Crystalization behaviour of binary mixtures of fatty acid ethyl esters with ethyl laurate

Costa, Mariana C. [1]; **Boros, L.A.D.** [2]; **Krahenbühl, M.A.** [2]; **Coutinho, J.A.P.**[3]; **Meirelles, Antonio J.A.** [1]

[1] ExTrAE-Departmento de Engenharia de Alimentos – FEA – UNICAMP, Brasil
[2] LPT-Departamento de Processos Químicos – FEQ – UNICAMP, Brasil
[3] CICECO, Departamento de Química da Universidade de Aveiro, Aveiro, Portugal

The increasing world population and increasing technological development of many countries allied to the possible shortage of oil, in a not so distant future, has aroused the world interest in alternative options for energy generation. Moreover the environment has been giving warning signals due to the excess of pollutant components generated by burning of fossil fuels. These problems can be mitigated replacement biofuels originated by renewable resources such as bioethanol or biodiesel, among others. Biodiesel is currently being produced essentially by the transesterification of vegetable oils and fats converting triacylglycerols into fatty acid esters that can be ethyl or methyl esters according to the alcohol employed in the reaction. In spite of the interest in biodiesel, is yet scarce on the literature, data about solid-liquid equilibrium of biodiesel and its components. These data play an important role to understanding the low temperature behavior of biodiesel. To overcome this limitation the melting points of five binary mixtures of ethyl laurate with saturated and unsaturated fatty acid ethyl esters (ethyl oleate, ethyl linoneate, ethyl myristate, ethyl caprate and ethyl caprilate) were measured by Diferencial Scanning Calorimetry technique. All of the studied systems exhibit in its phase diagrams an eutectic point and some of them exhibit some transitions under *liquidus* line not yet established. The Predictive UNIQUAC model, developed for the prediction of cloud points of diesels and previously applied to fatty acid methyl esters, is shown to produce an excellent prediction of the experimental data measured in this work.

Supported by FAPESP (2008/56258-8 and 2008/09502-0) and CNPQ (304495/2010-7, 480992/2009-6)