

Thermodynamics of dissolution and infrared-spectroscopy of solid dispersions of phenacetin

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Abstract

© 2016 Journal of Advanced Pharmaceutical Technology and Research. In this work enthalpies of dissolution in water of polyethylene glycols (PEGs) having an average molecular weight of 1000 and 1400, Pluronic-F127, phenacetin as well as the composites prepared from them were measured using solution calorimetry at 298.15 K. Intermolecular interaction energies of polymer-phenacetin were calculated on the basis of an additive scheme. It was shown that for mixtures with high content of polymer (>90 wt%) Pluronic-F127 has the highest solubilizing effect, while for mixtures with (4-6):1 polymer: phenacetin ratio the best solubilizing agent is PEG-1400. Infrared-spectra showed a decrease of the number of self-associated molecules of phenacetin with increasing of polymer content in the composites. The obtained results enabled us to identify the features of intermolecular interactions of polymers with a model hydrophobic drug and may be used for optimizing the conditions for preparing solid dispersions based on hydrophilic polymers.

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Keywords

Enthalpy of solution, molecular interaction, phenacetin, Pluronic-F127, polyethylene glycol, solution calorimetry