Long-lasting biosourced wear engines based on PolyHydroxyalkanoates for high-performance cosmetic deposit

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Abstract

All day wear is a key expectation of makeup consumers, with only petrochemical solutions available today on the market, especially silicone-based ingredients.
In cosmetic products, the wear performance is typically achieved through a film-forming agent highly concentrated in the deposit. This "performance engine" ensures long lastingness of the deposit by providing both mechanical resistance (resistance to rubbing, transfer) through a good balance between adhesion on skin and cohesion within the film, and chemical resistance (resistance to water, sebum for the face, olive oil for the lips).

In a context of growing need for sustainability (1), it is essential to identify new, entirely biosourced wear engines to develop innovative makeup products offering both long-lasting and comfort throughout the day, capable of replacing petrochemical based products.

To achieve this objective, the polyhydroxyalkanoate family was investigated (2) and a "performance engine" was built around a naturally biosynthesized polyester belonging to this family: poly(3-HydroxyNonanoate), also known as PHn. It appeared as the first green lipophilic polymer exhibiting a high level of cohesion within the film, thus demonstrating strong film-forming properties and high resistance to both water and oil. With the help of automated formulation and performance evaluation platforms, experimental plans were designed and performed to break through PHn's lack of adhesion while maintaining its high cohesion. Winning combinations with natural origin ingredients were identified, achieving in vivo performance equivalent to petrochemical benchmarks which unlocks a new path for tomorrow's high performing makeup products.

(1) L'Oreal. L'Oréal for the Future. Our Commitments for 2030. Available at: https://www.loreal.com/en/nordics/oreal-for-the-future/ (accessed 06/01/25)

(2) Portal, J., Garcon, R. Cosmetic composition comprising a polyhydroxyalkanoate in an oily medium, FR patent 1873652 assigned to L'OREAL (2020)

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