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Active Exopolysaccharides Based Edible Coating Enriched with Red Seaweed (Gracilaria gracilis) Extract for Improved Preservation of Shrimp Quality during Refrigerated Storage

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Abstract : Unfortunately, shrimps are highly perishable and they start deteriorating immediately after death owing to their high water content and nutritional components. Currently, there has been an increasing interest in bioactive edible films and coatings to preserve the freshness and quality of foods. In this study, active edible coatings from microalgal exopolysaccharides (EPS) enriched with different concentrations of Red Seaweed Extract (RSE) (0.5, 1 and 1.5 % (w/v)) were developed and their effects on the quality changes of white shrimp during refrigerated storage (4 ± 1 °C) were examined over a period of 8 days. The control and the coated shrimp samples were analyzed periodically for microbiological (total viable bacteria, psychrotrophic bacteria, and enterobacteriaceae counts), chemical (pH, TVB-N, TMA-N, PV, TBARS), textural and sensory characteristics. The results indicated that the coating with a mixture of EPS and RSE could significantly decrease the total volatile basic nitrogen (TVB-N), trimethylamine (TMA) and thiobarbituric acid reactive substances (TBARS) ($p < 0.05$). With storage, EPS coatings containing RSE at both levels (1 and 1.5 %) were more effective in inhibiting the microbial species studied, specially psychrotrophic bacteria. Also, EPS + RSE coated samples had lower polyphenol oxidase (PPO) activity and lipid oxidation ($p < 0.05$) toward the end of storage. Textural and color properties of coated shrimp were generally more acceptable. Sensory scores indicated no significant changes in all samples during storage. The obtained results indicate that the edible EPS coating solutions enriched with RSE have noticeable effects on the quality and shelf life of shrimps when compared to control group. Finally, the present work demonstrates the effectiveness of EPS enriched coatings, offering a promising alternative to preserve more better the quality characteristics and to extend the shelf life of shrimp during the refrigerated storage

Keywords : active coating, exopolysaccharides, red seaweed, refrigerated storage, white shrimp
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