

Solubility studies of trans-cinnamic acid in mixed solvents

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Phenolic acids are a subclass of phenolic compounds with chemical and biological properties of interest in the pharmaceutical and food industries. The design of their extraction and separation processes includes the knowledge of their thermophysical properties as well as multicomponent solid-liquid equilibria data.

For these compounds, even essential solubility data in pure organic solvents and water are scarce. Therefore, in this work, trans-cinnamic acid was chosen as a model compound for which only a few solubility data in pure water and alcohols can be found in the literature [1-3].

The solubility of trans-cinnamic acid in the mixed solvents water + ethanol, and water + methanol was measured, at 298.15 K, using the isothermal shake-flask method and quantitative analysis either by gravimetry or UV spectrophotometry. As can be seen in Fig. 1, the solubility of the acid can significantly increase with the addition of the alcohol, with a more pronounced effect induced by ethanol. In a complementary approach and aiming to search for other methods to increase the aqueous solubility of trans-cinnamic acid, the phase-solubility diagram was determined for systems containing α -cyclodextrin.

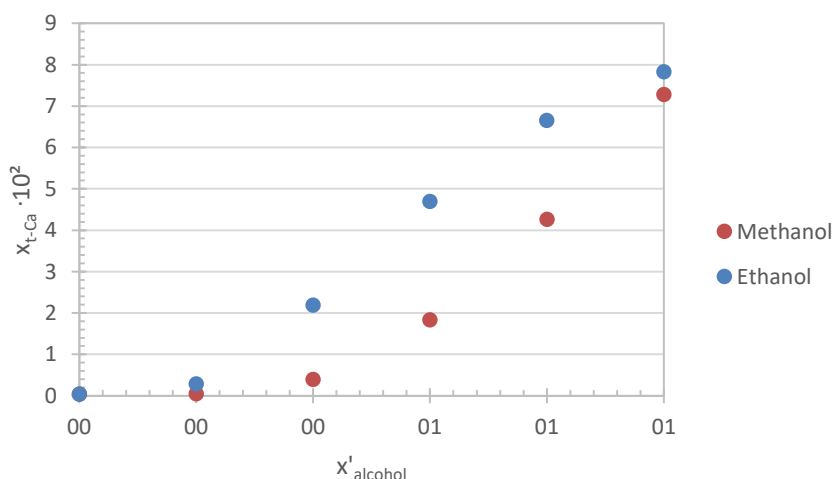


Fig.1. Solubility of trans-cinnamic acid in mole fraction (x_{t-Ca}) in mixtures of alcohol + water at 289.15 K versus the mole fraction of alcohol in solute-free basis

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