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COMPARATIVE STUDY OF CHEMICAL CHARACTERISTIC OF WASTE COOKING OIL BIODIESEL SYNTHESIZED VIA NOVEL METHOD

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Abstract:

Biodiesel is a great alternative of clean fuels and energy and has already received great attention due to spike in demand. Biodiesel is a petroleum diesel substitute and one of the favorable source of biofuels due to its biodegradability and environmental compatibility. The chemical characteristic of Waste Cooking Oil biodiesel novel method was evaluated. The objective of this research is to compare synthesized biodiesel from waste cooking oil and to characterize the properties of biodiesel from different transesterification variables. The properties is to be compared with fuel quality standard which is standard ASTM D6571 and European Norm EN14214. One Step Transesterification and Two Step Transesterification was compared with molar ratio alcohol to oil, reaction temperature and reaction time as parameter. Different online library such as Science Direct and Google Scholar is used to gather relevant articles for the comparison. The result from the collected articles is compared to the quality standard and the best quality of fuel is to be determined. The study found that the optimum condition for One Step Transesterification to produce biodiesel with high yield is at 6:1 molar ratio of alcohol to oil, 65 °C reaction temperature and 120 min reaction time. While for Two Step Transesterification the optimum condition to produce biodiesel with high yield is at 6:1 molar ratio of alcohol to oil, 25 °C reaction temperature and 60 min reaction time. and the best quality of biodiesel in regards low acid value and iodine value. The study also found that One Step Base Catalyzed Transesterification produce the best quality of biodiesel in regards of high cetane number and low saponification value while The study also found that Two Step Acid-Base Catalyzed Transesterification produce the best quality of biodiesel in regards of low acid value and low iodine value.

Keywords:

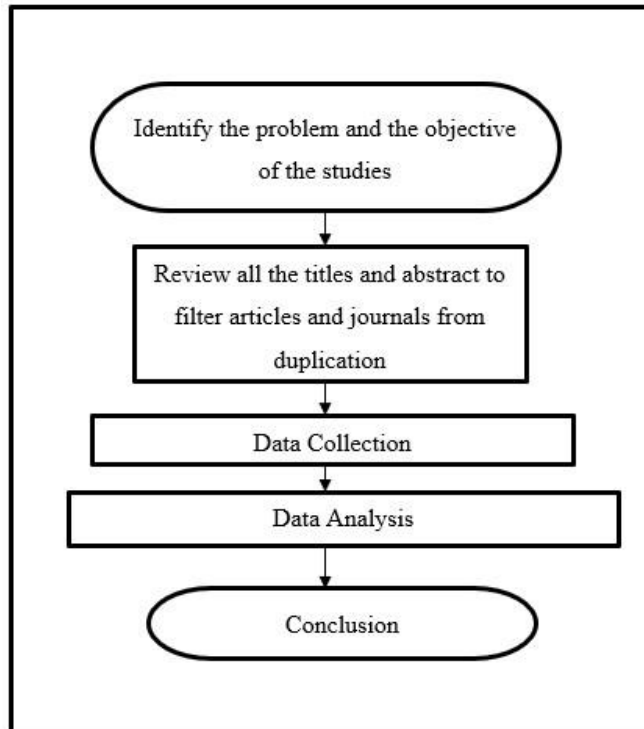
Characteristic, Waste Cooking Oil, Biodiesel, Transesterification, Biodiesel Standard

Objectives:

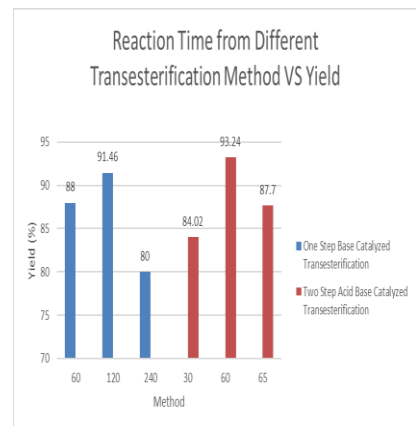
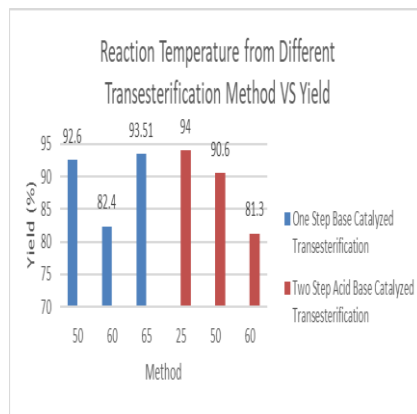
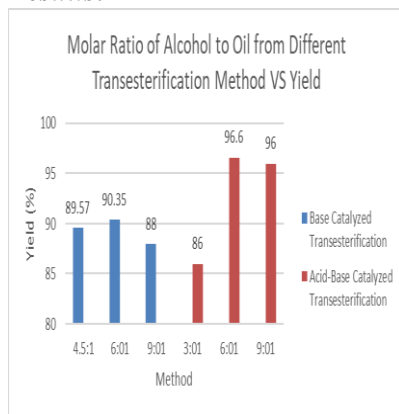
- To compare the effect of reaction condition for One Step Base Catalyzed Transesterification and Two Step Acid Base Catalyzed Transesterification method in producing biodiesel from Waste Cooking Oil (WCO)

- To compare the biodiesel properties that were synthesized from Waste Cooking Oil (WCO) via different reaction condition of transesterification

Methodology:



Results:





Conclusion:

Biodiesel can be produced by many different methods. One of the famous methods is by using Transesterification. From the study of different Transesterification method affect the yield of biodiesel production and the characteristic of biodiesel produced. From the comparison of molar ratio of alcohol to oil, reaction temperature and reaction time for One Step Base Catalyzed Transesterification and Two Step Acid Base Catalyzed Transesterification, the studies show that Two Step Acid Base Catalyzed Transesterification gives a better yield with the condition of 6:1 molar ratio and with higher reaction time. While One Step Base Catalyzed Transesterification gives better yield result with higher reaction temperature. The comparison gives result that the optimum condition for One Step Base Catalyzed Transesterification to produce biodiesel with high yield is at 6:1 molar ratio of alcohol to oil, 65 °C reaction temperature and 120 min reaction time. While for Two Step Acid Base Catalyzed Transesterification the optimum condition to produce biodiesel with high yield is at 6:1 molar ratio of alcohol to oil, 25 °C reaction temperature and 60 min reaction time.

The comparison of biodiesel chemical characteristic which is Acid Value and Iodine Value between One Step Base Catalyzed Transesterification and Two Step Acid Base Catalyzed Transesterification shows that Two Step Acid Base Catalyzed Transesterification show better result in producing lower acid value and iodine value. The biodiesel produced from Two Step Acid Base Catalyzed Transesterification could reduce corrosion and deposit formation in engine. While the comparison between Saponification Value and Cetane Number show that One Step Base Catalyzed Transesterification gives better result which would give a higher quality of fuel compared to Two Step Acid Base Catalyzed Transesterification