

Interaction effects of lead and salicylic acid on some quantitative and qualitative growth parameters and antioxidant enzymes of basil

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Abstract

Nowadays, phenolic compounds and plant growth regulators such as salicylic acid has been prescribed to reduce the adverse effects of different stresses. This greenhouse experiment was conducted in 2013, as a factorial randomized complete block design with 3 replications, to examine the effects of lead and salicylic acid on basil (*Ocimum basilicum*) plant, cv. Keshkeni Luvelou. Factors included 4 levels of lead [0 (control), 100, 200 and 300 mg/kg of soil] and foliar application of salicylic acid at 3 levels [0 (control), 50 and 100 ml/L]. Results showed that addition of lead significantly reduced leaf area, number of leaves, plant height, fluorescence and chlorophyll content of the plants and increased proline, soluble carbohydrates and guaiacol and ascorbate peroxidase enzymes. In addition, salicylic acid spraying had significant ($P \leq 0.01$) influence on all traits. Spraying salicylic acid at concentration of 100 ml/L at the fourth level of lead (300 mg/kg soil) decreased guaiacol, ascorbate peroxidase and soluble carbohydrates by 78.6, 73.8 and 24.3%, respectively, compared to the control. In this study, the interaction between salicylic acid and lead on leaf area, plant height, leaf chlorophyll content, fluorescence, proline, soluble carbohydrates, guaiacol and ascorbate peroxidase was significant. In general, the results of this experiment suggested that salicylic acid plays a moderating role, reducing the negative effects of lead toxicity on the studied traits of basil.

Keywords: Medicinal plants, Antioxidant enzymes, Proline, Heavy metals.

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