Abstract

Fructans, fructooligosaccharides (FOS) and inulin, are carbohydrates comprising fructose molecules linked or not to a terminal sucrose molecule. Because of the biological effects of its consumption, they are considered as fibers. Studies have demonstrated that fructans are intensely fermented in the large intestine, thus rendering a favorable environment to mineral absorption. In the present work, the effects of FOS from Raftilose and from yacon tuberous roots on the bioavailability of Ca and Mg in growing rats were evaluated. Two biological assays were carried out, the first one lasting 23 days (n=16) and the second one lasting 27 days (n=24). In the first assay, weanling male Wistar Hannover rats were fed diets supplemented with Raftilose (5% FOS). In the second assay, they were fed diets supplemented with yacon flour (5 and 7.5% FOS). In both assays, the control diet followed AIN-93G. All diets were supplemented with 7.5g calcium/kg diet. Diet and water were given *ad libitum*. Feces (first and second assays) and urine (second assay) were collected along the 3 experimental periods (4th, 10th and 16th days of experiment), each period lasting 5 days. The animals were sacrificed and their livers, spleens and kidneys were removed and weighed. The cecum was removed and its contents and wall were weighed. After centrifuging the contents, residues (R) and supernatant (S) were weighed and the pH of S was determined using a chemical tape. In the second assay, portions of the cecum and proximal colon walls were fixed in Bouin's alcoholic solution and then transfered to a 70% ethanol solution, aiming histological analyses. The bones (femur and tibia) were removed for bone mineral density (BMD) analyses, mineral contents and mechanical properties (only the femur). Ca and Mg analyses were also performed on the feces (apparent absorption), urine (mineral balance) and cecal contents. The results were evaluated using analysis of variance (ANOVA), considering a significance of 95%. Significant increases in the weight and moisture of feces and in the weight of the cecum (contents and wall) were observed. Besides, the consumption of FOS significantly stimulated the absorption and mineral balance, although such an effect was not so evident for Mg. That increase was reflected in a greater bone mineral retention, confirmed through atomic absorption spectrophotometry analyses. A positive effect on mechanical properties (maximum load and hardness) was observed in the femur of animals feeding on FOS, relatively to the control groups. On the other hand, no significant differences in BMD were observed in any of the bone regions analysed (proximal, midshaft and distal) among the experimental groups. Histological analyses demonstrated a noticeable increase in the depth and number of cecum crypts, as well as in the number of bifurcated crypts. The positive effects on intestinal absorption, mineral retention and mechanical behavior of the bones, observed in the present study, show an important role of FOS in healthy bones.