

“Electrochemical Study of the Interaction of Carbendazim Pesticide with Metal Ions Copper and its Environmental Impacts”

I. M. da Costa¹, L. Codognoto¹, E.M. Valle^{1*}

¹Universidade Federal de São Paulo, Instituto de Ciências Ambientais, Químicas e Farmacêuticas, Departamento de Ciências Exatas e da Terra, Diadema, São Paulo, Brazil

*e-mail: emavalle@gmail.com

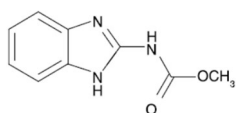


Figure 1: Molecular Structure of Carbendazim

The carbendazim (MBC), Figure 1, is a fungicide with protective and healing activity against a wide range of fungal diseases, especially those caused by *Ascomycetes spp.*, *Deuteromycetes* and *Basidiomycetes spp.*, in crops of fruit and vegetables. In addition, the MBC is the most important degradation product of other benzimidazole fungicides such as benomyl and thiophanate-methyl. Copper (Cu) is a metal of moderately abundant, which is easily found in the earth crust. Thus, it may interact with molecules of pesticides presents in the environment. Reports in the literature show the influence of metals on the pesticide sorption mechanism, because of these pesticides have ability to form complexes with metals bioavailable in the soil. Thus, is very important understand how these interactions occur. In this study was evaluated the interaction of ion metal copper (II) with carbendazim pesticide, using the cyclic voltammetry technique. The pesticide has an anodic peak in an irreversible process around 1.10 V, and the ion copper has a formal redox process around - 0.10 V. After adding of the pesticide solutions in the electrochemical cell contains Cu^{2+} , a new anodic peak was observed around 0.60 V (Figure 2 A), indicating the formation a new species in solution. The interaction between MBC and Cu^{2+} ions was evaluated by UV-Vis spectroscopy too in order to confirm this interaction. Was observed changes in the absorption band of MBC like shown in the Figure 2 B.

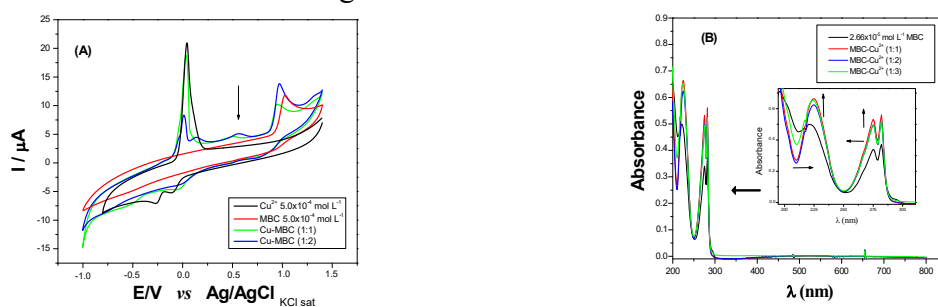


Figure 2. (A) Cyclic voltammograms and (B) UV-Vis Spectra, for the metal ion copper, carbendazim pesticide and Cu-MBC complex.

FAPESP, CAPES and CNPQ

Boudina, A.; Emmelin, C.; Baaliouamer, A.; Grenier-Loustalot, M. F.; Chovelon, J. M.; *Chemosphere*, **2003**, 50, 649

Coutinho, C. F. B.; Coutinho, L. F. M.; Mazo, L. H.; *Quim. Nova*, **2009**, 32, 228.

Garcia, A. F.; Rollemberg, M. C.; *Quim. Nova*, **2007**, 30, 1592.