

DNA Binding and Cleavage Studies of Cobalt Complexes Containing Bioactive Mixed Ligands

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Abstract

The complexes containing bioactive ligand of the type $[\text{Co}(\text{L}^1\text{L}^2)] (\text{PF}_6)_2$ complex **(1)** (where $\text{L}^1=1,10\text{-phenanthroline}$ and $\text{L}^2 = \text{N,N-dimethyl-2-\{5-[(pyrrolidin-1-ylsulfonyl)methyl]-1H-indol-3-yl\}ethanamine}$ (almotriptan) in 1:1 molar ratio of ligands) and $[\text{Co}(\text{L}^1\text{L}^3\text{L}^4)] (\text{PF}_6)_2$ complex **(2)** (where $\text{L}^3=4\text{H-1,2,4-triazol-4-amine}$, $\text{L}^4=1\text{H-benzimidazole-2-thiol}$ and the ligands are in the ratio 1:1:1, were synthesized and characterized. The DNA binding property of the complexes with calf thymus DNA has been investigated using absorption spectra, viscosity measurements and thermal denaturation experiments. The intrinsic binding constant K_b has been estimated at room temperature. The absorption spectral studies indicate that the complexes intercalate between the base pairs of the CT-DNA tightly with intrinsic DNA binding constant of $2.4 \times 10^6 \text{ M}^{-1}$ for **(1)** and $3.3 \times 10^4 \text{ M}^{-1}$ for **(2)** in 5 mM Tris-HCl/50 mM NaCl buffer at pH 7.2, respectively. The oxidative cleavage activity of **(1)**, and **(2)** upon pUC19 DNA were studied by using gel electrophoresis and the results show that complexes have potent nuclease activity.

Keywords:

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DNA binding

Viscosity measurements

Thermal denaturation

Cleavage studies