Abstract

Acetanilide (ACN) and phenacetin (PNC) are compounds structurally related with acetaminophen widely used as model drugs in pharmaceutical chemistry. Based on published thermodynamic quantities for dissolution, partitioning and sublimation of ACN and PNC, at 25.0 °C, thermodynamic quantities for drugs solvation in cyclohexane-saturated water (W(CH)) and water-saturated cyclohexane (CH(W)), chloroform-saturated water (W(CL)) and water-saturated chloroform (CL(W)), and isopropyl myristate-saturated water (W(IPM)) and water-saturated isopropyl myristate (IPM(W)), as well as the drugs dilution in the organic solvents were calculated. The Gibbs energies of solvation were favourable in all cases. Respective enthalpies and entropies were negative indicating an enthalpy-driving for the solvation process in all cases. Otherwise, the Gibbs energies of dilution were favourable for ACN and PNC in IPM(W) but unfavourable in the other organic solvents, whereas the respective enthalpies and entropies were negative for both drugs in all the organic solvents, except for PNC in CH(W) indicating enthalpy-driving for the dilution process in the former cases and entropy-driving for the later. From obtained values for the transfer processes, an interpretation based on solute-solute and solute-solvent interactions was developed.

Keywords

Acetanilide, phenacetin, solvation, dilution, partition coefficient, organic solvents, solution thermodynamics