

Effects of phosphorylated chitosan oligosaccharides on calcium absorption in the ovariectomized rat

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ABSTRACT

In order to fortify calcium absorption acceleration activity of chitosan oligosaccharides (COSs), the COSs separated into various ranges of molecular weights (>10 kDa, 10-5 kDa, 5-1 kDa and <1 kDa) were phosphorylated by reaction with sodium trimetaphosphate. Phosphorylated COS (P-COS) with the range of molecular weight, 5-1 kDa had higher bioavailability *in vitro* (antiprecipitation activity in phosphate solution) than that of COS, and P-COS was applied on *in vivo* test. Six-week-old female Sprague-Dawley rats were ovariectomized and fed experimental diets containing a low-calcium diet (0.5% Ca, 0.4% P) for 6 weeks in order to investigate effects on calcium and bone metabolism. The final calcium concentration in serum and urine was significantly higher than that of basal (fed CaCO₃ as calcium source) and COS diet group, and the concentration in feces was lower than both. Moreover, bone strength and density in femur is significantly higher than both. These results demonstrated that P-COS had a potent calcium-absorbable material like casein phosphopeptide and definitely involved in calcium metabolism *in vivo*.