



# Biodiesel from Scum Oil and Waste Oil

## (20150113, Dr. Roger Ruan)

### Process Converts Scum to Biodiesel

A new waste remediation process converts scum from waste water treatment plants (WWTPs) into ASTM compliant biodiesel. The six-step method begins with a filtration step that separates water/oil/solid while converting soap to free fatty acid (FFA). A combination of acid washing and acid catalyzed esterification with glycerin removes soap and impurities while converting FFA to glycerol esters, and glycerol washing separates biodiesel and glycerin after base catalyzed transesterification with methanol. After producing fatty acid methyl esters (FAME) and glycerol, FAME/glycerol/methanol will be separated and FAME recovered. The crude FAME is then distilled to produce high quality biodiesel that can be used directly in transportation vehicles. This method has high conversion rate (it has converted 70% of dried and filtered scum to biodiesel), low material cost, low energy input and low waste discharge.

#### MN-IP Try and Buy

##### Try

- Trial period is up to 6 months
- Trial fee is \$5,000 for six months
- Trial fee is waived for MN companies or if sponsoring \$50,000+ research with the University
- No US patent expenses during trial period

##### Buy

- \$25,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first \$1M in sales

### Technology ID

20150113

### Category

Engineering & Physical  
Sciences/Chemicals  
Engineering & Physical  
Sciences/Sustainable Technology  
Life Sciences/Industrial Biotech

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### Reduces Environmental Pollution

Currently scum is treated by either anaerobic digestion or landfilling. Anaerobic digestion produces a low value methane gas while landfilling can cause environmental problems and is very costly. Due to high water content, high free fatty acid and soap content, and impurities in the scum, there is currently no cost effective process available that converts scum to biodiesel. This new process converts scum to a higher value product (biodiesel) while also reducing environmental pollutants in both landfills and water resources. The unique conversion technology not only pertains to scum conversion but also offers improvement opportunities to commercial biodiesel plants. The process has great potential as an alternative pathway for scum treatment.

### BENEFITS AND FEATURES:

- Converts scum to high value biodiesel
- Lowers net cost of scum disposal
- Low material input
- Low energy consumption
- Low/no wastewater discharge
- Generates revenue from scum
- Environmentally sustainable
- Reduces landfill costs as well as environmental pollutants
- Estimated 3-year payback period
- Small pilot plant built and demonstrated on site at sewage treatment plant

#### **APPLICATIONS:**

- Biodiesel from waste products such as scum, spent oil, gut oil, waste cooking oil
- Waste/wastewater treatment plants where significant scum is generated
- Vegetable oil disposal where significant free fatty acids are present in waste oil

**Phase of Development** - Pilot scale demonstration

#### **Researchers**

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[External Link](http://bbe.umn.edu) (bbe.umn.edu)

#### **Publications**

[\*Process development for scum to biodiesel conversion.\*](#)

*Bioresource Technology*, 2015 Jun;185:185-93. doi: 10.1016/j.biortech.2015.01.081. Epub 2015 Feb 18.

#### **Interested in Licensing?**

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