BIODIESEL PRODUCTION FROM MARINE FISH WASTE USING MARINE MOLLUSCA SHELLS AS HETEROGENEOUS CATALYST

Muhammad Shoaib & Abdul Majeed Khan*

Research Laboratory of Bioenergy (RLB)

Department of Chemistry

Federal Urdu University of Arts, Science and Technology,

Gulshan-e- Iqbal Campus, University Road, Karachi, Pakistan

Abstract:

Biodiesel produced from marine fish waste using waste heterogeneous catalysts derived from Mollusca shells under the influence of different heating sources. Waste fish oil was extracted from marine fish waste and heterogeneous catalysts were derived from marine waste Mollusca shells. Waste fish oil was converted into biodiesel with the help of transesterification reaction, by reacting with bioethanol in the presence of heterogeneous catalysts under different heat sources. The product of transesterification reaction was the mixture of biodiesel and glycerin.

Introduction

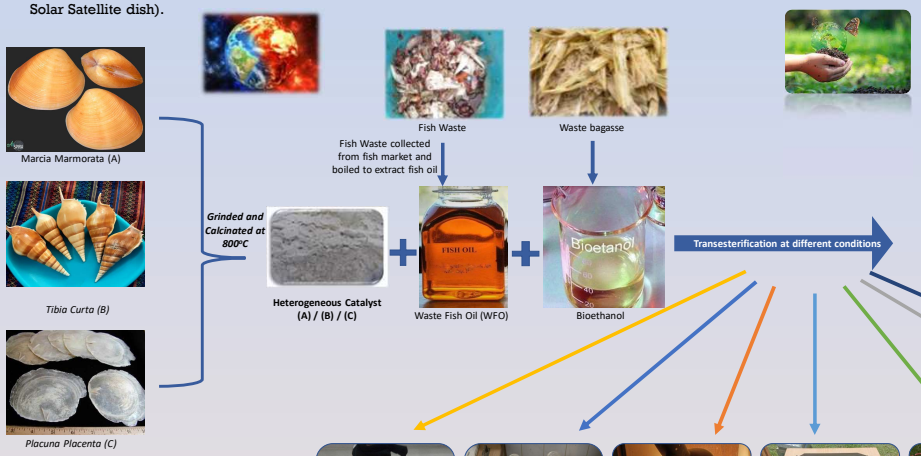
Currently, fossil fuels provide most of the energy demands of the whole globe, and on the other hand, inappropriate their continuing consequences, and it is expected that supplies will remain sufficient for the next few generations. Fossil fuels are the primary energy sources of the present time. Currently, our main energy sources are fossil fuels. They are unsafe to the environment because they trigger global warming, ozone layer depletion, biosphere devastation and ecological destruction. To satisfy the growing energetic needs of humanity; we need to look at all the alternative energy sources that are sufficient, which will also protect our earth from disasters like global warming, ozone layer depletion, ecological destruction, and biosphere destruction.

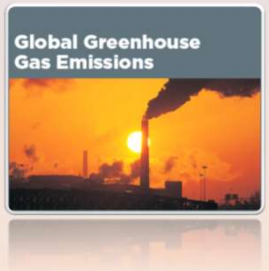
Goals and Objective:

- Biodiesel is a renewable, biodegradable, innocuous, carbon neutral, and ecologically aware fuel for diesel engines with low exhaust emanations, a high flash point and excellent lubricant
- Biofuel production will limit production of green house gases to save environment from disasters.
- Biodiesel from waste marine is economically favorable and it also recycle waste into energy

Methodology:

- Fish waste collected from Karachi fish market and boiled till oily layer appeared, oily layer collected and filtered to get fish oil.
- Waste bagasse used to produce Bioethanol.
- Three different species of Mollusca shells collected from different regions and grinded to fine powder and allowed to calcinated at 900°C for about 8 hours to produced heterogeneous catalysts.
- Biodiesel produced by transesterification reaction of WFO with Bioethanol in the presence of heterogeneous catalysts on different conditions (Room temperature, Conventional Heat, UV Irradiation, Waste electric lamp, Solar light, Solar Fresnel lens, Solar Satellite dish).

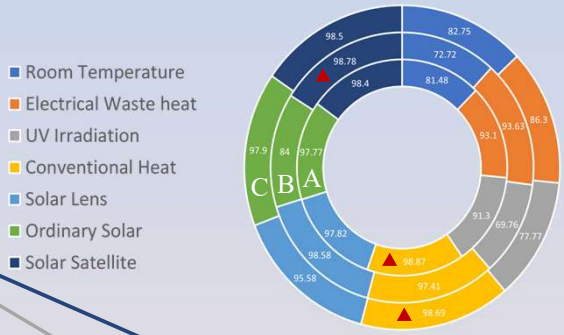




Analysis:

- Characterization of biodiesel carried by TLC, GCMS and ASTM standards.

Biodiesel comparision with different catalyst A, B & C



References:

- Alsalme, E. F. K., I.V. Kozhevnikov (2008). Heteropoly acids as catalysts fo liquid-phase esterification and transesterification. *Applied Catalysis A: General, 349*, 170–176.
- Barber, D. (2017). The Differences Between Biofuel & Fossil Fuel. Bizfluent. https://bizfluent.com/list-7626415-differences-between-biofuel-fossil-fuel.html
- Barnard, T. M. L., Nicholas E Boucher, Matthew B Stencel, Lauren M Wilhite, Benjamin A. (2007). Continuous-flow preparation of biodiesel using microwave heating. *Energy & Fuels, 21*(3), 1777-1781.
- Deka, D. C. B., Sanjay. (2011). High quality biodiesel from yellow oleander (Thevetia peruviana seed oil. *Biomass and Bioenergy, 35(S)*, 1797-1803.

Muhammad Shoaib

Federal Urdu University of Arts, Science and Technology

shoaibharoon10@gmail.com