

Effect of mycorrhizal inoculation and phosphorus fertilizer on fenugreek resistance against arsenic

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Abstract

The aim of this study was to evaluate the effects of mycorrhizal inoculation and phosphorus (P) application on arsenic (As) toxicity and absorption by fenugreek, after application of As to soil. In this greenhouse experiment, plants inoculated with three mycorrhizal species and grown in soils with different levels of applied P and As, were compared. Phytotoxicity of As was determined by studying plant growth, As accumulation, as well as uptake of macronutrients and concentration of photosynthetic pigments. Based on the results, addition of As significantly reduced plant growth, uptake of macronutrients and concentration of photosynthetic pigments. Most of the absorbed As was retained in roots and fenugreek roots had higher concentration of As than the shoots. In addition, P and mycorrhiza had a significant impact on all traits, except sodium concentration. In this study, the interaction between As vs. P as well as between As vs. mycorrhiza was significant on concentration of carotenoids, potassium and arsenic in shoots. P and mycorrhiza had a moderating role and decreased the negative effects of arsenic toxicity on these properties. Results of this experiment revealed that application of P fertilizer and mycorrhizal inoculation in fenugreek could be effective in reducing the negative effects of As stress by increasing the uptake of nutrients and concentration of photosynthetic pigments.

Keywords: Heavy metals stress, Nutrients, Chlorophyll, Bio-fertilizer.

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