

Utjecaj kontaminacije tla kadmijem na međuodnos koncentracije Fe, Zn, Mn, Cu, K i Cd u zrnu ozime pšenice

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Sažetak

Kadmij je toksičan i kancerogen element koji može utjecati na akumulaciju drugih elemenata u zrno ozime pšenice. Cilj ovog rada bio je ispitati međuodnos koncentracija željeza (Fe), cinka (Zn), mangana (Mn), bakra (Cu), kalija (K) i kadmija (Cd) u zrnu ozime pšenice uzgajane ne kontaminiranom i tlu kontaminiranom Cd. Pokus je bio postavljen po potpuno slučajnom planu s dva tretmana (Cd) u četiri ponavljanja. Kultivari ozime pšenice (52) uzgajani su u posudama, a žetva je obavljena u punoj zriobi. Prikupljeni uzorci zrna su razoreni mokrim postupkom, mješavinom dušične kiseline (HNO_3) i vodikovog peroksida (H_2O_2) mikrovalnom tehnikom. Koncentracija elemenata u uzorcima utvrđena je direktnim mjerenjem pomoću ICP-OES tehnike.

Značajna veza (r_s) utvrđena je između koncentracije Fe i svih ostalih elemenata u zrnu pšenice na nekontaminiranom tlu, dok je na tlu kontaminiranom Cd, koncentracija Fe u zrnu bila u statistički značajnoj vezi jedino sa koncentracijom Zn i Mn u zrnu. Na tlu kontaminiranom Cd, koncentracija Cd u zrnu bila je u statistički značajnoj negativnoj vezi sa koncentracijom Cu i K u zrnu, dok na nekontaminiranom tlu nije utvrđena veza između koncentracije Cd i Cu u zrnu. Statistički značajna veza pozitivnog smjera utvrđena je između Mn i Cd na nekontaminiranom ali i na kontaminiranom tlu, no na kontaminiranom tlu utvrđena veza je puno slabija. Dobiveni rezultati ukazuju na to da kontaminacija tla Cd može utjecati na odnose ispitivanih elemenata u zrnu pšenice.

Ključne riječi: kadmij, željezo, cink, mangan, koncentracija u zrnu, ozima pšenica

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Soil Cd contamination influences on the interdependence of Fe, Zn, Mn, Cu, K and Cd concentration in winter wheat

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Abstract

Cadmium is a toxic and cancerogenic metal that can influence on accumulation of other elements in winter wheat grain. The aim of this paper was to examine relationship between iron (Fe), zinc (Zn), manganese (Mn), cuprum (Cu), potassium (K) and cadmium (Cd) grain concentration on uncontaminated and Cd contaminated soil. Experiment was set up according to a completely randomized design with two treatments (Cd) and four replicates. Winter wheat genotypes (52) were grown in pots and grain was harvested in full maturity. Collected samples were wet digested with HNO_3 and H_2O_2 in microwave vessels. A concentration of elements was determined by inductively coupled plasma-optical emission spectrometry (ICP-OES) technique.

Significant correlation (r_s) was found between Fe concentration and concentration of all other elements in grain on uncontaminated soil while on Cd contaminated soil Fe grain concentration was in correlation only to Zn and Mn grain concentration. On Cd contaminated soil Cd grain concentration was in statistically significant negative correlation with Cu and K grain concentration while on uncontaminated soil there was no relationship of Cd to Cu. On the other hand, Cd was in statistically significant positive relationship to Mn both on uncontaminated and Cd contaminated soil, but on contaminated soil relationship was weaker. Results indicate that there are differences in interdependence of element concentration in grain under different soil Cd levels.

Key words: cadmium, iron, zinc, manganese, grain concentration, winter wheat

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