The biological activity mechanism of thiosemicarbazones is closely related to their ability to inhibit the biosynthesis of DNA, possibly by blocking the enzyme ribonucleotide diphosphate reductase; binding to the nitrogen base of DNA, hindering or blocking base replication; creation of lesions in DNA strands by oxidative rupture. Structure–activity relationships evidence not only that the complexation enhances the antimicrobial activity of bioactive ligands against some tested microorganisms but also that the presence of a metal center may also play a relevant role in the activity of coordination compounds [1]. In recent years the medicinal applications of oxovanadium(IV) complexes with N-, O- and S-donor chelating ligands a thiosemicarbazone ligand in ONS coordination mode have been investigated especially for their potential insulin-mimetic effects [2]. Besides these effects, other pharmacological activities of vanadium compounds include tumor growth inhibition and prophylaxis against carcinogenesis [3].

A new oxovanadium(IV) template complex of 2,2'-dihydroxybenzophenone-S-methyl thiosemicarbazone and salicyl aldehyde was synthesized. The complex was characterized by elemental analysis, IR and electronic spectra. The electrochemical behaviors of the ligand and its complex were studied using cyclic voltammetry. The measurements were carried out with a Gamry Reference 600 potentiostat/galvanostat utilizing a three-electrode configuration at 25°C. For cyclic voltammetry (CV) and square wave voltammetry (SWV) measurements, the working electrode was a glassy carbon. The surface of the working electrode was polished with an alumina suspension before each run. A platinum wire served as the counter electrode, an Ag/AgCl was employed as the reference electrode. Tetrabutylammonium perchlorate (Bu4NCIO4, TBAP) in dimethyl sulfoxide (DMSO) was employed as the supporting electrolyte at a concentration of 0.1 M. [4] High purity N2 was used to remove dissolved O2 at least 10 min prior to each run maintain a nitrogen blanket during the measurements. This work presents the assignments of the redox couples and the electrochemical parameters, which included the half-wave peak potentials (E1/2), anodic to cathodic peak potential separation (ΔEpc), and ratio of the anodic to cathodic peak currents (Ipa/Ipc).

References