

Characterization of Biodiesel Produced from Cow-Tallow

Authors : Nwadike Emmanuel Chinagoron, Achebe Chukwunonso, Ezeliora Chukwuemeka Daniel, Azaka Onyemazuwa Andrew

Abstract : In this research work, the process of biodiesel production in a pilot plant was studied using cow tallow as raw material, methanol as the solvent and potassium hydroxide as catalysts. The biodiesel quality was determined by characterization. The tallow used in the production had a molecular weight of 860g. Its oil had a density value of 0.8g/ml, iodine value of 63.45, viscosity at 300C was 9.83pas, acid value was 1.96, free fatty acid (FFA) of 0.98%, saponification value of 82.75mleq/kg, specific gravity of 0.898, flash point of 1100C, cloud point of 950C and Calorific value also called Higher Heating Value (HHV) of 38.365MJ/Kg. The produced biodiesel had a density of 0.82g/ml, iodine value of 126.9, viscosity of 4.32pas at 300C, acid value of 0.561, FFA of 0.2805%, saponification value of 137.45 mleq/kg. Flash point, cloud point and centane number of the biodiesel produced are 1390C, 980C and 57.5 respectively, with fat content, protein content, ash content, moisture content, fiber content and carbohydrate content values of 10%, 2.8%, 5%, 5%, 20%, and 37.2% respectively. The biodiesel higher heating values (calorific values) when estimated from viscosity, density and flash points were 41.4MJ/Kg, 63.8MJ/Kg, and 34.6MJ/Kg respectively. The biodiesel was blended with conventional diesel. The blend B-10 had values of 1320C and 960C for flash and cloud points, with Calorific value (or HHV) of 34.6 MJ/Kg (when estimated from its Flash point) and fat content, protein content, ash content, moisture content, fiber content and carbohydrate content values of 5%, 2.1%, 10%, 5%, 15%, and 62.9% respectively.

Keywords : biodiesel, characterization, cow-tallow, cetane rating

Conference Title : ICMMME 2014 : International Conference on Mechanical, Materials and Mechatronics Engineering

Conference Location : Paris, France

Conference Dates : December 30-31, 2014