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A comparative study on enzymatic hydrolysis of potato protein powder; efficiency and functionality

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This study aimed on a short-term enzymatic hydrolysis on potato protein powder (non-denatured protein extract) by application of Neutrase, Alcalase, Flavourzyme and trypsin at different concentration (0.1, 1 and 3%) in free fall pH. The efficiency of peptide generation and functional properties of resulting peptides were determined in terms of degree of hydrolysis (DH), peptide chain length (PCL), yield, protein recovery and functional properties such as protein solubility, emulsifying activity index (EAI), emulsion stability index (ESI), foaming capacity (FC) and foaming stability (FS). Based on the data, all tested enzymes resulted in different DH, PCL, nitrogen recovery, and varied bulk density. Expectantly, administration of higher enzyme concentration led to higher DH and more yield in which highest values belonged to 3% Neutrase and lowest was related to 3% Flavourzyme. Mean PCL varied between 15.18-17.47 amino acids for all tested conditions and peptide powder solubility ranged from 93-100%. By increasing the enzyme concentration, EAI increased with highest value belonged to Alcalase and trypsin, followed by Flavourzyme and Neutrase ($p < 0.05$), whereas, ESI showed a revers trend ($p < 0.05$). In terms of FC and FS, the same trends as EAI was observed as the most FC belonged to Alcalase and trypsin, and the most stable foam was related to trypsin (3%), followed by Alcalase, Flavourzyme and Neutrase ($p < 0.05$). In conclusion, enzymatic hydrolysis of potato protein concentrate is a promising technique for release and recovery of bioactive peptides.

Keywords: potato protein,, enzymatic hydrolysis,, bioactive peptides,, emulsifying activity