Potentiometric and Equilibrium Studies on Complex-Formation Reactions of $[\text{Pd}(\text{2-aminomethylpyridine})(\text{H}_2\text{O})_2]^{2+}$ with Ligands of Biological Significance and Displacement Reactions of DNA Constituents

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The stability constants of the complexes formed between various biologically relevant ligands (amino acids and DNA constituents) and $[\text{Pd}(\text{Pic})(\text{H}_2\text{O})_2]^{2+}$ were investigated at 25 °C and 0.1 M ionic strength. The concentration distribution diagrams of the various complex species as a function of pH were evaluated. DNA constituents form 1:1 and 1:2 complexes. The equilibrium constants for the substitution of representative coordinated DNA constituents by mercaptoethylamine, cysteine and glutathione were calculated. The results are expected to contribute to the chemistry of antitumour agents. The thermodynamic parameters ΔH° and ΔS° calculated from the temperature dependence of the equilibrium constants were determined for adenosine, and adenosinemonophosphate complexes with $[\text{Pd}(\text{Pic})(\text{H}_2\text{O})_2]^{2+}$. The thermodynamic study of these systems is very important because it can give information about the structural environment of the complexes; moreover, it can help in outlining different noncovalent interactions such as coulombic forces and hydrogen bonds.

Keywords: Potentiometry, Complex-formation, thermodynamics, antitumor, Speciation, glutathione.

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