

LIQUID-LIQUID EQUILIBRIUM FOR TERNARY SYSTEMS CONTAINING BIODIESEL, CRUDE GLYCERINE, METHANOL AND ETHANOL AT (303.15 AND 318.15) K

Daniele de Bastiani and Marcelo Lanza*

Laboratory of Thermodynamics and Supercritical Extraction (LATESC)
Department of Chemical Engineering and Food Engineering (EQA)
Technological Center (CTC)
Federal University of Santa Catarina (UFSC)
P.O. Box 476, Zip Code 88040-900, Florianópolis, SC, BRAZIL

In the field of science and industry, crude glycerine is formed from glycerol and several other compounds which are undesirable for industrial applications. There are several ways to produce glycerine for industrial use, but the crude glycerine is also produced as a byproduct of biodiesel production. This crude glycerine can be an environmental problem and for industrial use is necessary that it be purified. Therefore, studies involving separation and purification processes of crude glycerin are extremely important for the area of biodiesel production. Thereby, liquid-liquid equilibrium (LLE) data are important variables in thermodynamic processes of separation and purification, however, there are not ELL data with crude glycerine, just pure glycerin (glycerol). This work was performed using crude glycerin for determination of ELL data. First, biodiesel of soybean oil with ethanol or methanol were produced in laboratory by transesterification reaction and crude glycerine was also obtained these reactions. After that, ELL data for the mixture of biodiesel, alcohol and crude glycerin were determined using glass cells at temperatures of 303.15 K and 318.15 K. The phase compositions in equilibrium were determined using analytical technical of gravimetry and sodium periodate method (60 °C) to quantify the mass fraction of alcohol and free glycerin, respectively. The biodiesel fraction was quantified by difference. The ELL results are good quality, but the impurities of crude glycerine drastically affect the equilibrium. For all the systems investigated were found good alignments between the phase compositions and the overall compositions indicating low deviations from mass balance.

Keywords: liquid-liquid equilibrium, crude glycerine, biodiesel, methanol, ethanol.

*Corresponding author: mLANZA@ENQ.UFSC.BR