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TRACE ELEMENTS IN LIVING ORGANISMS - AISETOV

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***Alma Mater Studiorum*, University of Bologna**

The role of trace elements in health: from healthy environments to healthy living organisms

ABSTRACT BOOK

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O-02. The exhausting of metallothionein responses in the bivalve mollusks depending on the tense of exposure

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The evaluation of metal accumulation in metallothioneins (MTs) of bivalve mollusks is usually used for the bioindication of environmental pollution by toxic metals. However, containing a remarkable number of thiol groups, MTs could also act as scavengers of reactive oxygen species. The aim of this study was to validate the functionality of MTs of bivalve mollusks by comparing the responses in experimental and field exposures. Both native and transplanted for 30 days bivalves Anodonta cygnea were used at three different sites of a small tributary in the basin of the Dnister river along a gradient of pollution: in a village (Kr), near a motorway (MW), and in the municipal effluents area (Tr). The mollusks for laboratory exposures and transplantations were collected in the pristine site. In the laboratory, the mussels were exposed to Cu2+ (0.01 and 0.2 mg L-1) for 14 days. In the mollusks transplanted at Kr site and exposed to 0.01 mg·L-1 of Cu, a hormesis-like response was detected: an increase in the concentrations of MTs, Cu- and Zn-MT (threefold) and the GSH levels, and a decrease in the lipid peroxidation (LPO). The Zn/Cu ratio in MTs was approximately 2:1 in these groups. The specimens from the polluted sites (MW, Tr), both native and transplanted, and whose exposed to 0.2 mg L-1 Cu demonstrated the exhausting of particular MT responses (concentration and profile under the ion-exchange chromatography), and increases in the levels of GSSG/GSH ratio and LPO. The Zn/Cu ratio in their MTs was 1:1. Hence, the up-regulation of MTs functionality was correspondent to the changing of their metal composition and accompanied with the activation of antioxidant response. The activation or exhausting of MTs responses could potentially be utilized in the ranking of environmental impacts.