

AOCS annual meeting and expo, 2 juli 2020

## Microbial Biosurfactants: Is Mainstream on the Horizon?

Sophie Roelants and Wim Soetaert  
Ghent University and Bio Base Europe Pilot Plant

Microbial biosurfactants have been holding the promise as environmentally friendly alternatives for petrochemical derived surfactants for the last decade. Indeed, across the market (large) companies are investing in these technologies and microbial biosurfactants are already applied in quite some consumer products today. The remaining hurdles for these technologies to really lift off can be summarized as high costs in comparison to the market references and a limited variety in molecular structures to satisfy the plethora of sought for functionalities. Moreover, most of the technologies are still in their infancy, characterized by suboptimal processes often resulting in batch to batch variation, a lack of knowledge and a of scale up evidence. A last issue is the fact that the use of so-called first-generation renewable substrates, such as sugar and vegetable oil, as substrates negatively impacts the LCA for microbial biosurfactants.

At BBEPP and InBio.be we focus on all the above-mentioned shortcomings and aim to increase the microbial biosurfactant market segment in the coming years. We apply an integrated approach where microbial strain engineering, process (fermentation and purification) development and -optimization, scale up and application testing are tightly linked and interconnected. We recently succeeded in the development of a battery of *Starmerella bombicola* yeast strains producing a library of over 20 (new-to-nature) glycolipid biosurfactants and developed sustainable and scalable (continuous) fermentation and purification processes for these biosurfactants. The biosurfactants were screened in high throughput for a range of relevant properties for the industry, such as foaming, rheology, surface tension (and CMC), emulsification, but also biological properties such as anti-microbial and -viral properties. Moreover, efforts were done to develop the bioprocesses starting from waste- and side streams instead of 1G substrates, thus positively impacting the environmental impact of the new microbial biosurfactants.

The combination of the described efforts is expected to result in a commercial breakthrough of microbial biosurfactant in the next ten years.