Contents of zinc, copper, chromium and manganese in silver foxes according to their age and mineral supplementation

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Abstract

Serum, livers and kidneys of 30 silver foxes from one breeding farm were subjected to analysis of the four microelements contents. The samples derived from 3 groups of animals (n=10) selected according to age and developed reproduction disorders. Cu, Cr and Mn were determined by a graphite furnace AAS whereas Zn by the flame AAS methods. Serum levels of Zn were the least variable ($\bar{x}_{(n=30)}=4.72 \pm 2.313 \, \mu g \cdot mL^{-1}$) and the mean of Cu content was $0.26 \pm 0.244$, of Cr was $0.029 \pm 0.032$ and of Mn was $0.074 \pm 0.085$ $\mu g \cdot mL^{-1}$. The livers and kidneys contained respectively: $159.9 \pm 23.66$ and $74.25 \pm 14.44$ $\mu g \cdot g^{-1}$ of Zn; $34.03 \pm 12.43$ and $13.66 \pm 1.67$ $\mu g \cdot g^{-1}$ of Cu as well as $6.28 \pm 0.97$ and $2.60 \pm 0.33$ $\mu g \cdot g^{-1}$ of Mn. The most variable was Cr level achieving $1.00 \pm 1.06$ and $1.43 \pm 2.64$ $\mu g \cdot g^{-1}$ (all results per gram of wet weights). The differences between means and medians within the age groups did not exceed 41%, however chromium was an exception, its values differed more than 2 times. High zinc level found both in the serum and the organs resulted from its concentration in feedstuff being $1040.5 \, \mu g \cdot g^{-1}$, exceeding the recommended level for farming foxes. Over-supplementation of dietary Zn might suggest connection between subtoxic action of Zn or its interaction with Cu or Cr followed by subsequent effect on reproduction events. Whether nature of Zn effects derived from direct target action or from Zn – Cu or Zn – Cr interactions have to be solved experimentally. Some foxes contained copper and chromium in livers and kidneys at levels exceeded significantly those considered as physiological ranges for mammals, whereas manganese was within these limits. Thus, manganese was considered to keep homeostasis status of this element in the examined foxes.

Key words: foxes, zinc, copper, chromium, manganese, serum, liver, kidney, age, reproduction