ENZYMATIC TREATMENT OF SOY PROTEIN CONCENTRATE: INFLUENCE ON THE POTENTIAL TECHNO-FUNCTIONAL AND ANTIOXIDANT PROPERTIES

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Abstract

In recent years, there has been an unprecedented demand by both consumers and industry, for inexpensive plant-derived protein hydrolysates as potential dietary sources of antioxidants. This is a particular refers to the protein from agricultural crop, such as soybean flour and/or flakes, especially from the soy protein concentrate (SPC). However, insolubility of SPC in water limits its more extensive use as food-protein ingredient, but it can be overcome by applying various enzymatic and non-enzymatic treatments. In order to expand the application of SPC, the influence of the one-step enzyme modification by using the commercial food-grade endoprotease from *Bacillus licheniformis* on the antioxidant and functional properties has been considered.

For this purpose, SPC under the various dry matter contents (DM) were pre-incubated at the optimal temperature and hydrolyzed in a mechanically stirred batch reactor. The bioactivity was evaluated using radical-scavenging and metal-chelating assays.

The ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid)) radical-scavenging ability reached higher values at DM 8% and smaller hydrolysis degree (*DH*) 12.85%, then a decreasing for higher *DH* and the minimum reducing power was observed after hydrolysis of SPC with DM 2% and *DH*~18% (64.2%). It appeared that the all prepared hydrolysates had the high yields of bioactive peptides which had the ability to strongly chelating prooxidant ferrous metal ions (> 95%). The techno-functionalities of SPC hydrolysate (DM 8%) with relatively higher antioxidant activities were remarkably higher compared to the untreated SPC. Namely, this hydrolysate had excellent solubility over a pH range of 2-12 which was improved compared to untreated SPC-8%. The oil holding capacity was also enhanced, while enzyme treatment was damaging to both of emulsifying properties, activity and stability, and water holding capacity.

The results obviously show that enzyme treated SPCs were superior to the untreated SPC in the analyzed bioactivity and techno-functionality and can be concluded that obtained SPC hydrolysates may be used as new value-added functional ingredients.

***Key words**: Soy protein concentrate, One-step enzyme treatment, Soy protein hydrolysate, Radical-scavenging activity, Metal-chelating activity, Solubility, Emulsifying capabilities, Oil/Water holding capacity.*