INTRODUCTION

Previous research studies have shown that polyphenolic aqueous extracts obtained from different vegetal raw material modulates plant growth and development, metal tolerance and bioaccumulation process in different heavy metal stress conditions.

Catechins are flavan-3-ols that occur widely in the plant kingdom and it was also identified in considerable concentrations in spruce bark and grape seeds aqueous extracts. On the other side, the use of low molecular weight organic acids which are easily biodegradable has been proposed as an alternative to the synthetic chelants. The aim of this research was to evaluate, through different techniques (SEM, FTIR, AAS), the influence of catechine (1, 10, 50, 100µM) addition into a copper (25mg/L) contaminated environment, on metal bioaccumulation into maize plant.

RESULTS AND DISCUSSIONS

The results shown that the addition of catechine into a copper contaminated environment presented inhibitory effects on roots growth and development but permit a proper development of the shoots even in a 25mg/L Cu(II). Bioaccumulation of copper ions decreased up to 80% comparing with the values registered for 25mg/L Cu(II) into the roots zone.

EXPERIMENTAL

✓ Germination test were carried out in Petri dishes, each one containing 10 maize seeds pre disinfectated with NaOCl 1% for 15 min and 20mL tested solution (10 mL tap water - Control, 10mL CuSO₄ · 5H₂O (50µM) Cu(II) and 10mL Catechine solution (1, 10, 50, 100µM) + copper solution: Cu –Catechin, Cu –Catech 10, Cu –Catechine 50, Cu –Catechine 100 corresponding to different Copper – Catechine tested concentrations.
✓ After 10 days the maize seedlings were separated to rosettes, hypocotyls, cotyledons and green biomass quantitative determination, biometric measurements were realized. The experiment was carried out in triplicates and an average value was reported.
✓ Dry separated rape plantlet sample were mineralized in HNO₃ (65%) and H₂O₂ (30%) on a hot plate (120 C) for at least 5h, than heavy metal concentration was determinate using a GBC Avanta Atomic Absorption Spectrophotometer.
✓ FTIR spectra were obtained for the dry shoots of the maize plantlet resulted in 25mg/L Cu (II) contaminated growth medium supplemented with Catechine (100µM). The oven dried plant samples were ground into a fine powder by using an agate mortar and the FT-IR spectra were recorded using Bruker IFS-66v model FT-IR spectrometer in the region 4000-400cm⁻¹ by employing standard KBr pallet technique (2.5% sample).
✓ Maize roots were lyophilized to remove free water using a Christ freeze dry system. Samples frozen in liquid nitrogen, and then fractured into small pieces with a blunt knife were mounted on a aluminium stubs and examined using a Hitachi S-2460 N scanning electron microscopy equipped with EDX (Energy Dispersive X-Ray) Kenex, Sigma –Detector Diode Si – Li.
✓ The chlorophyll was extracted in 80% acetone and spectrophotometrically determining by reading the absorbances at fixed wavelength 470, 646, 663nm.