercial partners. Richard has a PhD in organic chemistry from University of Rouen (France) on synthesis of biologically active peptides.

During the last 24 years, Richard has been part of the R&D leading team to develop the new generation of active ingredients capitalizing on his expertise in peptide chemistry and his experience to design biomimetic peptides as well as molecular structures inspired by nature. Nowadays, Richard is also involved in the development of botanical actives, biotechnology and plant cell culture.