

Zinc catechin complexes in aprotic medium. Redox chemistry and interaction with superoxide radical anion

Mario E. Bodini, M. A. Del Valle, R. Tapia, F. Leighton, P. Berrios

Abstract

The redox chemistry of catechin and its zinc(II) complexes has been studied in dimethyl sulfoxide. In the absence of base, catechin undergoes oxidation processes at 0.96 and 1.24 V versus SCE. The first process corresponds to the formation of the quinonic form of the catechol moiety. In the presence of 1 equiv. of base, a stable 1:2 complex is formed with oxidation processes that show up at 0.26 and 0.62 V versus SCE. The voltammetric and spectroscopic characterization of the species produced after the oxidation processes are described. Upon interaction of the complex with superoxide radical anion in dimethyl sulfoxide, its basic character causes the formation of the monoanion of catechin leading to a more stable zinc(II) complex. Protonated superoxide disproportionates to molecular oxygen and peroxide leading to oxidation of the bound ligand. Upon complexation the oxidation potentials decrease, favoring thermodynamically the antioxidant action of this flavonoid.