



Counteracting Enterobacteriaceae: Antibacterial Efficacy of Cuminum cyminum and Zataria multiflora Essential Oils on Silver Carp Fillets during Refrigerated Storage

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Abstract

Fish packaging technology plays a crucial role in preserving the quality and extending the shelf life of fish, which is both a valuable and perishable food item. Among bacteria, the Enterobacteriaceae is considered an indicator for food contamination. Natural and herbal ingredients, including whey protein isolate and herbal essential oils, have received attention for their environmental compatibility and beneficial effects on human health. This study examined the effects of a whey protein isolate (WPI) coating, which included cuminum cyminum essential oil (CCEO) and zataria multiflora essential oil (ZMEO), on the enterobacteriaceae of silver carp fillets over a period of 10 days in refrigerated storage. We estimated 16 treatments using a combination of three concentrations (0.3%, 0.45%, and 0.6%) of two essential oils. The results revealed that incorporating 0.4% CCEO and 0.6% ZMEO coating significantly improved coating's antibacterial activity, effectively retarding the proliferation Enterobacteriaceae. Overall, The combined use of ZMEO and CCEO in the coating of whey protein isolate can prevent the growth of enterobacteriaceae and increase their shelf life.

Keywords: cuminum cyminum, zataria multiflora, essential oils, wpi coating, silver carp, Enterobacteriaceae.