



Evaluating environmental impact via life cycle assessment for more informed ingredient selection

Croda Beauty

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PRODUCT/SERVICE BACKGROUND INFORMATION

Life cycle assessment (LCA) is a method of quantifying the environmental impacts of products, from raw material extraction to leaving the producer's gate (cradle-to-gate) or to end-of-life (cradle-to-grave). It offers deeper insight into the environmental impacts of a study system, beyond what a single indicator can provide.

In the context of personal care, LCA enables data-driven decisions for ingredient selection and formulation to reduce the environmental impact of consumer products.

Sulfate-free shampoos comprise 25% of global shampoo launches (last five years) and have grown 21% since 2020 (Mintel), making it important to understand their impact on ecosystems. LCA supports this review.

WHAT IS THE COMPANY INTRODUCING TO THE MARKET/INDUSTRY?

We present a comparative cradle-to-grave LCA of two anionic surfactants used in shampoo formulations.

The study aimed to compare the environmental impact of a Croda Beauty ingredient, Crodasinic™ LS30, with a conventional alternative, applying ISO 14040/44 standards and Environmental Footprint 3.0 methodology to assess impacts across 16 environmental indicators using a 4-stage process. Results were analysed from three perspectives: ingredient impact, shampoo formulation, and consumer use.

The analysis revealed statistically significant differences in the ingredients' environmental impact despite similar functional performance, with additional insights into formulation and consumer use phases.

HOW WILL THIS NEW PRODUCT/SERVICE IMPACT THE INDUSTRY (BENEFITS)?

The study demonstrates the value of LCA in evaluating environmental performance across ingredients with similar functional profiles, revealing hotspots that may not have surfaced in other analyses.

Our study found the most significant environmental hotspots were associated with the consumer-use phase; however, ingredient-level analysis identified statistically significant differences in the impacts between the two anionic surfactants.

This insight enables opportunities to address hotspots and enhance the sustainability of the product system. With the support of this robust data, manufacturers in the personal care industry can better embed sustainability into their product innovation.