



A Controllable and Robust Cell-Free System for Fatty Acids Production

Tech ID: 23596 / UC Case 2013-833-0

SUMMARY

Researchers from the UCLA have designed a cell-free system capable of producing fatty acids at a rate that is an order of magnitude higher than normal cell culture systems.

BACKGROUND

Fatty acids (FA) are used in health and wellness industries as nutritional supplements and cosmetic products. Additionally, fatty acid production has been the focus of recent research because they are a source of biofuels. Traditionally, industrial biofuel is either derived from the hydrolysis of waste vegetable oils or is derived from engineered cell culture systems of E. coli or algae. The use of foodstuffs, waste vegetable oils, or cell systems are yet to be successful at efficiently producing large scale and cost-effective biofuels able to compete economically with existing fuel sources.

INNOVATION

UCLA researchers from the departments of bioengineering and mechanical engineering have developed a cell-free system capable of producing a large amount of fatty acids within a short period of time. This novel system is robust and can maintain an increase in fatty acid production at a rate that is an order of magnitude higher compared to existing cell culture systems. The system can maintain production for months, and with proper maintenance may persist for much longer. This reproducible system produces fatty acids freely in solution that are relatively easy to harvest. This system may provide a scalable and cost-effective method for fatty acid production.

APPLICATIONS

- ▶ Biofuel
- ▶ Nutritional supplements
- ▶ Cosmetics

ADVANTAGES

- ▶ Cell-free system is less expensive and easier to control
- ▶ Highly reproducible and robust system that can maintain production for months with proper maintenance
- ▶ Fatty acids are freely in the solution and therefore easy to harvest
- ▶ Production of fatty acids with a rate that is higher by an order of magnitude in three weeks compared to conventional cell cultures

STATE OF DEVELOPMENT

A system has been designed and tested that shows an increased fatty acid production. The system maintains fatty acid production for over 55 days. Future work entails optimization of key parameters in order to maintain a robust and long-lasting system.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,155,968	12/18/2018	2013-833

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Fatty acid, biofuel, supplement, vitamin, cosmetic, ethanol, biodiesel, algae, cell-free, fuel, energy, bioenergy, green energy, cleantech

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
 - ▶ Industrial/ Energy
- ▶ **Energy**
 - ▶ Bioenergy

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