ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Physical and Chemical Properties of Biodiesel from Chicken Oil.

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ABSTRACT

Our study is to measure the density and chicken biodiesel viscosity depending on the temperature. This study showed that the density and chicken biodiesel viscosity decrease with the temperature. This allowed us to conclude that the resulting biodiesel has very similar properties to the biodiesel used by the engines.

Keywords: Density, Oil Biodiesel Chicken, Temperature, Viscosity.

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ISSN: 0975-8585

INTRODUCTION

Since the early 1900s, the biodiesel was defined as an alternative form of diesel fuel from vegetable oils, animal fats and alcohol[1]. With the help of the American Society for Testing & Materials (ASTM), the subsequent legislation such as the Energy Policy Act (EPAct) helped to define the biodiesel. In December 2001, ASTM Issued defined the physical / chemical constraints for biodiesel and then the biodiesel blends with diesel fuel [2].

The production of biodiesel is an alternative production of clean fuels, biodegradable, non-toxic and renewable. It can both be used as alternative fuel to conventional diesel or additive.

Biodiesel has some advantages as a fuel derived from agricultural products, which have properties similar to that of diesel, they are easy to carry, available, renewable, biodegradable and exhibit efficacy at the higher combustion. The low sulfur and aromatics content in biodiesel has a positive effect on greenhouse gases. In addition, biodiesel has attractive characteristics as a higher cetane number and a high flash point [3].

MATERIAL AND METHODS

Density variation

Density volumetric or mass provide information about the establishment, the gold oxidation state polymerization. The hydrometers are cylindrical tubes of glass, hollow, graduated, weighted with lead shot, and immersed in liquids.

They are penetrated more or less deeply vertically, depending on the forces (downward due toitsweight, andupward, duetobuoyancy) opposed. The weight of the displaced fluid is equivalent to the volume of the displaced liquid (submerged volumeof the hydrometer) that multiple density of the liquid. The submerged volume of the hydrometer change inversely to the density of the liquid. This means that the lower is the density, the more the hydrometer will sink in the liquid sample.

Figure 1: standard glass hydrometer weighted with lead.

The density or specific gravity (d) inform about the establishment, the state of oxidation or polymerization. In our study we used chicken oil and biodiesel made from the same oil. The measuring of the density is shown in Figure 1.

Variation of viscosity

The kinematic viscosity (η) is a property of the oil resulting from the resistance which oppose the molecules at a force tending to move by sliding. It varies with temperature [4].

The results of measurements of the viscosity (mm^2/s) oil chicken and their biodiesel function of temperature are shown in Figure (3).

ISSN: 0975-8585

Materials

The viscosity is measured by a viscometer of Osswald:

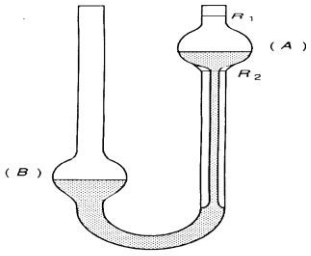

Figure 2: Viscometer Oswald

Methods

Measuringof the vegetableoilsviscosity:

Measuring the flow time of a volume V of fluidthrough a capillary tube. The viscosityisproportional to the flow time of:

$$\nu = K \cdot \Delta t$$

The constant K of the apparatus is given by the manufacturer of the viscometer.

RESULTS

We have studied the variation of the density and viscosity versus the chicken biodiesel temperature.The resultsobtained are shown in figures (3) and (4) respectively.

The variation of the density

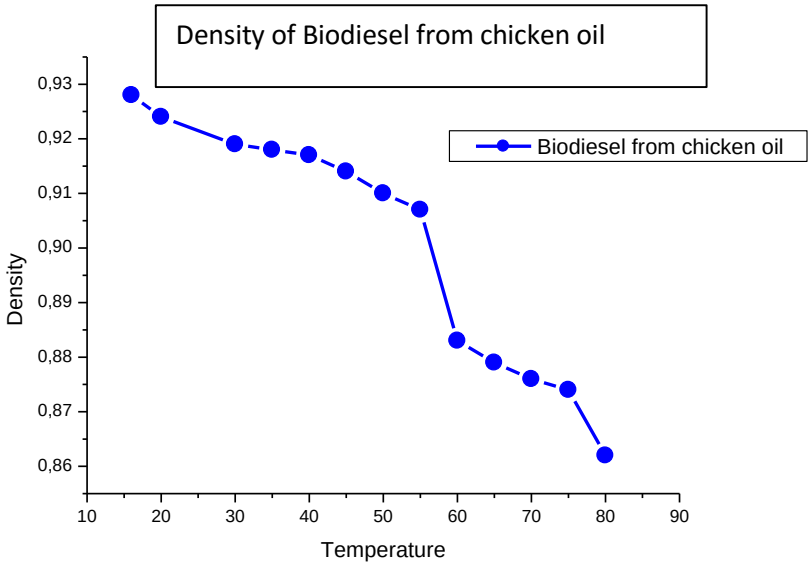

Figure 3: The variation of the densitybased on the biodiesel temperature of chickenoil.

From the values shownschematically in Figure (2), itisobservedthat the density of the chickenoilbiodiesel isdecreasedwithincreasing thetemperature. Moreover, thisdecreaseis not similar for all 3 samplesstudied, itis normal for oil and chicken for fryingoildensitychicken, itdecreases a linearway up to the

ISSN: 0975-8585

temperature T = 70°C and thenitfallsrapidlybetween T = 70 ° C to 80 ° C, while the density of the biofuelfallexponentially.

Variation of viscosity

The results of measurements of thechickenoil biodieselviscosity (mm² / s) depending on the temperatureareshown in Figure (3).

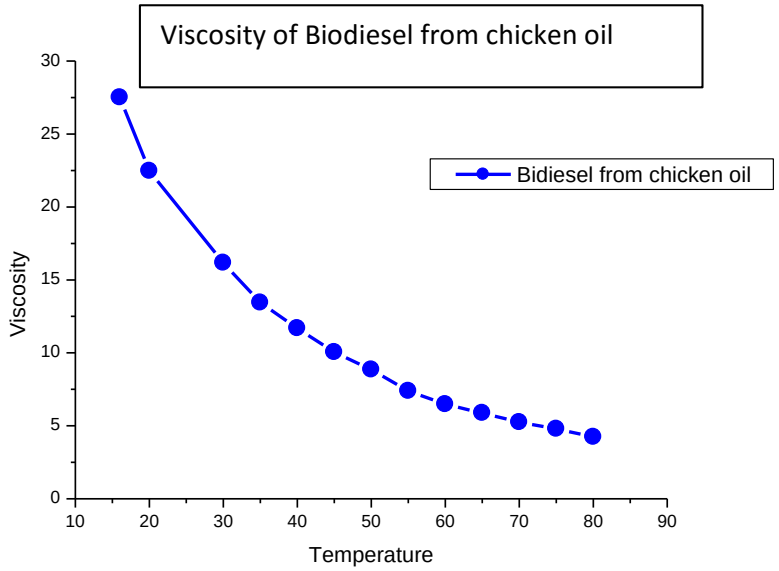

Figure 4: Measurement of thechicken oil biodieselviscosity.

DISCUSSIONS

From what previously mentioned and the results obtained (change in density and viscosity of Biodiesel chicken oil), we can deduce that we can perfectly well use the chicken oil biodiesel as biofuel.

CONCLUSION

Biodiesel is an excellent diesel replacement fuel and itisprobably the best solution to the gasemissionproblems,greenhouse and urban pollution.

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