

Physicochemical and Antioxidative Characteristics of Black Bean Protein Hydrolysates Obtained from Different Enzymes

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Abstract : Black bean is an excellent protein source for preparing hydrolysates, which attract much attention due to their biological activity. The objective of this study was to characterize the physicochemical and antioxidant properties of black bean protein, hydrolyzed by ficin, bromelain or alcalase until 300 min of hydrolysis. Results showed that bromelain and alcalase hydrolysates possessed a higher degree of hydrolysis (DH) than that of ficin, thereby presenting different ultraviolet absorption, fluorescence intensity, and circular dichroism. Moreover, all hydrolysates possessed the capacity to scavenge DPPH radical with the lowest IC₅₀ of 21.11 µg/mL, as well as to chelate ferrous ion (Fe²⁺) with the IC₅₀ values ranging from 6.82 to 30.68 µg/mL. Intriguingly, the oxidation of linoleic acid, sunflower oil, and sunflower oil-in-water emulsion was remarkably retarded by the three selected protein hydrolysates, especially by bromelain-treated protein hydrolysate, which might attribute to their high hydrophobicity and emulsifying properties. These findings can provide strong support for black bean protein hydrolysates to be employed in food products acting as natural antioxidant alternatives.

Keywords : antioxidant activity, black bean protein hydrolysate, emulsion physicochemical properties, sunflower oil

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