

## Modeling of liquid-liquid phase equilibrium in system triacylglycerides – fatty acid – ethanol

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**Keywords:** modeling, phase equilibrium, liquid-liquid system, UNIFAC model, triacylglycerides, ethanol, oleic acid, stearic acid, lauric acid.

### Abstract

The aim of the paper is to estimate the possibility of using UNIFAC model for the analysis of phase equilibria in systems TAG – CarbA – EtOH, where TAG – triacylglycerides (sunflower oil), CarbA – fatty carboxylic acids – oleic (OIA), stearic (StA), lauric (LaurA), EtOH – ethanol at temperatures ranging from 30 to 70 °C, which is associated with the disposal of waste oils containing free fatty acids. UNIFAC model with modified group interaction parameters ( $a_{mn}$ ,  $a_{nm}$ ) was used. For the studied systems the simulations and experiments were carried out. Obtained data allowed to plot the ternary phase diagrams, determine the composition of reversible transition of the systems from heterogeneous into homogeneous state, calculate residual dispersion and the degree of compliance of calculated and experimental data. It was found that for systems with OIA application of the UNIFAC model with modified group interaction parameters led to results of calculation close to experimental, but it gives substantial deviation for systems with LaurA and especially with StA. Due to the relatively high melting points of these acids the probability of forming of solid phases in the systems increases with growing of overall number of phases up to three.