Abstract

Soy whey is generated as a process waste while preparing soy based food products tofu. Discarded whey is not only accountable for pollution problem, but also represents an economic and nutritional penalty in this era. Therefore, its valorization is of prime importance to the industry. The present investigation aims to convert this proteinaceous waste into bioactive peptide enriched hydrolysate. Soy whey protein was enzymatically treated with the *Aspergillus awamori* nakazawa protease. Respective protease was efficient to produce antioxidant peptide beholding radical scavenging ability of 40-50% at normal conditions. Remarkable increase in the radical scavenging activity upto70% was noticed at the Response surface methodology (RSM) based optimized condition: temperature, 40 ^{o}C; salt concentration (NaCl), 0.05 M; surfactant concentration (Triton X 100), 0.0075%; hydrolysis time, 80 min and enzyme to substrate concentration, 164 IU/g of soy whey protein.

Fractionation on the basis of molecular size resulted in concentrated permeate possessing 1.2 fold higher activity. Hydrolysate showed stable antioxidant activity during the processes of pH variation of 2-9 while under extreme pH radical scavenging activity drastically decreased, retaining nearly 79% of the total original activity. More than 50% antioxidant activity loss took place at salt concentration >1.5 mM. Presence of micronutrient such as Cu^{2+}, Mn^{2+} Ca^{2+}, Mg^{2+} and Co^{2+} in the reaction medium also altered the ABTS scavenging reaction rate, hydrolysate beholded >60% activity. Addition of phenolics and vitamins in hydrolysates showed strong synergistic effects with peptides. Gastro intestinal digestion resulted in 1.15 fold increase in the activity at the end of pancreatic digestion. Such results prove the candidature of soy whey hydrolysate as potential ingredients to formulate functional foods.

The present study also describes the preparation of edible film from the soy whey. A different concentration of SWPI was evaluated for film formation. To overcome the brittleness, sorbitol was added to obtain free-standing films. No proper film formation occurred at 1-3% of SWPI, while further increase in protein concentration lead to proper film with varying thickness and properties. It is observed that the heating temperature (60-90 ^{o}C) is the most influencing parameters for aiding proper protein

dispersion in the film forming solution. It can observe from the physical, mechanical and surface properties that SWPI edible films have a potential application in food and biomedical fields because of their excellent solubility.

Keywords: Soy whey, Isolate, Hydrolysate, Antioxidant peptide, Edible film