

ACTIVE COATINGS INCORPORATING ANTHOCYANINS FOR POTENTIAL FOOD PACKAGING

Dalila Fernanda Canizales Rodríguez¹, Ariel Alain Vergel Alfonso², Francisco Rodríguez Félix², Jose Agustin Tapia Hernández², Ana Liz Gonzáles Bravo², Victor Manuel Ocaño Higuera¹, Betzabe Ebenhezer López Corona², Enrique Márquez Ríos², Silvia Elena Burruel Ibarra³, María Irene Silvas García², Marcela Mendez Balderrama¹, Carmen Lizette del Toro Sánchez²

¹Universidad de Sonora, Departamento de Ciencias Químico Biológicas, Mexico. ²Universidad de Sonora, Departamento de Investigación y Posgrado en Alimentos, Mexico. ³Universidad de Sonora, Departamento de Investigación en Polímeros y Materiales, Mexico.

The high perishability of most foods has prompted continuous research into sustainable alternatives for extending their shelf life, with active packaging emerging as a promising strategy. Edible biopolymer coatings have proven to be a promising option for the development of active food packaging materials. In this study, active coatings composed of pectin and beeswax incorporating commercial anthocyanins were developed and characterized to evaluate their potential application as food active materials. The antioxidant and antifungal activities of the anthocyanins and coatings were determined, and their rheological properties, pH, color, SEM, and FT-IR characteristics were assessed. Anthocyanins inhibited over 50% of DPPH• and ABTS•+ radicals at concentrations below 80 µg/mL and reduced the growth of *Colletotrichum siamense* by 32.16% at 0.25% (w/v). The most suitable coating formulation consisted of 3% (w/v) pectin, 1% (w/v) beeswax, and 1% (w/v) Tween 80, with anthocyanins added at 0.1, 0.25, and 0.5%. The coatings exhibited suitable viscosity values (0.08–0.12 Pa·s), acidic pH (3.05–3.78), and reddish hues. FT-IR analysis revealed interactions among components through shifts in the C=O stretching band, while SEM micrographs displayed continuous pectin matrices with embedded beeswax crystals. Although the antioxidant and antifungal activities of anthocyanins slightly decreased within the coatings, the results remain acceptable and promising for their use as active edible materials for food preservation.

Keywords: Anthocyanins, Active food packaging, Edible coating

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Presenting author's email: dalila.canizales@unison.mx