

Biodiesel from Low Quality Feedstocks Using Solid Super Acids

Biodiesel is a non-toxic and biodegradable fuel made from renewable plant oils and animal fats. It has similar performance with fewer emissions and greater lubricity compared to petrodiesel. Biodiesel also possesses a much higher energy balance compared to its petroleum counterpart. Despite these advantages this green fuel struggles to compete with more traditional fuels.

The major impediment to lowering the cost of biodiesel is that conventional methods of manufacture require high grade feedstocks that are expensive. Most commercial procedures involve the transesterification of pure plant oils with methanol in the presence of a homogenous base catalyst. Under these conditions biodiesel is obtained in high yields under moderate reaction conditions at acceptable rates. Complications are encountered when contaminants such as free fatty acids or water are present. Homogenous acids are capable of catalyzing the production of biodiesel from lower cost oils containing free fatty acids. They are not attractive from a commercial standpoint as they are corrosive and biodiesel is obtained at economically feasible rates only under forcing conditions.

Attempts have been made using heterogeneous catalysts; in particular solid acids, as they would allow for the production of biodiesel from impure feedstocks in a green and continuous manner. Thus far none is ideal. This research effort will use a novel subset of heterogeneous acid catalysts bearing super acidic moieties for the production of biodiesel from both pure and low grade feedstocks. This approach will reduce waste, increase safety, simplify production, and give biodiesel a competitive advantage.

For a more detailed overview of this topic area please refer to the document entitled *Biodiesel from Low Quality Feedstocks Using Solid Super Acids* in the *Investment Opportunities* section of the website.

Cost = Approximately \$75,000 for Stage 1 (includes initial patent filing costs)

Likelihood of Success = 60 %

Earning Potential = 8

Return on Investment = The investor will retain all intellectual property rights in return for granting Innovative Science, Inc. a 5-10 % royalty for use of the developed technology.