Abstract. The present study examined the effect of aluminum on δ-aminolevulinic acid dehydratase (δ-ALAD) and hematocrit, and assessed the effects of zinc and selenium on activity of the enzyme affected by aluminum in vivo and in vitro. Experiments were done on white laboratory mice of (20-25) g body mass. To assess the effect of aluminum on δ-ALAD in vivo, mice injected i.p. with 0.5 LD₅₀ aluminum chloride (AlCl₃) (25 mg Al³⁺/kg body mass). To estimate the effect of zinc and selenium on activity of the enzyme affected by aluminum, twenty minutes before intoxication with 0.5 LD₅₀ aluminum chloride mice were injected i.p. with 0.5 LD₅₀ of sodium selenite (Na₂SeO₃) or with 1.56 mg/kg of zinc sulphate (ZnSO₄). Control animals received an injection of the same volume of saline.

Injection of mice with a single dose of aluminium significantly increased concentration of metal in blood. However, δ-ALAD activity changed only slightly. Furthermore, addition of zinc before aluminum injection was related to significant increase of aluminum content and a little enhancement of δ-ALAD activity in blood. In blood of mice where selenium additives were used no changes in aluminum concentration or δ-ALAD activity was registered, and level of hematocrit decreased.

The in vitro effects of aluminum on δ-ALAD activity in blood of experimental mice were investigated. Concentration causing half-maximal inhibition (IC₅₀) of enzyme activity was used to assess the effects of Al³⁺ on δ-ALAD activity in blood.

The findings suggested that low concentrations of aluminum ions slightly decrease δ-ALAD activity in vitro, while high concentrations of aluminum ions inhibited the enzyme. Aluminum ions are medium whereas zinc ions are weak and cadmium ions are strong catalytic poison (IC₅₀ Cd²⁺ < IC₅₀ Al³⁺ < IC₅₀ Zn²⁺). Zinc ions also showed a weak protective effect on inhibition of δ-ALAD caused by aluminum ions, but do not remove it ((IC₅₀ Al³⁺ < IC₅₀ Al³⁺ + Zn²⁺).

Key words: aluminium, zinc, selenium, δ-aminolevulinic acid dehydratase, in vivo, in vitro.