ABSTRACT

The world today is challenged with many environmental issues related to energy reserves. With the advancement in technology and the ever increasing demands for fuel, the urgency to develop alternative methods is crucial. Air pollution, global warming, green house effects, sulfur emissions, nitrogenous emissions etc are the effects of high usage of petroleum or conventional diesel. There are two alternatives to reduce these effects. Either reduce the usage of fuel or find renewable sources of energy to produce these materials. The best option that came along was the use of plant oils or fats to produce diesel. This fuel is called biodiesel. Several raw materials are used to produce biodiesel like sunflower oil, castor oil, soy bean oil etc. Palm oil is an easily available raw material. These oil triglycerides undergo transesterification reaction that converts the triglycerides to methyl esters and glycerol with the help of an alcohol and an alkali catalyst. But the fatty acid content of oil is very high, hence a pretreatment of esterification needs to be carried out to initially reduce the fatty acid content and further proceed with transesterification. To reduce the cost of production, PFAD or Palm Fatty Acid Distillate was taken as the raw material to produce biodiesel. PFAD is a pretreated form of palm oil which has only fatty acid content which needs only esterification process to convert the fatty acids to methyl esters in the presence of a strong acid catalyst. Different set of experiments were performed using two variable factors - the volume of methanol and the amount of catalyst. Both these parameters have a critical impact on the quality of biodiesel, thus. To determine the quality of the product Acid Value was measured. Acid value gives the measure of the number or fatty acids left in the product after esterification. Lower the acid value, the better quality it signifies. The optimum conditions were 6 times volume of methanol and 4% (w/w) conc. Sulfuric acid. This is because this expt gave the least AV of only 2.67 mgKOH/g. It is known from this research, palm acid oil can be a good, economic and efficient raw material to produce biodiesel. Biodiesel has its own advantages of having negligible emissions while its own disadvantage of not being able to use in low temperatures etc. Hence, if renewable sources of energy can be employed to produce fuel can be the key factor for a better, less polluted atmosphere to live in.