

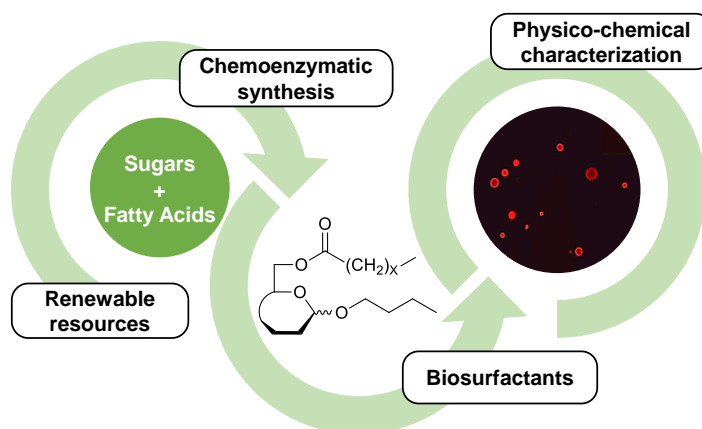
# Chemoenzymatic synthesis of bio-based surfactants from renewable resources

Giovanna Speranza

Department of Chemistry, University of Milan, via C. Golgi 19, 20133 Milan, Italy

Environmental and health concerns about the effects of conventional surfactants have increased the demand for ecofriendly alternatives that possess good biodegradability and low toxicity, along with the desired functional performance. Sugar fatty acid esters (SFAEs) are non-ionic biosurfactants characterized by excellent surface and interfacial tension reduction capability, extensively used as emulsifiers in cosmetic, food and pharmaceutical sectors. They are tasteless and odorless and, moreover, can be produced from renewable resources. The current industrial synthesis of SFAEs still relies on harsh reaction conditions resulting in high energy consumption and complex mixtures of products. Thus, more sustainable and selective processes towards these compounds are highly desirable.<sup>[1]</sup>

A library of SFAEs was prepared by lipase-catalyzed esterification of isomeric mixtures of alkyl glycosides (namely D-glucosides and D-galactosides) with molten fatty acids (lauric, palmitic and stearic acid), using Novozym® 435 as a biocatalyst in an easily scalable solvent-free system. The physico-chemical properties of the synthesized tensides were finely investigated.<sup>[2]</sup>



This work was financially supported by Cariplo Foundation (Italy) (call: "Circular Economy for a sustainable future 2020", project BioSurf, ID 2020-1094, <https://www.biosurfproject.it/>).

## References

- [1] a) R. Hausmann, M. Henkel, Eds. *Biosurfactants for the Biobased Economy*, Springer Nature Switzerland AG, Cham, (2022); b) J.W. Agger, B. Zeuner, *Curr. Opin. Biotechnol.* **78** (2022) 102842.
- [2] a) S. Sangiorgio *et al.*, *Colloids Interface Sci. Commun.* **48** (2022) 100630; b) R. Semproli *et al.*, *ChemPlusChem* **88** (2023) e202200331.