Bio-Based Production of Non-Straight-Chain and Oxygenated Fatty Acids for Fuels and More

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WARF: P140318US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new solution for synthesizing furan-containing and other valuable non-straight-chain fatty acids in large quantities.

Overview

Fatty acids generally can be classified as straight-chain or non-straight-chain. Non-straight-chain fatty acids are less abundant and highly valued in dietary supplements, cosmetics, pharmaceuticals, fuel additives, specialty chemicals and many other products.

At present there is no process for producing non-straight-chain fatty acids at commercially relevant levels. The identification of genes needed to synthesize these compounds in bacteria is one solution to producing moderate to large quantities of material.

The Invention

UW–Madison researchers have identified several enzymes in the bacterium *Rhodobacter sphaeroides* that can be purified to produce non-straight-chain fatty acids *in vitro* or expressed in genetically modified microorganisms including *E. coli* for synthesis *in vivo*. Strains may be 'fine-tuned' to produce a specific type of non-straight-chain fatty acid (e.g., furan-containing) by expressing, overexpressing or deleting the enzymes in various combinations.

Applications

- Bio-based production of non-straight-chain fatty acids including furan-containing fatty acids, branched-chain fatty acids and cyclic fatty acids
- These compounds support a variety of end applications such as biofuels, fuel precursors or oxygenated fuel additives, cardio-protective health supplements, antioxidants, stabilizers and chemical feedstocks.

Key Benefits

- New method for achieving high quantities of valuable fatty acids

Stage of Development

The researchers have produced furan-containing fatty acids (FFA) and methylated unsaturated fatty acids (M-UFA) *in vivo* using modified *R. sphaeroides* and *E. coli*.

Additional Information

For More Information About the Inventors

- Timothy Donohue
- Joshua Coon

Tech Fields

- Materials & Chemicals : Biochemicals & biomaterials
- Research Tools : Microbial technologies

For current licensing status, please contact Mark Staudt at mstaudt@warf.org or 608-960-9845