Bitter peptides as immune modulator reducing antibiotics in aquaculture and inhibit oxidation of myofibrillar protein of peeled shrimp (Litopenaeusvannamei) during chilled storage

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We have shown that bitter peptides of thehydrolysates of pepsin digested fish protein can increaselymphocytes and lysozyme activity and improve fish survival in aquaculture (Luo C. et al., FSIM, 2018). Protein oxidation during food storage has a significant impact on both food quality and safety.

In this study, the protective effects of bitter peptidesobtained from large yellow croakerprotein on myofibrillar protein oxidation in peeled shrimp during chilling storage were investigated by evaluating the carbonyl and total sulfhydryl. Also, in vitro antioxidant activity of bitter peptide, and the structure stability of muscles protein throughout oxidation was examined by both scanning electron microscope (SEM) and sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE). From the antioxidant assay, bitter peptides had a significant 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical-scavenging activity, reducing power of ferric ions and metal chelating ability.

Chemical analyses showed that myofibrillar protein at chilling storage were highly susceptible to oxidation.The bitter peptide's antioxidant potential increased significantly as the increase of the concentration.

The results indicated that treating peeled shrimp with bitter peptides before chilling storage significantly decrease the formation of carbonyl derivatives and reduce the loss of thiol groups when compared with the water treated sample (control). In addition, the results of both SEM and SDS-PAGE confirm that there was less distortion of tissue structure and degradation/oxidation of the protein on bitter peptides treated samples.

key words: Bitter peptides; Myofibrillar protein; Litopenaeusvannamei; Antioxidant activity; Structure stability