

Physico-chemical and Biofunctional Properties of Shrimp (*Penaeus japonicus*) Hydrolysates Obtained from Subcritical Water Treatment

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Abstract

This research was conducted to evaluate shrimp hydrolysate produced using subcritical water treatment, an environmentally friendly and green technology at temperature ranged 100–200 °C and 30 bar for 10 min. Various physico-chemical and biofunctional parameters viz. color, pH, total protein content, phenolic compounds, Maillard reaction products, total sugars, reducing sugars, total amino acids, free amino acids, and radical scavenging activities were studied to optimize hydrolysis condition for extracting the maximum biofunctional compounds. The yield of hydrolysates varied from $44.87\pm 1.74\%$ to $88.55\pm 2.15\%$, where the maximum yield was obtained at 200 °C and the color of hydrolysate was showed dark brown due to formation of Maillard reaction products. The hydrolysates showed alkaline pH which was increasing with the temperature increment. The values of protein, phenolic compounds, and Maillard reaction products were found to be 45.76 ± 1.27 g/100 g dried mass, 12.47 ± 0.19 mg trolox/g dried mass, and 4.02 ± 0.01 , respectively in hydrolysates produced at 200 °C. Total sugar and reducing sugar content of hydrolysate produced at 200 °C were maximum and the values were 49.30 ± 0.11 mg/g dried mass and 14.18 ± 1.23 mg/g dried mass, respectively. *Penaeus japonicus* hydrolysates showed strong in vitro free radical scavenging capacity and the DPPH, ABTS, and FRAP activities were found to be 3.08 ± 0.04 , 26.74 ± 0.06 , and 12.12 ± 0.50 mg TEAC/g dried mass, respectively. The maximum free and total amino acids contents were found 2749.17 mg/100 g and 3014.08 mg/100 g dried mass, respectively in hydrolysates obtained at 175°C; further increase of temperature degraded amino acids. Shrimp hydrolysate prepared at 200 °C and 30 bar showed strong biofunctional properties and could be a suitable food ingredient in food and pharmaceutical industry.