

Abstract

The Effect of Bitter Melon and Chromium(III) Supplementation on the Mineral Status of Rats Fed a High-Fat Diet[†]

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Abstract: A diet rich in simple sugars and high in fat promotes the development of diseases such as obesity, diabetes and heart disease. A high-fat diet causes changes in the carbohydrate–lipid metabolism, but may also reduce the absorption of certain elements. According to the available literature, the hypoglycemic potential shows, among other things, bitter melon and chromium(III). The aim of this work was to determine the effect of these preparations on the Fe, Zn and Cu status in experimental animals. The experiment was conducted on 60 male Wistar rats. In the first stage, 10 rats received a standard diet, while 50 rats were fed a high-fat diet for 6 weeks to induce insulin resistance. Then, these rats were divided into five groups: one group fed a high fat diet, and four groups fed diets supplemented with two doses of lyophilized bitter melon (1 vs. 5% of diets) and chromium propionate (10 vs. 50 Cr mg/kg diet) for 6 consecutive weeks. During the autopsy, internal organs (liver, kidneys, spleen and heart) were collected. The content of Fe, Zn and Cu in tissues was determined by the AAS method followed by microwave digestion. Statistical analyses included both one-way and two-way (treatment × dose) analysis of variance. It was found that the high-fat diet lowered Zn and Cu in the liver and kidney, and also decreased Fe in the spleen. The 2 × 2 analysis showed that Cr(III) supplementation dose-dependently increased Zn in the spleen, while BM significantly decreased Zn in the heart. The interactions between those factors were noticed. An interaction analysis showed that the higher dose of BM significantly normalized the levels of Zn and Cu in the liver and Fe in the spleen only at the lower dose of Cr(III). In addition, a lower dose of BM and a higher dose of Cr(III) reduced the level of Cu in the heart. In conclusion, simultaneous supplementation with Cr(III) and BM is effective in improving the mineral status of rats fed a high-fat diet only when one of them is used at a lower dose.

Keywords: bitter melon; chromium; high fat; minerals



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