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Antioxidant and Angiotensin converting enzyme inhibitory Peptides from Soybean milk protein by Papain and Trypsin

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Soybean (*Glycine max*) has long been recognized as a source of high-quality protein and considered the largest edible protein source around the world. Unfortunately, several communities frequently experience with symptoms of immunoglobulin-mediated soy protein allergy due to the presence of allergenic epitopes in soybean protein. Therefore, it can realize that development of bioactive peptides from soybean protein through holistic way may reduce the limitation of soybean consumption. In present investigation, enzymatic hydrolysis of soybean milk proteins with cysteine protease papain and serin protease trypsin were performed in a well-equipped bioreactor, operated with batch mode. In soybean milk protein hydrolysis reaction, different enzyme and substrate ratios, such as 0.02:100, 0.057:100, 0.114:100 and 0.229:100 were tested. However, the degree of hydrolysis (5% Trichloroacetic acid soluble protein) of soybean milk proteins was increased after papain treatment in a concentration dose-dependent manner, the degree of hydrolysis of soybean milk proteins was not significantly changed after trypsin treatment up to enzyme and substrate ratio 0.114:100. The molecular weight of soybean proteins and soybean-based peptides produced by enzymatic hydrolysis was evaluated with sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) method. Results represented similar features with a degree of hydrolysis. Antioxidant capacity in enzyme-treated soybean milk was measured with the Ferric reducing ability of plasma assay and the 2,2-Diphenyl-1-Picrylhydrazyl (DPPH) radical-Scavenging assay. Antioxidant capacity and angiotensin-converting enzyme inhibitory activity of enzyme-treated soybean milk had similar trend with degree of hydrolysis. The results showed a non-competitive mechanism of angiotensin-converting enzyme inhibition by the soybean milk proteins. It may expect that results of the present investigation will open a horizon in food and agricultural industries.