



UMS+24^o

SERIES

4th - 6th April 2024

MONA
PLAZA HOTEL,
Belgrade,
Serbia

XIII CONGRESS OF MICROBIOLOGISTS OF SERBIA
with international participation

MIKROMED REGIO 5

**FROM BIOTECHNOLOGY TO HUMAN
AND PLANETARY HEALTH**



BOOK OF ABSTRACTS

ORGANIZER:



SUPPORTED BY:



Federation of European
Microbiological Societies



Republic of Serbia

MINISTRY OF SCIENCE,
TECHNOLOGICAL DEVELOPMENT AND INNOVATION

Publisher

Serbian Society for Microbiology
www.ums.rs

For publisher

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President of the Serbian Society for Microbiology

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Technical Editor & Cover design

Vojislav SIMIĆ & Stevan MIHAJLOVIĆ

ISBN 978-86-7078-178-8



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PP74

GROWTH OF RHIZOBIAL STRAINS AND THEIR PLANT GROWTH PROMOTING ACTIVITY UNDER HEAVY METAL STRESS

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Heavy metals increase in the soils has become a worldwide issue. The growth and nutrient balance of different legumes including alfalfa could be disrupted in soils with increased nickel concentrations. Inoculation of legumes with rhizobia, nitrogen-fixing bacteria, can decrease concentrations of heavy metals in plants and could be used for phytostabilization of heavy-metal contaminated soils. The mechanisms of rhizobia for plant growth promotion partly overlap with protection mechanisms used by metal-tolerant rhizobacteria. Besides nitrogen fixation, some of them are the producers of plant hormones, which promote plant growth; such is indole-3 acetic acid. Therefore, the purpose of this study was to select nickel tolerant rhizobial strains and evaluate their indole-3 acetic acid production under nickel stress. Screening alfalfa rhizobial strains for nickel tolerance showed that

all of the tested strains could grow well in the medium supplemented with 0.1 mM Ni, and some of the tested strains could tolerate up to 1.1 mM Ni, that is the highest Ni concentration tested in this study. Generally, the addition of Ni in the range from 0.05 to 0.4 mM affected the production of IAA in the medium supplemented with tryptophan, as a precursor for IAA, but the IAA levels still remained very high. The IAA was not detected at 0.7 mM Ni. The alfalfa rhizobial isolates are overall relatively sensitive to Ni concentrations. Some strains with high nitrogen fixation capacity and IAA production were sensitive to Ni, indicating the importance of metal tolerance evaluation. The selected IAA producing Ni tolerant rhizobial strains are potential candidates for further investigation in nickel biosorption assays and heavy metal stress alleviation in plants.

KEYWORDS: alfalfa rhizobia; heavy metals; plant growth promotion

ACKNOWLEDGEMENT: This research was supported by the Science Fund of the Republic of Serbia, #GRANT No 7015, Utilizing rhizobia to reduce the risk of heavy metal accumulation in alfalfa: Nickel (Ni) case study - RhizoDETOX.