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ACE inhibitory activity of Peptide from krill(*Euphausia superba*) Hydrolysate

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Introduction

Angiotensin I converting enzyme (ACE) in renin-angiotensin system is a cause of essential hypertension, which covers most hypertension, one of the major adult diseases. Thus, the inhibition of ACE would be indispensable for the prevention and cure of hypertension. Therefore, a lot of studies on the ACE inhibitor have been conducted. Peptides from the protein hydrolysate have been reported as an remarkable inhibitor. Especially, various ACE inhibitory peptides were isolated and identified from marine products for their utilization as value added products.

Antarctic krill (*Euphausia superba*) could be a good food resource in view of high nutritive value as well as abundant catchable amount, which were suggested over sixty million tons a year by FAO. Therefore, this study analyzed ACE inhibitory activity of shelled krill hydrolysates hydrolyzed by commercial proteases, and established the optimum hydrolysis condition statistically by response surface methodology (RSM).

Materials and methods

Antarctic krill immediately frozen after catch was supported by In Sung Co. and stored below -40℃. Nine kinds of enzymes, such as Alcalase 0.6L, Flavourzyme 500MG, Protamex 1.5MG, Neutrase 0.5L (Novo Korea Co.), Maxazyme NNP, Sumizyme LP, Collupulin, Delvolase (Vision Biochem. Co.) and Protease-NP (Pacific Chem. Co.) were used for the hydrolysis of krill. Hydrolyses by commercial proteases were conducted with 2 % (w/w; dry basis) enzyme in 4 volumes (v/w) of water at 50℃ for 12 hr.

Angiotensin I converting enzyme inhibitory activity was analyzed by the method

of Yamamoto et al. (1980), an advanced one of Cushman and Cheung (1971). The optimum hydrolysis condition of shelled krill was established by response surface methodology (RSM).

Results and Discussion

Shelled krill (*Euphausia superba*) was hydrolyzed by commercial proteases, and degree of hydrolysate and ACE inhibitory activity of the hydrolysates were analyzed. Among the proteases, Alcalase 0.6L was the most effective for the hydrolysis of krill considering the degree of hydrolysate (87.5%) and ACE inhibitory activity (60%). The hydrolysate as affected by hydrolysis time showed the degree of hydrolysis of 87.0% and ACE inhibitory activity of 70% in 4 hr hydrolysis, which was determined as the most suitable and ecomomic hydrolysis time. In order to establish the optimum hydrolysis condition of krill, the degree of hydrolysis and ACE inhibitory activity as affected by the Alcalase concentration and the amount of water added were statistically analyzed by response surface methodology (RSM). The optimum hydrolysis condition was the hydrolysis with 1.5% Alcalase in 2 volumes (v/w) of water at 55℃ for 4 hr. The hydrolysate prepared from the optimum hydrolysis condition was fractionated by each molecular weight. The fraction of lower molecular weight showed the higher ACE inhibitory activity. IC_{50} of the fraction under 500 molecular weight was 0.565 mg protein/ml.

References

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