

Teški metali u tlu i procjednoj vodi na području vodocrpilišta Vinokovščak

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Sažetak

Stacionarno lizimetrijsko istraživanje provedeno je u razdoblju 2003-2006. u oraničnom sloju semiglej-aluvijalnog tla u blizini vodocrpilišta Vinokovščak, u Varaždinskoj županiji. Glavni cilj istraživanja bio je utvrditi stupanj onečišćenja tla i procjedne vode teškim metalima (Cd, Cu, Pb i Zn). U tu svrhu praćene su: dinamika koncentracija teških metala u tlu i vodi iz tenziometarskih i gravitacijskih lizimetara, količina ispranih teških metala procjednom vodom i ocijenjeno je onečišćenje tla i procjednih voda sukladno zakonskoj regulativi. Koncentracije teških metala u sloju tla 0-30 cm varirale su kako slijedi: Cd (0,28 - 0,83 mg/kg), Cu (16,0-44,0 mg/kg), Pb (18,9 – 40,0 mg/kg), Zn (42,1 – 93,0 mg/kg). Prema stupnju onečišćenja So ovo je tlo povećane onečišćenosti s Cu, Pb i Zn (0,25-0,50) i velike onečišćenosti s Cd (0,50-1,00). U procjednoj vodi gravitacijskih lizimetara koncentracije teških metala kretale su se u sljedećim rasponima: Cd (1,5 -4,8 mg/l), Cu (4,4-78,0 mg/l), Pb (6,0-52,0 mg/l) i Zn (18,0 – 268,0 mg/l). Sukladno vrijednostima MDK, utvrđene koncentracije Cu odgovarale su petoj (V), Cd i Pb četvrtoj (IV), te Zn prvoj (I) vrsti voda. Količina ispranih teških metala procjednom vodom kretala se od: 2,8 - 3,8 g Cd/ha, 17,0 – 42,7 g Cu/ha, 25,9 – 40,1 g Pb/ha i 86,4 – 142,0 g Zn/ha. U istraživanom razdoblju prisutno je znatno onečišćenje tla i procjednih voda. U budućuće bi se trebalo više pažnje usmjeriti k stalnom praćenju kakvoće tla i procjednih voda, posebno na ovakvim osjetljivim vodozaštitnim područjima.

Ključne riječi: teški metali, tlo, procjedna voda, onečišćenje, lizimetri

Heavy metals in soil and percolated water at Vinokovsčak water supply area

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Summary

Stationary lysimetric study was conducted in the period 2003-2006 in the ploughed layer of semigley-alluvial soil near water wells Vinokovščak in Varazdin county. The main objective was to determine the degree of soil and leachate pollution by heavy metals (Cd, Cu, Pb and Zn). For this purpose, it was monitored the dynamics of the concentration of heavy metals in soil and water from tenziometric and gravity lysimeters, the amount of leached heavy metals by percolated water and evaluated the soil and leachate pollution in accordance with legislation. Concentrations of heavy metals in the soil layer 0-30 cm ranged as follows: Cd (0,28 to 0,83 mg / kg), Cu (16,0 to 44,0 mg / kg), Pb (18,9 to 40,0 mg / kg), Zn (42,1 to 93,0 mg / kg). According to the degree of pollution So, this soil was strongly polluted with Cu, Pb and Zn (0,25 to 0,50) and highly polluted with Cd (0,50 to 1,00). The heavy metal concentrations in percolated water were in the following ranges: Cd (1,5 -4,8 mg / l), Cu (4,4 to 78,0 mg / l), Pb (6,0 to 52,0 mg/l) and Zn (18,0 to 268,0 mg/l). According to the MAC, concentrations of Cu were corresponded fifth (V), Cd and Pb fourth (IV), and Zn first (I) of the water category. The amount of leached heavy metals ranged from: 2,8 to 3,8 g Cd /ha, from 17,0 to 42,7 g Cu /ha, from 25,9 to 40,1 g Pb /ha and 86,4 to 142,0 g Zn /ha. In this period the soil and leachate were highly polluted by heavy metals. In the future, should pay more attention to the constant monitoring of the quality of soil and leachate, especially on such sensitive water protection areas.

Key words: heavy metals, soil, percolated water, pollution, lysimeters