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EFFECTS OF CADMIUM AND ZINC ON GROWTH AND METAL ACCUMULATION OF *Mathiola flavida* BOISS

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Abstract

The effects of cadmium (Cd), Zinc (Zn), and Cd–Zn on growth and their accumulation in the *Matthiola flavida* shoots were investigated. A factorial experiment with two factors (Cd and Zn) concerning four concentrations of Cd (0, 5, 10 and 20 mg L⁻¹) and four Zn concentrations (0, 10, 20 and 40 mg L⁻¹) were carried out. The shoot and root biomass of *M. flavida* growing in Cd–Zn medium decreased significantly ($p < 0.01$) compared to the control. Growing in the presence of 20 mg L⁻¹ Cd and 40 mg L⁻¹ Zn, resulted in the highest decrease of root and shoot biomass and tolerance index compared to that at 5 mg L⁻¹ Cd. At the highest Cd (20 mg L⁻¹) and Zn (40 mg L⁻¹) concentration, plant tolerance index was inhibited by 82 and 74%, respectively ($P < 0.01$) compared with the control. The concentrations of Cd and Zn in the shoots of *M. flavida* were increased with increasing Cd and Zn concentration in the medium. Significant inhibitory effects of Zn on Cd concentration in the shoots occurred at levels above 10 mg Zn L⁻¹. On the other hand, the shoot Cd concentration of *M. flavida* in the combined Cd and Zn treatment group was reduced by 67.6%, relative to that of the Cd alone treatment group. Zinc concentrations in the shoots decreased with increasing rates of applied Cd. Therefore, we recognize *M. flavida* as a candidate for remediation of sites co-contaminated by Cd and Zn purposes in Iran, the more so because they are adapted to the local climate and soil conditions.

Key words: Cadmium, Interaction, *Mathiola flavida*, Phytoremediation, Zinc

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