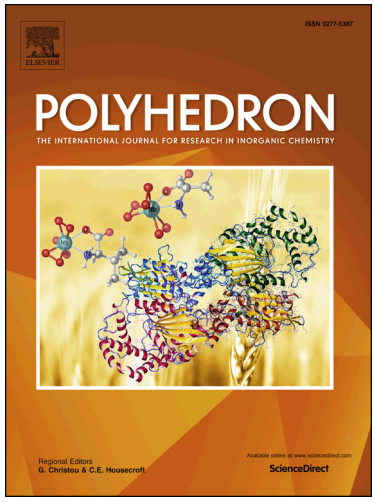

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PII: S0277-5387(17)30585-5
DOI: https://doi.org/10.1016/j.poly.2017.09.008
Reference: POLY 12818

To appear in: *Polyhedron*

Received Date: 19 July 2017
Revised Date: 10 September 2017
Accepted Date: 11 September 2017

Please cite this article as: S. Perontsis, A. Tialiou, A.G. Hatzidimitriou, A.N. Papadopoulos, G. Psomas, Nickel(II)-indomethacin mixed-ligand complexes: Synthesis, characterization, antioxidant activity and interaction with DNA and albumins, *Polyhedron* (2017), doi: https://doi.org/10.1016/j.poly.2017.09.008

Nickel(II)-indomethacin mixed-ligand complexes: Synthesis, characterization, antioxidant activity and interaction with DNA and albumins

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Abstract

The interaction of $NiCl_2$ with the non-steroidal anti-inflammatory drug indomethacin (Hindo) resulted in the formation of a series of mixed-ligands mononuclear complexes bearing the oxygen-donor methanol (MeOH) and/or the nitrogen-donors 2,2'-bipyridine (bipy), 1,10-phenanthroline (phen), 2,2'-bipyridylamine (bipyam) and 2,2'-dipyridylketone oxime (Hpko) as co-ligands. The resultant complexes $[Ni(indo\text{-}O)_2(MeOH)_4]$ **1,** $[Ni(indo\text{-}O,O')(bipyam)_2]Cl$ **2**, $[Ni(indo\text{-}O)_2(bipy)(MeOH)_2]$ **3**, $[Ni(indo\text{-}O,O')_2(bipyam)]$ **4**, $[Ni(indo\text{-}O)_2(phen)(MeOH)_2]$ **5** and $[Ni(indo\text{-}O)_2(Hpko\text{-}N,N')_2]$ **6** were characterized by diverse physicochemical and spectroscopic techniques. The structure of complex **2** was determined by single-crystal X-ray crystallography. Furthermore, the complexes **1-6** were investigated for their biological activity. The potential antioxidant activity of the complexes was evaluated by examining their *in vitro* ability to scavenge free radicals such as 1,1-diphenyl-picrylhydrazyl (DPPH), 2,2′-azinobis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and hydroxyl (OH) radicals. All complexes are better radical scavengers than free indomethacin. The interaction of the complexes with calf-thymus (CT) DNA was monitored by UV-vis spectroscopy, cyclic voltammetry, DNA-viscosity measurements and competitive studies with ethidium bromide (EB). According to the experimental findings, the complexes can bind tightly to CT DNA via intercalation and can displace EB from its EB-DNA conjugate. The interaction of the complexes with human serum albumin (HSA) and its homologue bovine serum albumin (BSA) was studied by fluorescence emission spectroscopy and the corresponding binding constants were calculated. The complexes bind tightly and reversibly to both albumins.

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