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

Tech ID: 33436 / UC Case 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

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INVENTORS

▶ Bai, Yuanyuan
▶ Chen, Xi
▶ Yu, Hai

RELATED CASES

2022-559-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Purification of 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
Stable N-acetylated analogs of Sialic Acids and Sialosides
Alpha1–2-Fucosyltransferase for Enzymatic Synthesis of Alpha1–2-linked Fucosylated Glycans
One-Pot Multienzyme Synthesis of Sialidase Reagents, Probes and Inhibitors