Biodiesel Production from Brown Grease

Mirit Kolet, Faina Nakonechny and Marina Nisnevitch

Since the Industrial Revolution in the 19th century, the world economy relied on fossil fuels as an energy source. The dramatic increase in oil prices, in spite of transient decreases, and global climate changes, affected by a rise in the atmospheric CO_2 concentration, have led to a need in alternative energy sources. Reducing dependence on fossil fuels could decrease concerns about energy security. For these reasons, a quest for sustainable and renewable biofuels has been gaining momentum in recent years, and bioenergy in general and renewable biofuels in particular are attracting increasing attention as a part of a trend to develop a sustainable and environmentally friendly economy.

The present study is focused on development of a scheme for continuous biodiesel production from cooking oil waste - brown grease. This scheme will enable to solve two problems: energetic and environmental. Brown grease has high free fatty acid content and therefore can serve as a potential feedstock for biodiesel production. First, a protocol for separation of a fat layer from brown grease wastes was elaborated, and then conditions for an effective esterification reaction were chosen when heating was replaced by an ultrasonic activation. At each experimental stage samples were tested by HPLC.

The results show that efficient separation of the fat layer from brown grease can be obtained under heating the wastes at 60°C for 15 min and following centrifugation at RCF 3,750 g for 5 minutes. The ultrasonic activation is expecting to serve as a basis for development of an innovative and efficient and biodiesel production in a continuous regime.