



The Soil Re-Union Science for Healthy Soils

4th International and
16th National Congress
of the Serbian Society
of Soil Science



Serbian
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Soil Science



THE BOOK OF ABSTRACTS

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MICROBIAL COMMUNITY IN ALFALFA RHIZOSPHERE IN RESPONSE TO INCREASED NICKEL CONCENTRATION

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ABSTRACT

Rhizosphere is a very active region containing many microorganisms involved in complex biological and ecological processes. Under adverse conditions such as trace element pollution, the rhizosphere of plants can modify the soil conditions and the effects of pollutants, promote plant growth and alleviate stress in plants. Alfalfa establishes effective nitrogen-fixing symbiosis with rhizobia. Besides nitrogen fixation, inoculation with rhizobial strains can result in promotion of the metal bioaccumulation within the root nodules in contaminated soil. Trace elements in the soil could be immobilized via their adsorption and/or accumulation in the plant roots and/or by bacteria in rhizosphere, resulting in reduction of their toxicity. To evaluate the effect of rhizobial inoculation of alfalfa on soil properties, two locations with different Ni content in the soil 195 mg/kg and 52 mg/kg, as well as 6 different rhizobial strains were tested. Concentrations of trace elements, total and available forms, as well as other chemical soil parameters were determined at the beginning and at the end of the vegetation period. Furthermore, the abundance and activity of specific groups of soil microorganisms in soils under the field experiment were evaluated: soil respiration, total number of microorganisms and the number of specific groups of soil microorganisms including fungi, Actinomycetes, oligonitrophiles, *Azotobacter* and ammonifiers.

Multivariate analysis of variance revealed a significant interaction between location and rhizobial strain used as inoculum on the total number of microorganisms, as well as number of specific groups of microorganisms including fungi, Actinomycetes and oligonitrophiles in the first and second year of the experiment, indicating that the effect of rhizobial treatment depended on the location. The soil properties also varied among treatments and the two locations. Some rhizobial treatments increased the soil respiration rate, total number of microorganisms in soil, as well as the number of one or more specific groups of microorganisms including oligonitrophiles, fungi, Actinomycetes, *Azotobacter* and ammonifiers, compared to the control.

Key words: alfalfa, soil quality, trace elements, microbial community

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