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Faculty of Agriculture



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Alfalfa growth in response to rhizobial inoculation under heavy metal stress

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Abstract

The application of inoculants with beneficial microorganisms can improve the soil properties, promote plant growth and alleviate stress in plants under elevated concentrations of potentially toxic elements. Rhizobial bacteria which forms symbiosis with leguminous providing nitrogen to the plant, in addition can also mitigate the effects of different stress factors. In this study the effects of rhizobial inoculation on alfalfa growth in soils with increased nickel (Ni) concentrations during two years was evaluated. The experiments were conducted in two locations with different concentrations of potentially toxic elements, primarily Ni concentrations, but also lead (Pb) and chromium (Cr), with six different rhizobial inoculants and followed during the two years. The inoculation in some treatments significantly increased alfalfa yield in particular cuts, depending on the locations and treatments, with up to 25% increase compared to non-inoculated plants. The statistical analyses showed that the year of utilisation and treatment, as well as interactions year x location, location x treatment, significantly influenced the yield of alfalfa. Overall, for all seasons and location the best treatments were inoculated for G-nov, 4193cs, and 252 *Ensifer meliloti* strains. The results showed potential of inoculation with particular rhizobia to improve alfalfa yield in soils with elevated potentially toxic elements and indicate the complex of the interactions of multiple factors in the environment.

Key words: alfalfa, rhizobia, soil, potentially toxic elements

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