

OFFICE OF TECHNOLOGY TRANSFER

AUBURN UNIVERSITY

Efficient Production of Biodiesel Using Radio Frequency Heating

Contact

Brian Wright
Auburn University
Office of Technology Transfer
334-844-4977
brian.wright@auburn.edu
<http://ott.auburn.edu/>
Reference: Biodiesel RF Heating

Inventors

Dr. Yifen Wang
Assistant Professor
Department of Biosystems
Engineering

Dr. Shaoyang Liu
Post-doctoral Associate
Department of Biosystems
Engineering

Dr. Steven Taylor
Professor
Department of Biosystems
Engineering

Reference

"Efficient Production of Biodiesel
Using Radio Frequency Heating."
S. Liu, Y. Wang, T. McDonald,
S.E. Taylor, *Energy Fuels*, **2008**,
22 (3), pp 2116–2120 ([pdf](#))

[Click here](#) for a listing of
Auburn's available physical
science technologies

Receive new technology
notices via email: [Sign up](#)
for Auburn's "Tech Notice"



Auburn University is an equal opportunity
educational institution/employer

Overview

Auburn University is seeking a licensee or development partner for an innovative biodiesel manufacturing process that substantially reduces production time and energy input. Current biodiesel production requires a lengthy heating step that consumes significant amounts of energy. With the Auburn invention, this heating step can be shortened by as much as 95%, significantly lowering the energy input required. This process has been demonstrated in the lab and is expected to be scalable.

Advantages

- Cuts heating time from 60 minutes to as low as 3 minutes, dramatically lowering energy input requirements and reducing production costs
- Uses fewer additives, reducing raw material and post-processing costs
- Uses radio frequency heating devices which are proven in large-scale commercial applications, suggesting scalability
- Can be done in batch or continuous processes and with vegetable oils or animal fats, improving process design optimization possibilities
- Has significant advantages over microwave heating, including increased efficiency, more uniform heating, and lower materials costs

Description

Unlike other alternative fuels, biodiesel is an immediately applicable option as a replacement fuel. Biodiesel production has increased 50% annually for the last 5 years. The Energy Policy Act of 2005 requires 7.5 billion gallons of domestic biodiesel to be produced by 2012. Biodiesel is generally produced from natural oils or fats by a reaction known as transesterification. This involves the reaction of the oil with methanol at high temperatures. Traditionally, this step is performed with simple heating and typically takes on the order of 60 minutes to complete.

Radio frequency heating (RFH) is a commercially available process used in such industries as food processing and wood products. By introducing RFH as the energy input for the transesterification step, this reaction time can be reduced to 3-5 minutes. This significantly saves on energy input and operating expenses for the production of biodiesel. In addition, the process is made more efficient, so fewer additives (methanol and catalyst) are required. This not only saves on raw material costs, but also on post-processing costs since less material needs to be removed.

This process has been demonstrated as a batch in the lab and is expected to be scalable. It should be generally applicable to any feedstock. Conversion to a continuous process could make the process more efficient, with the short heating time leading to reduced tank sizes. A licensee could commercialize this technology via biodiesel production or through production and sale of equipment to existing and future biodiesel producers.

Status

- A [US non-provisional patent application](#) has been filed
- Has been repeatedly successfully demonstrated on lab scale using canola oil and beef tallow

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture