Development and Characterization of fish Gelatin-Based Biodegradable Film Enriched with *Lepidium sativum* Extract as Active Packaging for Cheese Preservation

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Abstract

The physical and functional properties of gelatin-based films enriched with organic extracts from *Lepidium sativum* seeds were studied. Gelatin was extracted from the skin of dogfish (*Squalus acanthias*) and the functional gelatin-based films were used to preserve cheese during chilled storage. Ethanol extract (LSE3) and gelatin-based film enriched with LSE3 at 20 µg/mL showed high antioxidant potential using various complementary methods. No significant difference was measured in the mechanical parameters of the enriched films in terms of thickness, tensile strength and elongation at break. LSE3 incorporation at the highest-level decreased slightly the film L* value from 90.30 ± 0.10 to 88.10 ± 0.12, while the b* value increased from 0.91 ± 0.07 to 8.89 ± 0.12. Wrapping the cheese with gelatin-based film enriched with 20 µg LSE3/mL reduced the syneresis by 40% and stabilized the color, peroxidation and bacteria growth as compared to the unwrapped sample after 6 days of storage. In addition, cheese wrapped with the active gelatin-based film showed the lowest changes in texture parameters. Overall results suggest the use of the enriched gelatin film as active packaging material to preserve cheese quality.