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A calorimetric study of the interaction of silver ions with jack bean urease

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Abstract: A thermodynamic study of silver ions by jack bean urease (JBU) was carried out at 2 temperatures, 27 and 37 °C, in Tris buffer (30 mM; pH 7.0) using isothermal titration calorimetry (ITC). There was a set of 12 identical and noninteracting binding sites for the silver ions. The intrinsic dissociation equilibrium constant and the molar enthalpy of binding were 185 μ M and -16.7 kJ mol^{-1} at 27 °C, and 229 μ M and -16.3 kJ mol^{-1} at 37 °C, respectively. The molar entropy of binding was +15.7 J K^{-1} mol^{-1} at 27 °C and +17.1 J K^{-1} mol^{-1} at 37 °C. Hence, the binding process of silver ions to JBU is not only enthalpy driven but is also entropy driven, and the role of entropy should be made more effective by increasing the temperature.

Key Words: Urease; silver ion; isothermal titration calorimetry; binding constant; enthalpy of binding; entropy of binding

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