# Substrate And Process Engineering For Biocatalytic Synthesis And Facile Purification Of Human Milk Oligosaccharides (HMOs)

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

biocatalysis,

carbohydrate,

chemoenzymatic

synthesis, glycosylation,

human milk

oligosaccharides (HMOs)

### CATEGORIZED AS

- **Biotechnology**
  - Health
  - Other

### RELATED CASES

2022-559-0

## ABSTRACT

Researchers at the University of California, Davis have developed an innovative method for efficient, high-yield production and easy purification of Human Milk Oligosaccharides (HMOs) using a Multistep One-Pot Multienzyme (MSOPME) process.

## FULL DESCRIPTION

Researchers at the University of California Davis have developed a process that couples substrate and process engineering for the synthesis and purification of structurally defined HMOs. It employs a glycosyltransferase acceptor substrate-tagging strategy, where the carboxybenzyl (CBz) tag simplifies the purification process via the C-18 column and can be easily removed post-purification. This MSOPME process enables production of complex targets without intermediate oligosaccharides' isolation, with a single C18-cartridge purification process of the final product.

## APPLICATIONS

- Production of key ingredients in products aimed at improving human health.
- Creation of prebiotics and bacteriostatic agents.
- Development of nutrients for brain development.
- Production of potential nutraceuticals and therapeutics.
- Supplement for infant formulas.

## FEATURES/BENEFITS

- Efficient synthesis of complex HMOs without the need for intermediate oligosaccharides purification.
- Facilitated HMO product purification using a single C18 cartridge/column through the use of a CBz tag.
- Easy removal of CBz tag to form desired HMOs with a free reducing end.
- Ability to synthesize structurally defined HMOs in preparative and gram scales.
- Environmentally friendly enzymatic production method.
- Potential to be readily adapted for automation.
- Solves limited access to structurally defined HMOs in sufficient quantities.
- Addresses need for intermediate steps in the synthesis and purification of HMOs.
- Overcomes challenges associated with large-scale production of HMOs.

## PATENT STATUS

| Country | Type | Number | Dated | Case |
|---|---|---|---|---|
| Patent Cooperation Treaty | Reference for National Filings | WO 2023/141513 | 07/27/2023 | 2022-559 |

Patent Pending

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Purification of Glycosphingosines and Glycosphingolipids
- A Photobacterium Sp. Alpha2-6-Sialytransferase 9Psp2.6St) A366g Mutant With Increased Expression Level And Improved Activity In Sialylating Tn Antigen

- Synthesis of Capsular Polysaccharides
- Legionaminic Acid Glycosyltransferases for Chemoenzymatic Synthesis of Glycans and Glycoconjugates
- Using Escherichia coli to Produce Human Milk Oligosaccharide Lactodifucotetraose
- 4-N-Derivatized Sialic Acids and Related Sialosides
- O-Acetyl Glycosphingosines and Gangliosides, as well as Their N-Acetyl Analogs
- Stable N-acetylated analogs of Sialic Acids and Sialosides
- Alpha1–2-Fucosyltransferase for Enzymatic Synthesis of Alpha1–2-linked Fucosylated Glycans
- Engineering Pasteurella Multocida Heparosan Synthase 2 (Pmhs2) For Efficient Synthesis Of Heparosan Heparin And Heparan Sulfate Oligosaccharides
- One-Pot Multienzyme Synthesis of Sialidase Reagents, Probes and Inhibitors
- Novel Methods For Chemical Synthesis Of Lactosyl Sphingosines, Glucosylsphingosines, Galactosylsphingosines, And 3-O-Sulfogalactosylsphingosines

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