Novel Enzymes Enabling Microbial Fermentation of Sugar into Long Chain Alcohols

Tech ID: 25482 / UC Case 2014-99D-0

ABSTRACT

Researchers at the University of California, Davis have developed a novel group of enzymes with the potential to facilitate production of energy dense alcohols for use in biofuel and chemical production.

FULL DESCRIPTION

The USDA projects the industrial production of bio-based specialty chemicals to reach ~$340 billion USD by 2025, cutting our petroleum reliance in half. The key to achieving this goal is the increased industrial production of high energy density alcohols.

Current methods primarily yield short chain, low energy density alcohols, while long chain, high energy density alcohols (e.g., pentanol, hexanol, heptanol, and octanol) are either minor products of the pathway, or not produced at all. There is significant interest in producing high energy density alcohols given their use in specialty chemicals, liquid fuels, and fuel additives.

Researchers at the University of California, Davis have discovered a novel group of enzymes that can be used in biofuel and specialty chemical production pathways. The enzymes catalyze the penultimate step in the biological production of industrially relevant chemicals through amino acid based pathways. An entirely new family of enzymes not previously demonstrated to perform this reaction has been discovered and characterized to have a wide range of activities. Some of these enzymes are 4-orders of magnitude more specific to the production of longer chain alcohols than any known enzyme. This novel discovery could revolutionize the production of chemicals such as isobutanol, heptanol, and related alcohol products.

APPLICATIONS

- Biofuel
- Chemical Production
- Alcohol Products

FEATURES/BENEFITS

- High yielding production methods for energy dense alcohols
- Potential for improved chemical production

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,829,756	11/10/2020	2014-99D

RELATED MATERIALS

- Integrative genomic mining for enzyme function to enable engineering of a non-natural biosynthetic pathway - 11/24/2015

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Remediation of Volatile Phenols in Smoke-Exposed Fruit
- Engineered Phosphite Dehydrogenases for Recycling Orthogonal Noncanonical Cofactors
- Biological Conversion of Ethylene to n-Butanol and Other Chemicals Using E. Coli
- A Thermostable Lipase for PU Degradation

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OTHER INFORMATION

KEYWORDS

biofuel, enzyme, alcohol, chemical production

CATEGORIZED AS

- **Energy**
  - Bioenergy
  - Hydrocarbon
  - Other

RELATED CASES

2014-99D-0

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