



The antimicrobial effect of enhancing whey protein isolate with essential oils derived from *Cuminum cyminum* on Silver carp fillet during refrigerated storage.

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Abstract

This study examined the impact of using a whey protein isolate coating combined with *Cuminum cyminum* essential oil (CCEO) as an antibacterial agent on the quality and shelf life of silver carp fillets stored in a refrigerator.

The whey protein isolate coating was prepared using different concentrations of CCEO, namely 0%, 0.3%, 0.45%, and 0.6%. The antibacterial properties of the packaged fillet sample were evaluated and examined at a temperature of 4 °C for a duration of 0, 1, 3, 5, 7, 9, 11, 13, and 15 days.

After a duration of fifteen days, the levels of TVC (total viable counts), EBC (enterobacteriaceae), and LAB (lactic acid bacteria) were notably reduced when employing whey protein isolate coating with 0.6% CCEO, in comparison to alternative treatments ($p < 0.05$). The logarithmic colony-forming unit (CFU) counts per gram for total viable count (TVC), enterobacteriaceae count (EBC), and lactic acid bacteria (LAB) were 4.77, 4.81, and 4.23, respectively.

The findings demonstrate that the utilization of a whey protein isolate with CCEO can prolong the storage duration of silver carp fillets under refrigerated circumstances for a maximum of 15 days, without any negative impact on their taste, aroma, or texture.

Our research findings indicate that the application of a whey protein coating with CCEO can effectively prolong the shelf life of silver carp fillets when stored in the refrigerator.

Keywords: Whey protein isolate, *Cuminum cyminum*, essential oil, silver carp.