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Antioxidant and antimicrobial activities of astaxanthin from Penaeus monodon in comparison between chemical extraction and High Pressure Processing (HPP) (Article)

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Abstract

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The use of High Pressure Processing as an extraction method was studied by evaluating the yield of astaxanthin from shrimp carapace as a model. Previous studies have demonstrated the antioxidant and antimicrobial properties of astaxanthin. The aim of this research was to compare these properties of astaxanthin as a surrogate for its yield from High Pressure Processing (HPP) extraction with the effect of hydrostatic pressure, holding time and amount of solvents versus chemical extraction method. A solvent mixture of acetone and methanol 7:3 (v/v) was used in both methods. The pressure treated was at 238 MPa with 16.29 min of holding time and 6.59 ml of solvents for HPP method. Antioxidant activity was evaluated using scavenging activity of DPPH radical, the reducing activity of Ferrum redox reaction and oxygen radical absorption capacity. Antimicrobial activity was evaluated using a zone of inhibition test against four strain of bacteria: E. coli, E. aerogenes, S. aureus and B. subtilis. The sample of astaxanthin demonstrated a significant increase in DPPH radical scavenging activity (25.47% to 87.90%), reducing activity of Ferrum redox reaction (2.86 μmol TE/g to 8.13 μmol TE/g) and oxygen radical absorption capacity (2,000 μmol TE/100 g to 4,000 μmol TE/100 g) compared to the chemical extraction sample. The antimicrobial activity of the astaxanthin from the HPP sample produced a greater zone of inhibition against all four strains of bacteria when compared to the chemically extracted sample. A higher quality of astaxanthin was achieved with the HPP extraction method compared to chemical extraction.

Author keywords

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