Biotechnological conversion of renewable resources for cosmetic applications targeting biosurfactants and bioactive ingredients

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Sophorolipid biosurfactants are produced by fermentation on industrial scale focusing on cleaning and detergent applications. Structurally varied sophorolipids were produced by feeding fatty acids, fatty alcohols or mixed lipids to *S. bombicola* and *C. kuoi*. Open-chain sophorolipids from *C. kuoi* and alkaline treated anionic sophorolipids exhibited good foaming potential, while non-ionic lactonic sophorolipids had the lowest surface tensions. Upon feeding of fatty alcohols, both strains formed novel very-long chain non-ionic sophorolipids. In contrast to existing products these long chain sophorolipids are more hydrophobic and exhibit emulsification behavior. Therefore these new products have the potential to broaden the application range of sophorolipids in future, e.g. as novel emulsifiers for cosmetics.

Glycosylation of biologically active natural products like catechols can increase stability and water solubility making them commercially attractive for the cosmetic and pharmaceutical industry. In order to synthesize glucosides in a sustainable and efficient way with the cost efficient donor substrate sucrose, glucansucrases were screened from a library of lactic acid bacteria. Caffeic acid and structural analogues were successfully glucosylated by several newly identified glucansucrases. The strong antioxidant NDGA, a symmetrical hydrophobic bicatechol, was glucosylated by a few biocatalysts. Upon reaction optimization with statistical design methods the conversion of NDGA could be increased to > 90%. The glucosylated products exhibited increased storage stability and water solubility and additionally retained their biological activity in cell-based assays.