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Comparing the density of the vegetable oils (rosemary; Nigella; Zizyphus; Melissa) and diesel

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ABSTRACT

We relate in our study, measurements of the density of vegetable oils (rosemary, cumin, zizyphus, Melissa) and diesel, depending on the temperature. These measurements were made between 20 and 80 °C. These measurements show that the zizyphus oil density decreases very remarkably compared with rosemary oil, cumin and Melissa when the temperature increases. This decrease in density of Melissa oil led us to conclude that we can use it as biofuel instead of mineral oils when working with high temperature (140 ° C).

Key words: density, rosemary oil, cumin, zizyphus, Melissa, diesel, temperature.

INTRODUCTION

The concept of green chemistry [1] has emerged in order to "support the design of products and processes that reduce or eliminate the use and formation of hazardous substances." These eco-design rules sometimes seem binding but they can become profitable, especially for chemists and industrialists. Green chemistry principles tend towards more environmentally friendly methods of synthesis and use of renewable raw materials [2] .

Some plant oils have similar electrical and thermal properties, even better than those of current dielectric liquid with superior environmental performance. In transformers, stable, inert liquid, having good electrical and thermal properties needed outside this liquid must be non-toxic to the environment and readily biodegradable [3].

This discussion summarizes the density measurement of vegetable oils Rosemary, Nigella, Zizyphus, Melissa and diesel depending on the temperature. These measurements were made between 20 and 80 ° C. These measurements show that the density of Melissa oil decreases very remarkably compared to that of other oils with increasing temperature.

MATERIALS AND METHODS

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

They are penetrated more or less deeply vertically, depending on the forces (downward due toits 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 varies inversely to the density of the liquid. This means that the lower the density, the more the hydrometer will sink in the liquid sample

Figure 1: Standard glass hydrometer weighted with lead

RESULTS AND DISCUSSION

According to the figure below the oil Melissa (at 25 ° C 0.820) with the advantage of having a lower density is closer to that of diesel (25 ° C 0.810) compared with oil Nigella (refined at 25 ° C 0.920) followed by zizyphus oil (25 ° C 0.930) and rosemary oil (25 ° C 0.940)

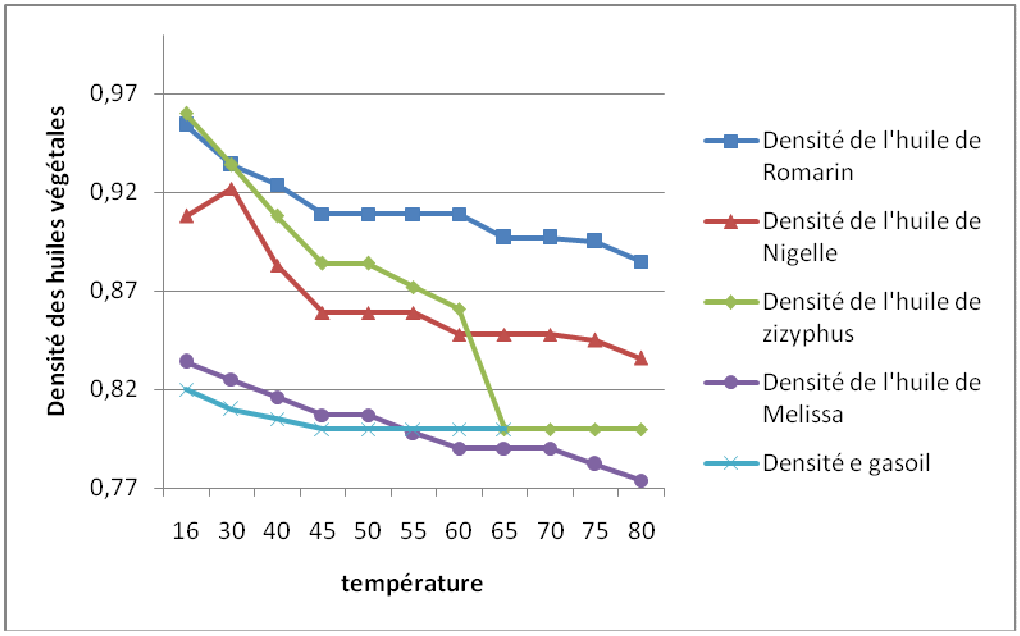

Figure 2 : Densités des huiles végétales et du gazole en fonction de la température

It is observed that the densities of the oil decreases as the temperature increases, this decrease can be explained:

- By different chemical changes experienced by the oil upon heating. By the orientation of the molecules when the temperature increases, thereby increasing the current flow through the oil.

CONCLUSION

The study of the density of the oils: Rosemary; Nigella; Zizyphus; Melissa and their comparison with the density of diesel, can be useful for application in technology (biofuels and lubricants). This study allowed us to compare our results on the behavior of the density as a function of temperature with those of other researchers working on the same research topic.

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