

Rheological behaviour of olive oil used as biodegradable lubricant

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The main objective of a lubricant is to reduce friction and wear. But also, it is responsible for heat evacuation. Taking into account their nature, there are mineral, synthetic, vegetal or animal lubricants. Until the XIX-th century, the manufacturing process of lubricants has been based on vegetal and animal resources. In southern countries, the olive and corn poppy oils were used meanwhile in northern countries the rapeseed oil was used. These oils have a high degree of biodegradability even today. But when mankind has discovered that oil could be processed for having lubricants and fuels at acceptable costs, the importance of vegetal resources had been reduced, but these petroleum-based lubricants have a strongly negative impact on the environment. This paper proposes three relationships of dynamic viscosity temperature dependence for olive oil. The purpose of this study was to find a polynomial or exponential dependence between temperature and dynamic viscosity of olive oil, using the Andrade equation changes. Equation constants A, B, C and D were determined by fitting polynomial or exponential. Thousands of years, this oil was used for cooking, cosmetics and soap, but also as fuel for lamps. This paper proposes the relationship to describe the dependence of the dynamic viscosity of an olive oil, on the temperature. Experimental data for one type of olive oil were used to calculate the accuracy of the proposed models. Equation constants were determined by exponential or polynomial best curves obtained at different shear rates using the program Origin 6.0. The correlation coefficients thus obtained varied between 0.8754 and 0.9999.

Biography

I am a teacher of chemistry and physics in middle school. I graduated from the Faculty of Chemistry of the University of Bucharest in 1998. Studies Master we made in the same college and we have completed in 2001. I obtained a Ph.D. in chemistry in 2008 after 6 years of research stage, in which we obtained multi-grade oils based on synthetic polymers. Since 2005 has participated in numerous national and international conferences, has papers publishing in journals national and international for study multi-grade oils, canola oils and sunflower oil. I continued the research by studying oils and get new rheological models describing their behavior.