
Abstract

**Background:** Zinc is an essential trace element for human health and well-being; however, methods currently available for the assessment of zinc status in humans are unsatisfactory.

**Objective:** The objective was to critically evaluate the use of various indicators of zinc status in humans in a controlled metabolic ward study.

**Design:** Indicators of zinc status were measured in 25 healthy postmenopausal women aged 64.9 ± 6.7 y. After a 10-d equilibration period, volunteers consumed a diet with either a low (1 mg/d; n = 12) or a high (3 mg/d; n = 13) copper content based on a total energy content of 8.4 MJ. They received the same amount of copper throughout the study. Both groups were fed the basal diet (3 mg Zn/d) with no zinc supplement for one 90-d period, and the diet supplemented with 50 mg Zn/d for another 90-d period.

**Results:** Zinc supplementation significantly increased ($P < 0.0001$) extracellular but not erythrocyte superoxide dismutase activity. This increase was more apparent when subjects were fed the low copper diet. Zinc supplementation in combination with the low copper diet significantly decreased ($P < 0.01$) amyloid precursor protein expression in platelets. Other indicators of zinc status that were significantly elevated after zinc supplementation were as follows: plasma zinc and free thyroxine concentrations and mononuclear 59-nucleotidase activity.

**Conclusion:** The measurement of serum extracellular superoxide dismutase activity may be useful as a marker for the functional assessment of zinc status in humans.