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Green catalyst mediated biodiesel production from waste cooking oil

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Waste cooking oil generated as a waste product during the manufacture of fried foods poses grave health risk to its consumers owing to the change in the chemical and physical properties of the oil during the frying process. In this regard, waste cooking oil can be a potential resource for biodiesel production owing to its abundant availability and moreover its utilization will curb the problem of its disposal and thereby negating the pollution incurred towards water and land resources. The availability of waste cooking oil depends upon the quantity of the consumption of edible oil and according to EIA (environmental impact assessment), in the United States of America, availability of waste cooking oil is estimated to be 100 million gallons per day. Major fraction of the waste cooking oil is dumped in the landfills thus leading to environmental problems while a small fraction is utilized for soap manufacturing and also as an additive during the manufacture of animal fodder which is also under the scanner owing to the European Union regulation of 2002 according to which its use in the manufacture of animal fodder is banned. Thus the route of biodiesel production from waste cooking oil is a potential value addition to this resource. Conventionally biodiesel is manufactured via transesterification of the lipids to yield fatty acid methyl esters utilizing acid, alkali etc., catalysts which pose the issue of corrosion to the reactors as well as the waste disposal issues. In this regard, utilization of lipase extracted from *Rhizopus oryzae* was investigated for transesterification of waste cooking oil to FAME (Fatty Acid Methyl Esters) and it was observed that the biodiesel produced majorly composed of palmitic and stearic acid methyl esters. Moreover the fuel quality of the produced biodiesel yielded calorific value of 37.83 MJ/kg, acid value of 0.2 mg KOH/ g biodiesel, iodine value of 8.71 g I2/ 100 g biodiesel and cetane index of 67.3. The characteristics studied fall well within the ASTM D6751 and EN 14214 standards prescribed for biodiesel thus justifying the use of green catalysts – lipase for biodiesel production of waste cooking oil.

Recent Publications

1. Kravola I and Sjoblom J (2010) Biofuels-renewable energy sources: a review. Journal of Dispersion Science and Technology. 31(3):409-425.
2. Qiu F et al. (2011) Biodiesel production from mixed soybean oil and rapeseed oil. Applied Energy. 88(6):2050-2055.
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Biography

G Lohit K Srinivas is currently a PhD Scholar at the Indian Institute of Technology Kharagpur, India. His area of research include: biodiesel production utilizing oleaginous microbes.

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