Abstract

In this study, the effects of phosphorus and potassium fertilizer were examined on As toxicity, growth, essential oil composition in two basil variety. The experimental design was a factorial with two basil variety including landrace of Zabol and keshkeni luvelou as first factor, and addition of phosphorous and potassium fertilizers to soil at three levels: 50, 150 and 250 mg K kg^{-1} soil as second factor. Arsenic sulphate was added to all the treatments at a uniform rate equivalent to 15 mg As kg^{-1} soil. The experiment was conducted in 2011 at the Zabol University greenhouse in Zabol, south Iran. Before reproductive phase onset plant height, number of lateral branches, number of leaves and lateral branches per plant and total fresh and dry weight of plant shoots, the leaf area per pot were recorded. In addition, qualitative characteristics include the essential oil content, essential oil constituents, macronutrients and As were measured. Morphological traits were affected by varieties at 1% level of probability. All growth parameters (except fresh weight) significantly changed between two varieties. Analysis of variance revealed that percentage of phosphorus absorbed from the soil was affected by varieties and phosphorus-potassium interaction, whereas phosphorus absorption was not significantly different across varieties. In both varieties, arsenic concentration in aerial parts reduced with increasing phosphorus addition. At different potassium fertilizer, the greatest As concentration was observed in the least potassium addition. Lowest essential oil production in both cultivars produced at the greatest As absorption and this heavy metal causes a change in the amount of essential oil constituents in both varieties.

Keywords: medicinal plants, heavy metals, essential oil, Chemical fertilizers

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