**Piroxicam complexes of Copper(II), Zinc(II), and Nickel(II); Interaction of *trans*-[Cu(Pir)2(THF)2] with DNA**

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**Abstract**

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most frequently used medicinal drugs. They are utilized primarily as analgesics, anti-inflammatories and antipyretics. Piroxicam is a [non-steroidal anti-inflammatory drug](http://en.wikipedia.org/wiki/Non-steroidal_anti-inflammatory_drug) used to relieve the symptoms of [rheumatoid](http://en.wikipedia.org/wiki/Rheumatoid_arthritis) and [osteoarthritis](http://en.wikipedia.org/wiki/Osteoarthritis), primary [dysmenorrhoea](http://en.wikipedia.org/wiki/Dysmenorrhoea), postoperative pain; and act as an [analgesic](http://en.wikipedia.org/wiki/Analgesic), especially where there is an [inflammatory](http://en.wikipedia.org/wiki/Inflammation) component. In addition piroxicam has nonpharmacological application too. Copper piroxicam complexs can catalyse the elimination of superoxide radicals. In this work pharmacological application of piroxicam was studied. Recently It had been found that the Cu complexes of piroxicam is itself more active as anti-inflammatory agent than its parent compound. Hence, one of the goals of this project is to synthesis piroxicam chelates with Ni(II), Cu(II) and Zn(II) ions. From the structural data it is possible to discern how it is coordinated to the metal ions, then to hypothesize how it can be coordinated in biological systems. The study aims also to determine the coordination capacity of piroxicam that incorporates served binding sites via the IR, UV-Vis, X-ray and NMR. All techniques reveal that piroxicam behaves as a monoanionic bidentate ligand coordinated to the metal ions through the pyridyl-N and carbonyl-O of the amide. Chelates have distorted octahedral geometrical structures. Piroxicam is not only used as anti-inflammatory and analgesic agent, but also exhibit chemopreventive and chemosuppressive effects on various cancer cell lines. Piroxicam exerts its anticancer effects by inhibiting both at the protein level and/or at the transcription level. Cu(II) complexes of this NSAID show better anti-cancer effects than the bare drug. CD spectrum is a sensitive reporter of any alteration in the DNA-backbone. We have therefore used CD spectroscopy to identify the backbone distortions in the DNA obtained upon binding of Cu(II)–piroxicam complex and Circular dichroism (CD) spectroscopy showed that the binding of Cu(II)–piroxicam with DNA results in DNA backbone distortions. Even though the molecular mechanism behind piroxicam complexes principal function, i.e. as analgesic and anti-inflammatory agents is quite well understood, it is not clear exactly how they exert their anticancer effects. Anticancer effects of these drugs have been implicated to occur both by the cyclooxygenase (COX)-dependent and COX-independent pathways.

Key Words

Non-steroidal anti-inflammatory drugs; Piroxicam complexes; Drug-DNA interaction; Anticancer; Circular dichromism; Antiinflammatory; Distortion; Analgesics.