Direct photobiological conversion of solar energy to volatile transport fuels

Fact Sheet

Project Information

PHOTOBIOFUEL
Grant agreement ID: 260661

Funded under
Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Start date 1 January 2011
End date 31 December 2015

Total cost € 916 119,90
EU contribution € 916 119,90

Coordinated by
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE
United Kingdom

Objective

The aim is to integrate photosynthetic solar energy conversion and synthesis of volatile engine-ready transport fuel in a single photobiological process. The focus is placed on the construction of phototrophic model systems for synthesis of the short-chain alkane propane (C3H8). Propane can be used in existing engines without further chemical conversion and can be easily recovered from the production process without destructive harvesting and extraction. However, no commercial biological
production process exists and there is no known metabolic pathway for short-chain alkane biosynthesis. The intention is to construct a synthetic pathway for propane biosynthesis. In order to facilitate the construction, alkane biosynthetic pathways are studied in detail and genes encoding key-enzymes are isolated from diverse organisms.

In order to directly capture solar energy to drive fuel biosynthesis, the synthetic pathways are assembled in the photosynthetic model organism Synechocystis sp. PCC 6803. Native host metabolism is thereafter optimized to maximize the delivery of metabolic precursors and reducing energy to the synthetic pathways. In order to facilitate strain construction, cyanobacterial host strains are optimized for metabolic engineering and hydrocarbon fuel biosynthesis.

The project has the ultimate aim to generate cyanobacteria strains that synthesize short-chain alkane using only light, CO2 and H2O as substrate. The project has a clear applied target with high potential for socio-economical impact and a high risk / high gain character.

**Fields of science**

- engineering and technology
  - environmental engineering
  - energy and fuels
  - renewable energy
  - solar energy
- engineering and technology
  - industrial biotechnology
  - metabolic engineering
- natural sciences
  - chemical sciences
  - organic chemistry
  - hydrocarbons
- natural sciences
  - chemical sciences
  - organic chemistry
  - aliphatic compounds
- engineering and technology
  - environmental engineering
  - energy and fuels
  - energy conversion

**Programme(s)**

FP7-IDEAS-ERC - Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

**Topic(s)**

ERC-SG-LS9 - ERC Starting Grant - Applied life sciences and biotechnology

**Call for proposal**

ERC-2010-StG_20091118
See other projects for this call
Funding Scheme

**ERC-SG** - **ERC Starting Grant**

Coordinator

**IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE**

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**Region**
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**Activity type**
Higher or Secondary Education Establishments

**Principal investigator**
Patrik Raymond Jones (Dr.)

**Administrative Contact**
Brooke Alasya (Ms.)

**Links**
Contact the organisation  
Website

**EU contribution**
No data

**Beneficiaries (2)**
London > Inner London — West > Westminster

Activity type  
Higher or Secondary Education Establishments

Principal investigator  
Patrik Raymond Jones (Dr.)

Administrative Contact  
Brooke Alasya (Ms.)

Links  
Contact the organisation  
Website  

Other funding  
No data

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TURUN YLIOPISTO  
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Manner-Suomi > Etelä-Suomi > Varsinais-Suomi

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Higher or Secondary Education Establishments

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Other funding  
No data

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