

Heavy Metal Accumulation in Kidney of wild *Microtus guentheri* (Danford and Alston 1880) from The Korkuteli-Antalya, Turkey

Fatma TURNA¹, Mustafa YAVUZ¹,

¹Department of Biology, Faculty of Science, Akdeniz University, Antalya, Turkey
myavuz.akd@gmail.com

Aim of the study: The objective of this study was to determine the concentrations of eighteen heavy metals (Fe, Al, Zn, Cu, Mn, Cr, Sr, Se, Mo, Ni, Sn, Pb, Ba, Co, V, As, Cd and Tl) in kidney from wild rodent *Microtus guentheri* from natural region which is near mine and stone quarry activities in Korkuteli-Antalya. It's well known that specific metals mainly accumulate in particular organs (for example, cadmium accumulates in kidney). This study is first record for heavy metal accumulation in kidney tissue for this species at this region. Heavy metal accumulation levels of kidney in *Microtus guentheri* can be used as monitor for environmental metal pollution.

Material and Methods: We worked with kidney samples of six voles specimens from one season (2016, spring) collected by means of Sherman traps, in Korkuteli-Antalya. Captured specimens were killed by cervical dislocation and kidneys were immediately removed, weighed and frozen at -40 °C prior to chemical analyses in polystyrene tubes. Kidney samples were removed from deep freeze and then allowed to dissolve for a period of time at room temperature. Kidney samples were set at 80-105 °C until completely dry and fixed weight. Also, microwave method was applied for the digestion products of samples. Samples homogenized by milling prior to analyses. Acid microwave digestion was carried out in a Berghof speedwave MWS-2 microwave. From each tissue, 0.5 g homogenates were placed in a teflon digestion vessel with mix: 8 mL 65% nitric acid (HNO₃) and 2 mL 30% hydrogen peroxide (H₂O₂). After digestion the samples were cooled to room temperature and diluted with ultra-pure water. Then, samples were analysed by Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-EOS). For control purposes, the same procedures were carried out for a blind sample on the same conditions. The concentrations of heavy metals were expressed for the kidney samples as milligrams per kilogram (ppm) for dry weight.

Results: From the final data, descriptive statistical characteristics were calculated (mean, standard error) for kidney tissues of *M. guentheri*. The mean concentrations of the metals accumulated in kidney samples of *M. guentheri* as follows (M±Se, n=6): Fe: 579.92±46.50, Al: 247.93±68.96, Zn: 101.41±7.12, Cu: 22.24±1.22, Mn: 12.16±1.49, Cr: 8.61±1.88, Sr: 4.08±1.13, Se: 3.60±0.32, Mo: 2.16±0.22, Ni: 1.19±0.21, Sn: 0.79±0.18, Pb: 0.79±0.13, Ba: 0.67±0.20, Co: 0.55±0.06, V: 0.49±0.05, As: 0.29±0.04, Cd: 0.22±0.05, Tl: 0.03±0.005 ppm. The order of mean concentration of the heavy metals in samples was Fe>Al>Zn>Cu>Mn>Cr>Sr>Se>Mo>Ni>Sn>Pb>Ba>Co>V>As>Cd>Tl. According to this data; The toxic heavy metal pollution began at the vicinity of Korkuteli. Case, is thought to be due to mine sources, like marble and stone quarries and maybe agricultural activities.

Acknowledgements: This study supported by Akdeniz University Scientific Research Projects Coordination Unit with FDK-2016-1421 project number.

Keywords: Heavy metal accumulation, *Microtus guentheri*, kidney, ecotoxicology, biomonitor