

A comparative investigation of the protective effects of natural oils vs. silicones on African and Caucasian hair types

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Hair is constantly exposed to physical stress due to washing and combing, as well as chemical stress, such as oxidative colouring, to achieve desired appearance set by trends and personal preferences. As a consequence of these activities, hair develops undesirable sensory attributes. On the cellular level, the cuticle becomes lifted, fractured and gradually completely degrades, leaving cortex cells exposed and weakened mechanically.

The aim of this study was to determine the protective effects of two natural oils (Crambe Abyssinica (Anyssinian) seed oil and Orbignya Oleifera (Babacu) seed oil), compared to two silicones (Bis-Aminopropyl Dimethicone and Silicone Quaternium-22). *Ex vivo* assessments were performed on virgin Caucasian and African hair tresses. The natural oils were chosen according to their triglyceride structures and molecular weight; the silicones were selected for this study based on their affinity to hair and low thermal conductivity.

The following active treatments were applied to tresses: a) the active was applied either neat (if natural oil) or diluted to 3% in cyclomethicone (if silicone) and left on tress for 10 minutes; b) each tress was then subjected to a 'grooming cycle', which consisted of 3 discrete repetitive sequences of washing with SLES (20%), blow drying and combing, after which it was exposed to heat damage from a hair straightener, pre-heated to 215°C. A total of three active treatments were applied to a tress. Finally, all tresses were subjected to UV radiation. Tresses subjected to the above grooming and UV damage without the prior application of any active were used as a control.

The following tests were carried out to assess the protective effects of treatments: shear stress required to extend wet fibre to 10% and wet tress combability (both carried out on TA.XT Plus, Stable Micro Systems, UK) and colour (CM-2600D, Konica Minolta, Japan). The data gathered was statistically analysed using SPSS software.

A statistically significant difference in the tensile stress required to extend wet Caucasian fibres by 10% was observed between all active treatments and control, except for Bis-Aminopropyl Dimethicone. African hair treated with natural oils did not show significant difference in the tensile stress experiments in comparison to silicones. Combing force of wet Caucasian hair pre-treated with *Crambe Abyssinica* (Anyssinian) seed oil was 95% lower than control, in line with the effect of Silicone Quaternium-22 (84% lower), but in contrast to Bis-Aminopropyl Dimethicone, where an increase of 109% was observed. The colour of Caucasian hair was affected by irradiation, but not enough to be statistically significant.

The results from this study are currently undergoing a comprehensive statistical analysis. There is an indication that natural oils perform better on African hair, while silicones have stronger effect on Caucasian hair. The statistical results of all tested effects will be provided in the poster.