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# Using Escherichia coli to Produce Human Milk Oligosaccharide Lactodifucotetraose

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## 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

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

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