



The University of Georgia Research Foundation, Inc.

Technology Commercialization Opportunity

Microbial Production of Pyruvate and other Economically Important Metabolites in Very Large Scale

UGARF Case: 0951

Inventors: M. Eiteman, E. Altman

Department: BioAgricultural Engineering

Intellectual Property Status: Pending in US and Europe

Introduction

Microbial fermentation processes are used to generate a myriad of comedic chemicals representing market segments valued in the billions of dollars. Microbial metabolic pathways are not though, naturally optimal for the generation of a desired chemical, rather they have evolved for the benefit of the organism. Metabolic engineering is the targeted and rational alteration of metabolism, and it involves the redirection of intra-cellular processes to generate a new product or a product in much higher yields and/or faster rates.

Pyruvate and its derivatives are important chemicals finding a wide gamma of applications in the synthesis of drugs, cosmetics and other biochemicals. For instance, pyruvate is of fundamental importance in the production of tryptophan, tyrosine, and alanine. Pyruvate and its derivatives, find applications as dietary supplements, in animal feed, food flavoring.

Technology Summary

The groups of Drs. Eiteman and Altman at UGA have developed a bio-fermentation method directed to the production of pyruvates and derivatives. The observed mass-yields are high (30g/L and above) as well as yields as a function of glucose consumed (0.70 and above). The method has been proven for the production of several pyruvate derivatives such as, for instance alanine and diacetyl. High yields are observed even around 12 h from start of fermentation.

Advantages

- Provides better results than those with engineered *Corynebacterium* or *Brevibacterium*
- Little or no competition due to the consumption of carbon to form acetyl-CoA
- *E. coli*-based, engineered strains are of easy growth
- Allows for the production of several pyruvate derivatives
- Very high yields (thus also facilitating purification) and faster than traditional biological routes

Potential Applications

- Pilot- to very large-scale production of pyruvates and key derivatives

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