Biosurfactants – Clean and sustainable

Submission from Evonik

The innovation.

Surface active agents (surfactants) are crucial for our daily lives and health because they allow us to clean our clothes, dishes, hands, bodies, and homes. In response to shifting consumer demand towards sustainable products, this fast-growing $40 billion global market for surfactants is now undergoing a rapid transition towards green surfactants that are fully biodegradable, biobased, minimize CO2 emissions and are not harmful to aquatic or other natural organisms.

Biosurfactants such as rhamnolipids are naturally occurring molecules, which can replace conventional surfactants in many applications, for example, washing dishes, cleaning textiles, and personal care. Evonik has developed a proprietary technology to produce rhamnolipids from sugar using an efficient biotechnological process. First, rhamnolipids are produced from sugar by fermentation with a dedicated and safe microorganism. Then, this sustainable and fully biobased product is purified in a specially tailored downstream process. This technology provides a platform for sustainable biosurfactants with tailor-made properties, exceptional biodegradability, and low ecological toxicity.

Evonik is the first company to manufacture rhamnolipids in commercial quantities, thus meeting the growing demand for safe and sustainable surfactants with superior performance properties. In January 2024, the first product was produced at Evonik's industrial-scale facility for sustainable biosurfactants in Slovenská Ľupča (Slovakia). The official opening of the plant took place on May 29th, 2024. This is the latest milestone in sustainability-driven biosolutions to respond to the high demand for biobased and biodegradable rhamnolipids for cleaning and personal care.

The benefits.

In contrast to other (partially) bio-based surfactants, this biogenic, carbon-based process does not require petrochemical feedstocks or tropical oils. Rhamnolipids are fully biodegradable and offer a sustainable alternative to conventional surfactants due to biobased raw materials and their low toxicological and ecotoxicological profile. Although they are mild, biosurfactants can solubilize oils and remove odours from the skin. Their exceptional foam-forming properties and mildness make them ideal for use in household cleaners and personal care products such as shampoos and micellar water.

Biosurfactants are also effective in extreme conditions, including at high pH and elevated temperatures. This allows their critical micelle concentration (CMC) to form with a lower amount of added surfactant, demonstrating their superior efficiency compared with chemical surfactants. They also offer superior performance in industrial applications such as coatings, mining, as well as oil recovery.

Additional materials:

Mueller, Jakob J., and Hans H. Wenk. "Biosurfactants–Nature's Solution for Today's Cleaning Challenges." Chimia 75.9 (2021): 752-752.

Biosurfactants by Evonik - Entering a new era of surfactants

A new dimension in sustainable cleansing - Glycolipids by Evonik