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In-vitro antioxidant and antibacterial studies of heterocyclic Schiff base nickel (ii) complexes: Synthesis and characterization

Ikechukwu Peter Ejidike and **Fanyana M Mtunzi**
Vaal University of Technology, South Africa

Schiff base-transition metal complexes obtained from heterocyclic molecules have received attention from many researchers regarding the development of bioinorganic compounds for biological application. The strategic design of biologically active molecules is a vigorous task and the variables affecting biological activity are diverse. Metal based antioxidants have gained recent attention for their ability to protect living organisms and cells from damage caused by oxidative stress or scavenge free radicals. In view of the growing interest in the development of new therapeutic agents and DNA probes for disease defence, we present nickel (II) complexes of tridentate Schiff bases with a N_2O donor atoms set and formulated as: $[Ni(L)X]\cdot nH_2O$, (where L = Tridentate donor ligands, X = Cl, Br-, NO_3-, CH_3CHOO-). The synthesized compounds were air stable and characterized spectroscopically. The spectra data showed that the ligands coordinate Ni ion through the azomethine nitrogen and enolic oxygen atoms. Electronic spectral measurements indicated a square planar geometry for all the complexes. The antioxidant activities of the complexes were investigated through scavenging activity on 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and 2-2′-Azino-di-[3-ethylbenzthiazoline sulfonate] (ABTS) radicals. The x-ray diffraction (XRD) analysis showed that the complexes possess crystallite sizes. The obtained IC_{50} values for the nickel complexes were higher than Schiff base ligand. The compounds were screened against two Gram-positive (*S. aureus* and *E. faecalis*) and two Gram-negative (*K. pneumoniae* and *P. aeruginosa*) bacterial strains. The antibacterial activity of the isolated compounds was found to possess MIC values in the range 1.564 - 12.5 mg/ml against the strains. However, antioxidant activities of the complexes showed moderate to strong free radical inhibitors for treating pathological damage associated with radical-generation leading to aging and cancer.

Biography

Ikechukwu Peter Ejidike completed his PhD from University of Fort Hare, South Africa. He is presently a postdoctoral fellow and supervising postgraduate students at Department of Chemistry, Faculty of Computer and Applied Sciences, Vaal University of Technology. He has published more than 18 research articles in reputed journals; others under review, and has been serving as a reviewer to various journals. He has taught chemistry at high schools, pre-varsity and university. He is a professional chemist member and member of the South African Chemical Institute (SACI) and International Union of Pure and Applied Chemistry (IUPAC), Member, Royal Society of Chemistry (MRSC).

destinedchild12@gmail.com

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