

# Unique combination of saccharides and symrise mushroom extract for efficient heat and humidity protection in hair fibers

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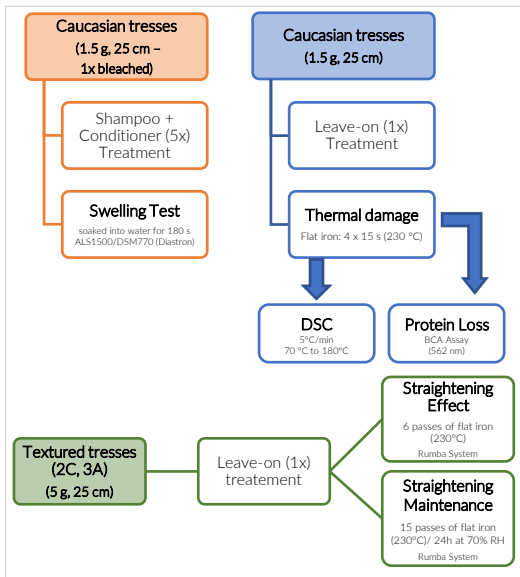
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## Introduction:

The use of heat-styling tools is one of the most common steps in hair care routines. The use of these devices can cause severe injury to the hair fibers, since thermal damage is a consequence of the association of high temperatures, long direct contact, and high frequency of heat source tools usage [1]. The most used ones, flat and curling irons, can reach temperatures up to 230°C, close to the keratin denaturation temperature (~240°C), meaning that the frequent exposition of the fibers to these processes may compromise hair's mechanical properties, increase its porosity, disbalance the water absorption, and affect some of its visual aspects, i.e. softness, alignment, frizz, and others. [2,3].

These damages can be sensory perceived and are usually correlated with the use of heat-styling tools by consumers. Among interviewed consumers from China, Germany, USA, and Brazil, 84% somewhat agree or strongly agree that flat iron and hair dryer damage the hair, and almost 20% of them perceived physical treatments (e.g., hot iron, blow dryer) as causes for their hair issues. Another interesting data was observed in Brazil, where almost 30% of the consumers are often concerned about excess of frizz/ electrostatic as well as rebellious/ difficult to comb/ flyways effects, characteristics that are often observed in hair oftentimes styled by heat tools [4]. Moreover, the hair styling provided by these devices is based on the rearrangement of hydrogen bonds present in the hair structure, making it vulnerable to high humidity conditions.

## Materials & Methods:



## Results & Discussion:

### Humidity Protection: Swelling Test

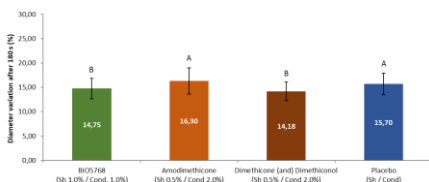


Fig. 1. Swelling Test results. Treated tresses with shampoo and conditioner containing 1.0% of BIO5768 presented lower diameter variation after 180 s of water immersion than placebo-treated ones. Same letters means  $P > 0.05$ . Different letters means  $P < 0.05$ . Calculated using one-way ANOVA, followed by Fisher's Least Significant Difference (LSD) test.

## References:

- [1] Gasparin, RM; Thomaz, FM; Lourenço, CB. Evaluation of thermal damage resulting from different protocols. In: 10th International Conference on Applied Hair Science, 2022. Online, Poster presentation.
- [2] Robbins, C.R. (2012) Chemical and physical behavior of human hair, Springer-Verlag, New York, 5th edition
- [3] Lee Y, Kim YD, Hyun HJ, Pi LQ, Jin X, Lee WS. Hair shaft damage from heat and drying time of hair dryer. Ann Dermatol. 2011; 23(4):455-462.
- [4] Symrise CICS database 2021 in 5 countries (US, Brazil, France, Germany, China). CICS, Symrise proprietary tool. Formed by 2500 respondents/country, their profile being representative in terms of gender, age and regions of the country population.

## Results & Discussion:

### Thermal protection: Protein Loss and Differential Scanning Calorimetry (DSC)

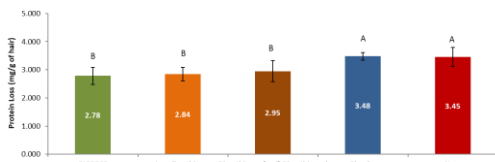


Fig. 2. Protein loss assay results. Treated tresses with leave-in containing 2.0% BIO5768 presented higher thermal protection than placebo-treated ones, and the same protection level of the evaluated silicones benchmarks. Same letters means  $P > 0.05$ . Different letters means  $P < 0.05$ . Calculated using one-way ANOVA, followed by Fisher's Least Significant Difference (LSD) test.

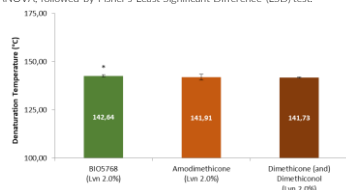


Fig. 3. Differential Scanning Calorimetry (DSC) assay results. Treated tresses with leave on containing BIO5768 at 2.0% presented higher thermal than tresses treated with leave-on at 2.0% of dimethicone and dimethiconol, and the same level of protection as the ones treated with 2.0% of amomodimethicone. \* $P < 0.05$  versus dimethicone and dimethiconol, Student's T-test.

### Styling: Straightening Effect and Straightening Maintenance

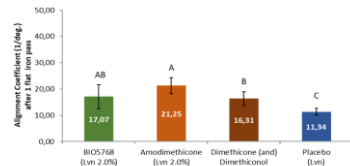


Fig. 4. Straightening effect assessment results. Treated tresses with leave-in containing BIO5768 at 2.0% presented similar alignment coefficients of the silicones benchmarks evaluated after one flat iron (230 °C) pass. Same letters means  $p > 0.05$ . Different letters means  $P < 0.05$ . Calculated using one-way ANOVA, followed by Fisher's Least Significant Difference (LSD) test.

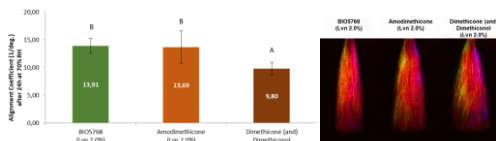


Fig. 5. Straightening maintenance assessment results. Treated tresses with leave-in containing 2.0% of BIO5768 presented similar alignment coefficients to the ones treated with 2.0% of amomodimethicone. Same letters means  $P > 0.05$ . Different letters means  $P < 0.05$ . Calculated using one-way ANOVA, followed by Fisher's Least Significant Difference (LSD) test.

## Conclusions:

Due to BIO5768 unique composition combining different molecular weights saccharides and mushroom extract, it works as a holistic ingredient that forms a substantive film in the surface of hair fibers, providing high thermal protection and acting in the main factors that can cause thermal damage. BIO5768 also protects the hair from humidity and prevents excessive water uptake, provides styling benefits such as more aligned hair fibers, and maintenance of desired styling shape over time (up to 24h) under high humidity environment.

## Acknowledgements:

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