

EFFECTS OF THE GROWTH STAGE ON THE TOLERANCE TO HEAVY METALS IN ALFALFA PLANTS (*MEDICAGO SATIVA*)

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Abstract

Alfalfa plants (*Medicago sativa*, Mesa variety) grown in a silt soil of pH 7.4±0.2, were exposed in separate batches to 100 ppm of Cr(VI), 500 ppm of Cd(ii), Cu(ii), Ni(ii), and Zn(ii) at different growth stages. At the stage of four days after germination, all the metals, except Zn(ii), had lethal effects to alfalfa seedlings. At 16 days, Cr(VI) and Ni(ii) still had lethal effects, and Cd(ii) and Cu(ii) destroyed more than 50% of the plant population. At 20 days, approximately 90% of the plants exposed to Cd(ii), Cu(ii), and Zn(ii) were able to grow without apparent negative effects. Root of the plants exposed to Cr(VI) grew significantly more as compared to other treatments and accumulated up to 4650 ppm of cadmium. The translocation percent of heavy metals from roots to shoots was 26%, 29%, and 21% for cadmium, copper, and zinc, respectively. These results demonstrated that tolerance of alfalfa plants to cadmium, copper, and zinc was positively correlated with the age of the plant. This opens a new possibility to the use of alfalfa in the phytoremediation of heavily contaminated soils with Cd(ii), Cu(ii), and Zn(ii).

Key words: heavy metals, *medicago sativa*, age of plants