

## Bioaccumulation of Cobalt in Blood Serum and Organs of Mice From Different Age Groups

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**Abstract.** Atomic absorption spectrometry (AAS) is the most commonly used method for detecting trace elements in biological samples. The aim of the present study was to determine the accumulation of cobalt ions in blood serum as well as in the spleen, liver and kidneys of mice from different age groups after chronic exposure to cobalt (II) compounds – cobalt chloride (CoCl<sub>2</sub>) and cobalt-EDTA (Co-EDTA). Pregnant ICR mice (placed in individual cages) were treated with daily doses of 75 mg/kg b.w. or 125 mg/kg b.w. CoCl<sub>2</sub> or Co-EDTA. On day 25 pn the newborn pups were placed in individual cages and treatment continued until day 90. At different ages – days 18, 25, 30, 45, 60 and 90 the experimental animals were sacrificed, their spleens, liver and kidneys were excised, weighed and processed for flame atomic absorption spectrometry (FAAS) studies. Blood samples were obtained; serum was collected after centrifugation and kept at -20°C until analysis with electrothermal atomic absorption spectrometry (ET-AAS). Age-matched mice obtaining pure tap water were used as controls.

Results indicate significant bioaccumulation of cobalt (Co) in the serum and organs of the treated mice compared to the untreated control. Immature mice (days 18, 25 and 30) were more sensitive to treatment compared to mature animals. In blood serum, higher Co (II) content was measured when mice were exposed to CoCl<sub>2</sub> compared to those that obtained Co-EDTA. Kidneys and liver accumulated more Co ions than the spleen. Higher metal content was found in organs of mice exposed to Co-EDTA compared to those treated with CoCl<sub>2</sub>. Spleens of mice administered to Co-EDTA accumulated ~10-fold more metal ions than those treated with the chloride which corresponded to the various histological changes observed in the spleen. A dose-dependent effect of the compounds was also observed while for the liver and kidneys an age-dependent effect was found.

Results suggest that Co bioaccumulation depends on the type of compound, its dose, duration, as well as on the age of the exposed group. AAS analysis of blood serum is a reliable marker for chronic Co exposure.