Cadmium and Zinc Interaction and Phytoremediation Potential of Seven *Salix caprea* Clones¹

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ABSTRACT

We evaluated the interaction between Cd and Zn in the bioaccumulation of seven clones of Salix caprea, which were exposed both to Cd and Zn alone and to a combination of Cd and Zn. Cadmium (Cd) and Zn concentration in the four treatments were administered in the following order: root > leaf > stem, and obvious differences were noted among the treatments and clones. The leaf Cd concentration of clone BH2 and stem Cd concentration of clone BH5 in the combined Cd and Zn treatment group was increased by 62% and 110%, respectively, relative of that of the Cd alone treatment group. On the other hand, the leaf and stem Zn concentration of clone BH8 in the combined Cd and Zn treatment group was reduced by 66% and 61%, respectively, relative to that of the Zn alone treatment group. Translocation of Cd and Zn from the root was higher in the leaf than in the stem, and the combined Cd and Zn treatment stimulated the translocation of Cd from the root to the leaf and stem, whereas it suppressed the translocation of Zn from the root to the leaf and stem. Therefore, the interaction effects were considered strongly synergistic with Cd in the presence of Zn, but proved antagonistic to Zn in the presence of Cd in the combined Cd and Zn treatment group. The phytoremediation potentials of the seven clones, which were estimated from standard indices of Cd and Zn concentration in Cd and Zn alone and the combined Cd and Zn treatment groups, were highest in clone BH3, and lowest in clone BH5. Therefore, we recognize S. caprea as an appropriate material for phytoremediation, and this is particularly the case with clone BH3. However, further research will be required to evaluate the effects of Cd and Zn on the physiological changes as well as tolerance mechanisms against metal toxicity in S. caprea clones.

Keywords : Cadmium, Zinc, Interaction, Salix caprea, Phytoremediation

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