Purification of Angiotensin Converting Enzyme Inhibitory Peptides Produced from High Hydrostatic Pressure-Assisted Protease Hydrolysis of *Katsuwonus pelamis* By-Product

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Abstract

One of the major causes of death around the world today is cardiovascular disease (CVD), its risk factors include hypertension. When angiotensin I is exposed to angiotensin I-converting enzyme (ACE), resulting in the formation of angiotensin II causes blood pressure to rise. Fish protein has high nutritional value and can be used as a good source of bioactive peptides with ACE inhibitory activity. *Katsuwonus pelamis* head was hydrolyzed with commercial enzymes (Protamex, Protin NY-100 and Protin SD-AY 10) and *Lactobacillus helveticus* crude enzyme (LH) under 100 MPa for 10 min, then extracted under 0.1 MPa till 24 hours (PX-F, NY-F and SD-F). The IC_{50} values of ACE in the PX-F, NY-F and SD-F were 0.081, 0.102 and 0.184 mg/mL respectively, the ACE inhibitory ability was increased by 40.7, 66.7 and 77.2%, respectively compared with the group without LH. NY-F digestion by gastrorintestinal proteases (NY-F-G) showed the highest ACE inhibitory activity (IC_{50} = 0.118 mg/mL). *Katsuwonus pelamis* head was hydrolyzed with Protin NY-100 and LH under 100 MPa for 20 min, then extracted under 0.1 MPa till 3 hours (HNYF) showed the best ACE inhibitory activity (IC_{50} = 0.053 mg/mL). HNYF digestion by gastrorintestinal proteases (HNYF-G) still retain ACE inhibitory activity (IC_{50} = 0.084 mg/mL). HNYF-G was separated by Sephadex G-25 column into 7 fractions (Fraction A-G). Fraction D showed the highest ACE inhibitory activity (Inhibitory efficiency ratio = 13288.97 %/mg/mL), the molecular weight of Fraction D was between 400 and 462 Da. In conclusion, high pressure assisted NY and LH hydrolysis of *Katsuwonus pelamis* head can increase the peptide content and ACE-inhibiting ability of hydrolysate, and the purified peptides isolated from *Katsuwonus pelamis* head protein hydrolysates have potential antihypertensive properties which could potentially be used as functional food ingredients.