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Effect of Iron and/or Zinc Deficiency on Plasma Mineral Concentrations in Rats

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Abstract:
Co-occurrence of iron and zinc deficiencies is suspected to be prevalent in human populations, because dietary sources such as red meat and major absorption inhibitors such as calcium and phytate are common for iron and zinc. The experiment described here was designed to determine the effect of dietary iron and zinc deficiencies and their interactions on plasma mineral concentrations in rats. Forty 4-week-old male Sprague-Dawley rats were assigned into 4 dietary treatment groups of 10 each for the 4-week study: iron-deficient group (FD), zinc-deficient group (ZD), iron/zinc-deficient group (FZD), and control group (Cont). Mineral concentrations (Mg, Ca, Mn, Ni, Cu, Zn, As, Se and Mo) were measured by ICP-MS. Fe concentration was measured by the colorimetric kit. Differences between groups were tested by Tukey's multiple comparison test and two-way ANOVA. P value less than 0.05 was considered significant. Plasma Fe concentration was decreased by iron deficiency. Plasma Zn concentration was decreased by iron and/or zinc deficiency. Plasma Mg concentration was increased by iron deficiency. Plasma Mo and Mn concentrations were decreased by iron deficiency. Plasma Se concentration was decreased by single iron deficiency and was however unchanged by combined deficiency of iron and zinc. There were no significant effects of dietary iron and zinc and their interaction on plasma Cu, Ni and As concentrations. These results suggest that sufficient cautions are required for evaluation of Mg, Mn, Se and Mo status by plasma analyses in patients with iron deficiency anemia.

Key words: iron, zinc, combined deficiency, plasma minerals, rats

[PDF (440K)] [References]