

**DRUŠTVO ZA ZAŠTITU BILJA SRBIJE**

Uz podršku

- Ministarstva za nauku, tehnologije i razvoj Republike Srbije
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### 1.28. HRONIČNI EFEKAT KADMIJUMA NA AKTIVNOST FOSFATAZA U SREDNJEM CREVU LARVI GUBARA

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Proučavan je hronični efekat dve koncentracije kadmijuma (10 i 30  $\mu\text{gCd/g}$  suve hrane) na masu larvi i aktivnost fosfataza (ukupnih, kiselih lizozomalnih i alkalnih) u srednjem crevu četvrtog stupnja larvi gubara (*Lymantria dispar* L.). Za detekciju izozima fosfataza korišćena je nativna PAGE elektroforeza i *p*-nitrofenil fosfat kao supstrat. Analiza je izvođena na 20 legala (5 larvi/ leglo/ tretman).

Utvrđeno je da obe koncentracije kadmijuma imaju inhibitoran efekat na aktivnost fosfataza (ukupnih, lizozomalnih i alkalnih). Masa larvi je bila smanjena samo na većoj koncentraciji kadmijuma (30  $\mu\text{gCd/g}$ ). Elektroforetogrami kiselih i alkalnih fosfataza su pokazali tri osnovne izoforme koje se razlikuju u nivou ekspresije u zavisnosti od legla i tretmana kadmijumom.

Varijabilnost alkalnih fosfataza na 10  $\mu\text{gCd/g}$  suve hrane je niža nego na kontroli, dok je varijansa lizozomalne fosfataze značajno veća na 30  $\mu\text{gCd/g}$  u poređenju sa kontrolom. Kako su homogenati srednjeg creva pulovani unutar legla (ful-sib familija), promena varijanse osobine predstavlja promenu genetičkog diverziteta.

Značajne i pozitivne korelacije za alkalne fosfataze, kako između kontrole i dve koncentracije kadmijuma tako i između dva tretmana kadmijumom, pokazuju zajedničku genetičku determinaciju svojstva u povoljnoj i stresnoj sredini. Zajednička genetička determinacija za masu larve je uočena i između dve koncentracije kadmijuma. Odsustvo značajnih korelacija za lizozomalnu fosfatazu između različitih sredina može ukazati na ekspresiju različitih gena.

Smanjenje aktivnosti lizozomalne fosfataze na obe koncentracije kadmijuma, povećanje varijanse na 30  $\mu\text{gCd/g}$  suve hrane i nedostatak značajnih korelacija između različitih tretmana ukazuje da bi ovaj enzim mogao biti indikator promena u životnoj sredini.

### 1.28. CHRONIC EFFECT OF CADMIUM ON PHOSPHATASE ACTIVITY IN THE MIDGUT OF THE GYPSY MOTH LARVAE

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Chronic effects of two cadmium concentrations (10 and 30  $\mu\text{gCd/g}$  dry food) on larval mass and midgut phosphatase activity (total, acid lysosomal and alkaline), were investigated in the 4<sup>th</sup> instar of the gypsy moth larvae (*Lymantria dispar* L.). Native PAGE was used for the detection of phosphatases isozymes using *p*-nitrophenyl phosphate as a substrate. The analysis was performed on 20 egg masses (5 larvae/ egg mass/ treatment).

Both cadmium concentrations inhibited phosphatase activity (total, lysosomal and alkaline). Only higher concentration (30  $\mu\text{gCd/g}$  dry food) reduced larval mass. Electrophoretograms of acid and alkaline phosphatases showed three major isoforms which differed in the level of expression depending on egg mass and cadmium treatment.

Variability of alkaline phosphatase at 10  $\mu\text{gCd/g}$  dry food was lower than at the control treatment whereas the variance of lysosomal phosphatase was significantly higher at 30  $\mu\text{gCd/g}$  compared with the control. As midgut homogenates were pulled within each egg mass (full-sib family), the change in a trait variance represented the change in genetic diversity.

Significant and positive correlations for alkaline phosphatase between the control and two cadmium concentrations as well as between the two cadmium treatments showed common genetic determination of a trait in the suitable and stressful environment. Common genetic determination was also observed between two cadmium concentrations for larval mass. The absence of significant correlations for lysosomal phosphatase between different environments might point to expression of different genes.

The decrease of lysosomal phosphatase activity at both cadmium concentrations, increase of variance at 30  $\mu\text{gCd/g}$  and lack of significant correlations between different treatments indicate that this enzyme could be the indicator of environmental changes.