

Using Escherichia coli to Produce Human Milk Oligosaccharide Lactodifucotetraose

Tech ID: 32384 / UC Case 2021-606-0

ABSTRACT

Researchers at the University of California, Davis have developed a method for producing human milk oligosaccharide lactodifucotetraose (LDFT) using E. coli.

FULL DESCRIPTION

Mother's milk contains various oligosaccharides, which offer diverse health benefits to infants. Many of these oligosaccharides are not present in most manufactured infant formula products sold globally. Thus, in situations when feeding an infant formula is the preferred caregiver option, it is important to consider adding key oligosaccharides found in human milk to formula milk. However, current methods to produce the desired oligosaccharides – such as extracting them from human milk or producing them with purified enzymes – are either expensive or have proven difficult to scale.

Researchers at the University of California, Davis have developed a method for producing one key oligosaccharide - lactodifucotetraose (LDFT) - using a non-pathogenic strain of Escherichia coli (E. coli). E. coli cannot produce LDFT naturally. However, researchers have engineered E. coli to express several key enzymes that then allow the E. coli strain to efficiently convert lactose and fucose to LDFT. This process can produce LDFT economically at an industrial scale. This same approach can also be used to produce other human milk oligosaccharides (HMOs).

APPLICATIONS

- ▶ Production of the human milk oligosaccharide LDFT for use as an infant formula additive or a functional food additive
- ▶ The same approach can be used to develop other engineered E. coli strains capable of producing other HMOs

FEATURES/BENEFITS

- ▶ Much lower production costs than current methods – which often require costly added cofactors
- ▶ Scales readily

PATENT STATUS

| Country | Type | Number | Dated | Case |
|--------------------------|-----------------------|----------------------------|------------|----------|
| United States Of America | Published Application | 2024011064 | 01/11/2024 | 2021-606 |

CONTACT

Prabakaran

Soundararajan

psoundararajan@ucdavis.edu

tel: .



INVENTORS

- ▶ Atsumi, Shota
- ▶ Bai, Yuanyuan
- ▶ Chen, Xi
- ▶ McArthur, John
- ▶ Yu, Hai
- ▶ Zhang, Angela X.

OTHER INFORMATION

KEYWORDS

Human milk

oligosaccharides,

Escherichia coli (E. coli),

infant formula,

lactodifucotetraose, LDFT,

Mother's Milk, Probiotics

CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ [Food](#)
- ▶ [Health](#)

RELATED CASES

2021-606-0

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
- ▶ Biological Conversion of Ethylene to n-Butanol and Other Chemicals Using E. Coli
- ▶ 4-N-Derivatized Sialic Acids and Related Sialosides
- ▶ Substrate And Process Engineering For Biocatalytic Synthesis And Facile Purification Of Human Milk Oligosaccharides (HMOs)
- ▶ O-Acetyl Glycosphingosines and Gangliosides, as well as Their N-Acetyl Analogs
- ▶ Biological Production of Industrial Small Esters
- ▶ Stable N-acetylated analogs of Sialic Acids and Sialosides
- ▶ Renewable Energy Synthesis System
- ▶ 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

University of California, Davis
Technology Transfer Office

1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

Tel: © 2021 - 2024, The Regents of the University of
530.754.8649 California
techtransfer@ucdavis.edu [Terms of use](#)
[https://research.ucdavis.edu/technology-](https://research.ucdavis.edu/technology-transfer/) [Privacy Notice](#)
[transfer/](#)
Fax:
530.754.7620