Thermal and Optical Properties of Jatropha (Jatropha curcas L.) Seed Oil

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This study was performed based on current needs of improve performance of oils and lubricants used today, derived from fossil fuels, which in a future become scarce and today are associated with environmental damage that they have caused at global level. As an alternative today different seeds and plants, that can be used for the production of bio-fuels, such as corn seed, sugar cane, kuzdu, Jatropha, among others. Also it is important not use seeds and plants used in the food industry to produce bio-fuels [1]. In this sense alternative plants such as Jatropha, which is not edible, is studied to produce vegetable oils for industrial use. Also this plant generates oxygen and reduces the amounts of environmental pollutants, reducing global warming [2]. In the study of these bio-oils it is important to obtain their thermal properties, which could determine the best useful for this type of biomaterial [3]. By other hand properties such as optical absorption coefficients, thermal effusivity and diffusivity can be obtained by different photothermal techniques such as photoacoustic spectroscopy, open photoacoustic cell, photopyroelectric spectroscopy [4], based on the thermal waves principle which consists of modulated heating of the sample produced by the absorption of modulated light impinging on the sample. Then by using these techniques, and their theoretical description, it is possible to obtain the optical absorption spectrum and thermal parameters, such as thermal diffusivity and effusivity, of the samples [5]. In the present study the optical absorption spectra, obtained in the range of 300 to 800 nm, show least significant difference. Also it was obtained the thermal effusivity of pure engine oil SAE 15W40, pure Jatropha oil and a mixture of 95% of SAE-15W40 oil with 5% of Jatropha oil. Biomaterials such as jatropha oil can be used as additive and reduce wear on machines for different automotive applications, industrial machines of high speed and also contribute in reducing pollution in the environment.

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