

## ABSTRACT

### INVESTIGATION THE RESPONSES OF *Pleurochaete squarrosa* (Brid.) Lindb and *Timmiella barbuloidea* (Brid.) Moenk TO HEAVY METAL STRESS

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In recent years, despite their widespread use as biomonitor, very little is known about mechanisms of oxidative stress occurring in bryophyte seen as a result of heavy metal pollution. In this study, the rapid physiological responses against heavy metal stress and changes of antioxidant mechanism of two bryophyte species (*Pleurochaete squarrosa* and *Timmiella barbuloidea*) belong to Pottiaceae family are determined. At this direction, samples collected from field, and then they were cultured nickel (Ni), lead (Pb), copper (Cu) and chromium (Cr)-containing solutions after the sterilization procedures. Levels of heavy metals accumulation, dry weight, lipid peroxidation, photosynthetic pigments analysis, hydroxyl radical (OH·) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) determination, antioxidant enzymes (superoxide dismutase, catalase, peroxidase, glutathione reductase, ascorbate peroxidase) activity measurements and non-enzymatic antioxidant molecules (glutathione, ascorbic acid and proline) amounts, antiradical activity analysis were evaluated in two bryophyte species exposed to metals stress. It was determined that *P. squarrosa* and *T. barbuloidea* accumulated metals which they were exposed, and Pb and Ni are the most accumulated metals. Despite the high accumulation of Ni and Pb in *T. barbuloidea*, there is no reduction in dry weight, the pigment degradation, lipid peroxidation and effective antiradical mechanism revealed the tolerance of the species on these metals. Cr and especially Cu caused high degree of oxidative damage in both species. According to result of experiments *P. squarrosa* is relatively more affected by applied heavy metals stress and it is determined to be more sensitive than *T. barbuloidea*.

**Key words:** *Pleurochaete squarrosa*, *Timmiella barbuloidea*, heavy metal, stress, antioxidant