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A Study on the interactions of L-arginine with D-maltose monohydrate in aqueous solutions at different temperatures

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ABSTRACT

The density and speed of sound of L-arginine (0.025 to 0.2 mol kg^{-1}) in aqueous + D-maltose monohydrate (0 to 6 mass % of maltose monohydrate in water) were obtained at temperatures of (298.15, 303.15 and 308.15) K. The apparent molar volume (V_ϕ), limiting apparent molar volume (V^o_ϕ), transfer volume ($V^o_{\phi,tr}$), as well as apparent molar compressibility ($K_{s,\phi}$), limiting apparent molar compressibility ($K^o_{s,\phi}$) and transfer compressibility ($K^o_{s,\phi,tr}$) were calculated using the experimental density and speed of sound values. The results have been interpreted in terms of solute-solute and solute-solvent interactions. Solute-solvent (hydrophilic-ionic group and hydrophilic-hydrophilic group) interactions, were found to be dominating over solute-solute (hydrophobic-hydrophilic group) interactions in the solution, which increases with increase in maltose monohydrate concentration.

Keywords: Density, Speed of sound, Transfer volume, Transfer compressibility, Solute-solvent interactions