

N°1291 / PC

TOPIC(s) : Industrial biocatalysis

Enzymatic modifications of sophorolipids: From biorefineries to valorization.

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PURPOSE OF THE ABSTRACT

Sophorolipids (SLs) are a broadly known family of biosurfactants, composed of a sophorose head glycosidically bonded to the carbon of the long hydroxyl fatty acid [1]. Sophorolipids are typically produced by non-pathogenic yeasts, with main microorganism used for cultivation being *Candida bombicola*. Sophorolipids obtained in this manner are a mixture of structurally related molecules [2]. Different structures of sophorolipid molecules result in differences in their biological and physicochemical properties and, consequently, in several fields of application [3]. Sophorolipid molecules obtained by fermentation have industrial applications on their own, but some structural variations are desirable to further broaden their scope [4]. Enzymatic modifications offer the possibility to synthesize new derivatives by inserting other functional groups, which cannot be obtained via the fermentation process. Exposure of sophorolipids to enzymes could provide means towards the defined modification of sophorolipids [5]. Many examples are given on alteration of the fatty acid carboxylic end and the sophorose acetylation pattern, although examples of modifications of the sugar part of the sophorolipid are limited [6].

In this work, the main promising working lines for sophorolipid valorization are described, to establish a rational strategy to afford novel sophorolipid compounds with different applications and properties. Moreover, strategies for the synthetic improvement of sophorolipid derivatives, e.g., biorefinery-like cascading, use of biobased solvents, and reaction optimization using mathematical modelling, will be discussed.

Acknowledgement: This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000560.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

sophorolipids | biorefineries | reaction optimization | mathematical modeling

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