

Absorption and bioavailability of nano size reduced calcium citrate fortified milk powder in ovariectomized and ovariectomized-osteoporosis rats

Abstract

The aim of this study was to evaluate the effects of fortification and nano-size reduction on calcium absorption and bioavailability of milk powder formula in sham, ovariectomized, and ovariectomized-osteoporosis rats as a menopause and menopause-osteoporosis model. Skim milk powder and skim milk powder fortified with calcium citrate and the suitable doses of inulin, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), and vitamins D3, K1, and B6 were formulated based on the North American and Western European recommended dietary allowances. Optimization on cycle and pressure of high-pressure homogenizer was done to produce nano-fortified milk powder. In vivo study demonstrated that fortification and calcium citrate nano-fortified milk powder increased absorption and bioavailability of calcium, as well as bone stiffness and bone strength in sham, ovariectomized, and ovariectomized-osteoporosis rats. This study successfully developed an effective fortified milk powder for food application.