

Recovery and purification of mannosylerythritol lipids (MELs) using aqueous two-phase extraction

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Introduction and background



Mannosylerythritol lipids: A class of glycolipid biosurfactants composed of a hydrophilic mannosylerythritol head group and a

Results

- ATPE system selection: 1-propanol/sulphate system had highest recovery of 83,8%
- MELs preferentially partitioned into the top alcohol-rich phase or settled at the interface



fatty acid tail with excellent interfacial and biochemical properties

-Structure similar to Ceramides-a vital component of the skin barrier

-highly valued in cosmetics for their moisturizing and repair properties, as well as in pharmaceuticals for advanced formulations.

Producing organisms: Moesziomyces sp, Ustilago sp.

Substrates: Hydrophobic e.g. soybean oil-High fermentation yields (165g/L), Low product purity, hydrophilic e.g. sucrose, lower fermentation

Downstream processing Technique : Solvent extraction, foam fractionation, chromatography

Challenges: large volumes of organic solvents required, low recoveries, environmental impact and biocompatibility Project Aim: To develop a recovery process for MELs by investigating their partitioning behavior in aqueous two phase systems • Effect of pH and temperature on recovery of MEL in 1-Propanol/salt ATPS:





Methodology

ATPS Selection

12 systems (3 alcohols-ethanol, 1-propanol and 2propanol + 4 sodium salts-phosphate, sulphate, tartrate, and citrate)



MEL partitioning behaviour studies

-Factors: Temperature, pH, Salt concentration -Partitioning of Cellobiose lipids (co-produced with Mels by *U.maydis*), and Oleic acid (model free fatty acid)



Conclusion



Polymer/Salt ATPS for in-situ extraction -Grow microorganisms under high-salt conditions -MEL partitioning in polymer/salt systems -Microbial growth under ATPS conditions

- 1-Propanol/sulfate ATPS selectively recovers MELs from fermentation broth.
- Ethanol/tartrate ATPS is effective for selective CBL recovery.
- PEG-salt systems show low MEL recovery, with PEG 4000/phosphate performing best.

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