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Physical and Chemical Properties of Biodiesel from Chicken Oil.

Assia SLITA¹, Nadia FILALI¹, Hanane ELAZZOUI¹, Larbi EL HAMMARI¹, Rajaa ROCHDI¹,
Imane HASSANAIN¹, Khoulood LAKRARI¹, Aicha SIFOU¹, Sanaâ SAOIABI¹, Mohamed.
ELAZZOUI¹, Said KITANE², and Mohamed ALAOUI EI BELGHITI¹.

¹Laboratoire de Chimie Physique Générale, Département de Chimie, Université Mohammed V, Faculté des Sciences, Avenue Ibn Batouta, BP 1014 Rabat.

²Laboratoire de chimie appliqué à l'Ecole Nationale de l'Industrie Minérale, Avenue Hadj Ahmed Cherkaoui BP 753 Agdal Rabat.

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.

**Corresponding author*

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 to its weight, and upward, due to buoyancy) opposed. The weight of the displaced fluid is equivalent to the volume of the displaced liquid (submerged volume of 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).

Materials

The viscosity is measured by a viscometer of Osswald:

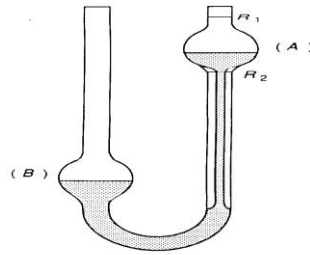


Figure 2: Viscometer Oswald

Methods

Measuring of the vegetable oils viscosity:

Measuring the flow time of a volume V of fluid through a capillary tube. The viscosity is proportional 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 results obtained are shown in figures (3) and (4) respectively.

The variation of the density

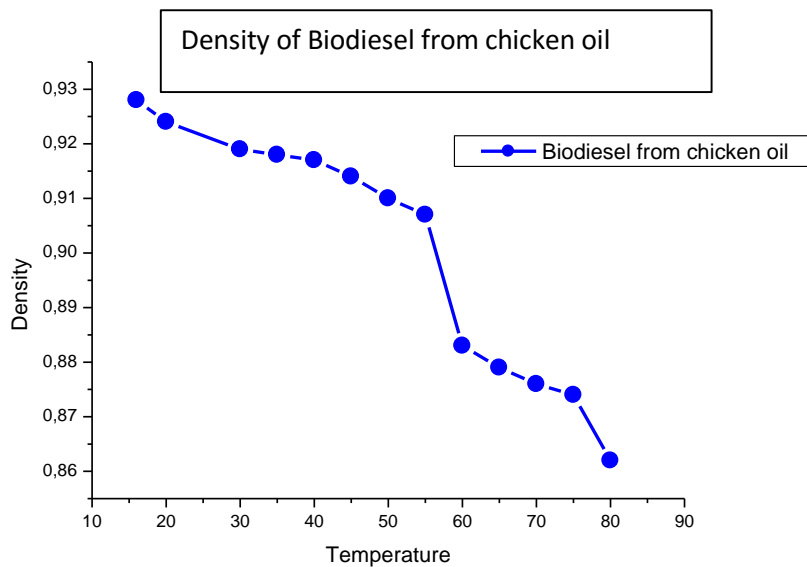


Figure 3: The variation of the density based on the biodiesel temperature of chicken oil.

From the values shown schematically in Figure (2), it is observed that the density of the chicken oil biodiesel is decreased with increasing the temperature. Moreover, this decrease is not similar for all 3 samples studied, it is normal for oil and chicken for frying oil density chicken, it decreases a linear way up to the

temperature $T = 70^{\circ}\text{C}$ and then it falls rapidly between $T = 70^{\circ}\text{C}$ to 80°C , while the density of the biofuel falls exponentially.

Variation of viscosity

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

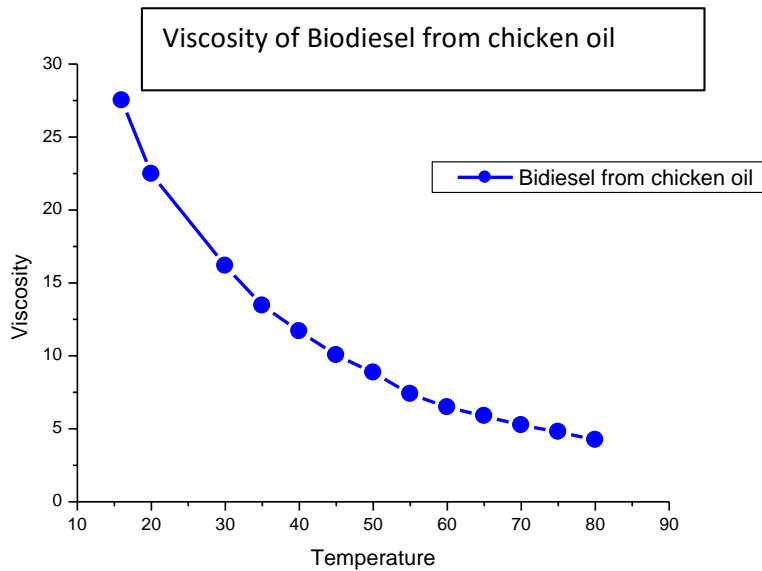


Figure 4: Measurement of the chicken oil biodiesel viscosity.

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 it is probably the best solution to the gas emission problems, greenhouse and urban pollution.

REFERENCES

- [1] CHAIB Faiza KHENFERAfa, Synthèse de biodiesel par la transestérification des huiles commercialisées, 2013.
- [2] A. Darwin, C. Perrier and P. Foliot, "The use of natural ester fluids in transformer", Proceedings of MATPOST conference, Lyon (France), Paper 0036, November 15-16, 2007.
- [3] Ayhan Demirbas. «Biofuels, Securing the Planet's Future Energy Needs». Springer. 2009. 4. Amish P. Vyas, Jaswant L. Verma, N. Subrahmanyam. «A review on FAME production processes». Fuel 89 1–9. 2010.
- [4] GODWE Emile, ENS Yaoundé DIPES II, étude comparative des biodiesels produits à partir des huiles végétales Camérounaises, année académique 2011-2012