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Investigations on zinc requirements of growing rats using albumen-based diet

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Abstract:

Dose-response relationships between dietary zinc(Zn)and physiological and biochemical parameters including total food intake, body weight gain, hemoglobin, liver and thymus weights, plasma Zn concentration, and plasma alkaline phosphatase(ALP)and angiotensin converting enzyme(ACE)activities were studied. Forty-eight 3-week-old male Sprague-Dawley rats were divided into 8 groups and fed diets containing graded levels of supplemental Zn: 0, 3, 6, 9, 12, 15, 18 and 30ppm(or mg/kg diets). The 12ppm of dietary Zn corresponds to NRC Zn requirement. The 30ppm of dietary Zn corresponds to the Zn level of AIN-93G formula. These diets were made with a modified formula of AIN-93G using spray-dried albumen in place of casein with supplemental biotin(2 mg/kg). The basal diet without supplemental Zn contained 0.3ppm Zn arising from albumen. Data were compared with 12 and 30ppm by Student's t-test, and also compared with 30ppm by Williams's test. Compared with 12 and 30ppm, total food intakes, body weight gains, plasma Zn concentrations, plasma ACE activities, plasma ALP activities, liver weights and thymus weights were significantly changed at 0 and 3ppm. Total food intakes, body weight gains, plasma Zn concentrations, plasma ACE activities and liver weights were significantly changed at 6ppm. Plasma Zn concentrations and plasma ACE activities were significantly changed at 9ppm. The apparent plateau breakpoints in these dose response relationships were placed between 15 and 18ppm.

Key words: zinc, requirements, biochemical parameters, dose response, rats

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