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## Inhibition of calcium carbonate crystallization by soybean protein hydrolysate and its promotion effect on calcium absorption

Koji Muramoto, Tomohisa Ogawa and Takako Naganuma

Graduate School of Agricultural Science, Tohoku University

### Summary

Many investigations into mineral bioavailability are concerned with improving the dietary supply of minerals. Casein phosphopeptide (CPP) is known to enhance the passive calcium absorption from the small intestine by inhibiting the precipitation of calcium phosphate and increasing the concentration of soluble calcium. We found that acidic peptides could also inhibit the crystal growth of supersaturated calcium carbonate solution. In this study, we hydrolyzed soybean protein, in which Glu/Gln and Asp/Asn comprise 35% of total amino acid residues, using several proteases and investigated the inhibitory activity of the hydrolysates on the crystal growth. Each hydrolysates showed different strength of the activity, suggesting the key role of the structure of peptides for the activity. The potency of a soybean protein hydrolysate was less than one tenth of that of a tryptic digest of casein, however, it increased over four fold by treating the soybean protein hydrolysate with glutaminase. The magnitude corresponded to the conversion rate of Gln residues to Glu residues. Furthermore, the potency increased by the addition of sodium chloride into the reaction mixture.

We examined the absorption rate of calcium in wister rats by feeding four different diets; egg proteins as a control diet, soybean protein, soybean protein/ hydrolysate mixture and soybean protein hydrolysate. Soybean protein diet and soybean protein/ hydrolysate mixture diet improved the absorption rate compared with the control diet. On the other hand, soybean protein hydrolysate alone did not change the absorption rate under this experimental condition.