Production of Glycolipid PEFAs from Yeasts

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Technology description

Glycolipids such as sophorolipids, mannosyl erythritol lipids, cellobiose lipids and polyol esters of fatty acids (PEFAs) are environmentally friendly and renewable biosurfactants produced by yeast and used in detergents and other consumer and industrial products. PEFAs are the least understood group of yeast derived biosurfactants and consist of amphiphilic molecules comprising a sugar alcohol, such as but not limited to, D-mannitol and D-arabitol esterified to a (R)-3-hydroxy fatty acid through the carboxyl end, with varying number of acetylations. Although little research on the topic exists, there is no previous research that suggests there is a method suitable for commercialization.
Researchers at the University of California, Davis have discovered a novel yeast species that is capable of synthesizing and secreting PEFAs when grown on sugar alone, rather than the typical method for biosurfactants production based on feeding a combination of sugar and oil. This allows for a solvent free, more economic harvesting and purification of the final product. This invention overcomes the three major obstacles of current production methods: the expense of harvesting the cells from the media, lysing the cells, and extracting the oil using organic solvents. In using the yeast strains grown under a nutrient limited media, PEFAs were optimized to a concentration of 33g/L - a much higher concentration than the 2g/L that has been achieved using other strains. This higher concentration yield can be used to achieve more efficient and cheaper products of PEFAs for industrial uses.
Method of using basidiomycetous yeasts to convert carbohydrates to glycolipid biosurfactants

Related Technologies
Production of Glycolipid Biosurfactants from Yeasts

Additional Technologies by these Inventors
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Application area

Surfactants acting as a detergent, emulsifier or dispersant

Advantages

Secretion of extracellular glycolipids allows recovery without lysing cells
Harvesting the glycolipids does not require the use of organic solvents
Cheaper and more environmentally friendly
Greater production yields
Synthesis without a hydrophobic substrate

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