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Short review on Production of Biodiesel from Animal Tallow via Enzymatic Transesterification

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Short Review

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ABSTRACT

In this article authors explained about effectiveness of enzymatic transesterification of animal fat using the experimental enzyme catalyst NS88001 [1,2]. He evaluated biodiesel yield with the effect of Oil: Alcohol, reaction temperature and reaction time. They worked on the different Oil: Alcohol ratio and observed their yield effect on biodiesel production [3,4]. Reaction performed in this procedure slowly at the starting stage and then increased rapidly due to the initial mixing and dispersion of alcohol in to oil substrate and effectively activation of catalytic enzyme NS88001 [5-25]. After alcohol dispersion, rapidly interaction of fatty acid with enzyme takes place resulted maximum yield conversion [1,26-30]. 114.95 – 65.59 % yield conversion were observed when they increased the reaction time from 4Hrs to 16Hrs at 45°C [1].

Review

In the high demand of fossil fuel we cannot depend on the limited resource we need to think about some other alternatives of renewable energy and biodiesel is one of them which can be used as a current resource of energy and fulfill the demand up to some extent. We can use biodiesel for compression ignition engine instead of diesel. We know that the use of biodiesel is sulfur free, non-toxic and biodegradable in nature so; these characteristics make it eco-friendly. There are several plants, animal fats, yellow grease, waste cooking and algae biomass which can be used as raw material for biodiesel production. The main component of fats and oils are triacylglycerols which are made up of different fatty acids and glycerol being the backbone. There is variation in all type of fatty acid due to their source component. Chemical process use to convert oils and fats in to biodiesel known as transesterification. Main objective of his work is to investigate the effectiveness of the enzymatic transesterification process for the production of biodiesel from animal tallow using methanol in a solvent free system [31-50].

Raw material, enzyme and chemicals

Animal tallow (10 Kgs; Stored at -20°C)
Enzyme catalyst: NS88001
Chemicals: Methanol, Tetrahydofuran, N,O-Bis (Trimethylsilyl)-trifluroacetamide and hilditch reagent.
Followed: Purification of crude animal tallow, (110° C, 50 rpm, 1 Hrs.)

They performed an enzymatic trans-esterification at different oil: alcohol molecular ratio, time and temperature and analyze product ratio with the help of gas chromatography. He explained different analysis result at different oil: alcohol ratio, reaction time and temperature and analyzed their result. According to his result if you would consider yield you found that in oil: alcohol ratio 1:4 molar ratio is more effective, it resulted (80.42%) mean yield; In reaction time we found 16 Hrs is more productive in their comparison it reflected 49% mean yield. But in reaction temperature 45°C is more productive [1].

DISCUSSION

Fatty acid [51-64] used in this experiment contains oleic acid (44%), palmitic acid (28%) and stearic acid (26%) as well as lower percentages of myristic acid (1%) and linoleic acid (1%). High content of Oleic acid improves quality of biodiesel.

The benefit of animal tallow oil is to increase methyl ester oxidation which might increase the cetane number which tends to delay the ignition time in the engine.

They considered 1:4 oil : alcohol molar ratio is standard because they found above 1:4 ration yield was going to decrease from 38.74, 25.41 and 44.10% at the reaction temperatures of 40, 45 and 50°C and the similar type of changes observed in reaction time.

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