Serbian Biochemical Society

Proceedings

Editor: Ivan Spasojević
Technical support: Jovana Trbojević-Ivić, Milena Dimitrijević, Tijana Ćulafić
Cover design: Zoran Beloševac
Publisher: Faculty of Chemistry, Serbian Biochemical Society
Printed by: Colorgrafx, Belgrade
No of printed copies: 130

Serbian Biochemical Society
Twelfth Conference

International scientific meeting

September 21-23, 2023, Belgrade, Serbia

"***Biochemistry in Biotechnology"***

The accumulation of manganese by *Chlamydomonas acidophila* strains isolated from acid mine drainage

Isidora Santrač[1*], Milena Dimitrijević[1], Marina Stanić[1], Marija Tanović[1], Valentina Ćurić[2], Snežana Kovačević[1], Ivan Spasojević[1]

[1]*Department of Life Science, Institute for Multidisciplinary Research, University of Belgrade, Serbia*
[2]*Faculty of Biology, University of Belgrade*

[*]*e-mail: isantrac@imsi.bg.ac.rs*

Acid mine drainage ponds represents a specific artificial ecosystem that gives advantage to extemophilic microalgae. The mechanisms of adaptaton of such strains to excess metal concentrations that are common for their habitat, are poorly understood. Herein, we analzyed two strains of the green microalga *Chlamydomonas acidophila* - 137 and PM01, which have been isolated from different mining sites, for their interactions with Mn ions. The effects of different concentrations of Mn^{2+} were investigated in the late exponential/early stationary phase of culture growth (15 days). Viability was determined by Evans blue assay. No toxic effects were observed at concentrations as high as 2 mM Mn^{2+}. The the time dynamics of Mn accumulation in the biomass was determined using ICP. It was shown that the maximum accumulation of Mn in strain 137 (3.79 ± 0.68 µg/mg) was reached at 24h, while for PM01 the highest uptake (3.23 ± 0.17 µg/mg) was observed at 72 h. Next we analyzed redox settings by measuring the levels of reduced thiols unsing *in vivo* EPR spin probing. The treatment with 2 mM Mn^{2+} induced a rapid and irreversible decrease in the level of thiols which indicates that Mn^{2+} activated prooxidtaive processes. The maximum drop of thios levels were: from 4.80 ± 0.05 to 2.70 ± 0.05nmol/mg fresh weight after 1h for 137; and from 4.70 ± 0.05 to 3.40 ± 0.05 nmol/mg fresh weiht after 30 min for PM01. Further, the level of reactive oxygen species was evaluated using fluorescent probe DCFH-DA assay. The changes were in agreement with thiol levels. Both tested algal strains show resistance to Mn and are therefore good candidates for application in water bioremediation.

Acknowledgements

This study was supported by Ministry of Education, Science and Technological Development of the Republic of Serbia, Grant No. 451-03-47/2023-01/20053.