Stresul oxidativ indus de către ionii de Cupru(II) şi fier(II) în frunzele de floarea soarelui

CIMPEANU Carmen, ENACHE Monica, MANOLE Emilia - USAMV Bucuresti

"Oxidative stress induced by copper and iron ions in sunflower leaves".
Nowadays, numerous scientific data indicate that heavy metals act as catalysts in the oxidative deterioration of the biological macromolecules, which suggests that heavy metal-determined toxicity may result, at least partly, from the tissular oxidative stress. The copper ions are supposedly as efficient as the iron ions in catalysing the free-radical formation process (oxigen reactive species). The present study examines the hypothesis according to which the Cu(II) ions are more reactive than the Fe(II) ions in inducing the oxidative stress. It presents a comparative analysis of the heavy metal ion effects upon the content in chlorophyll, malondialdehide (MDA), and glutathione (GSH) present in sunflower leaf fragments. Due to the toxic action of the metal ions, peroxidase activity in the cell increases about 2.5 times in Fe(II) ions, and 3.5 times in Cu(II), compared with the control. Glutathione concentration decreases by 40% in Fe(II) ions, and 50% in Cu(II) ions, compared with the control. Also, the content in chlorophyll decreases by 30% in Fe(II), and 40% in Cu(II). These results prove the oxidative stress produced in cells by the metal ions. The present study also tests the antioxidative efficiency of such free-radical consumming molecules as sodium benzoate and mannitol. Among the antioxidants tested, mannitol was observed to prevent the increase in lipid peroxidation more efficiently, being thus a better antioxidant than sodium benzoate.