

Diffusion Characteristics of Mango (*Mangifera indica* L. cv Carabao) Peel as Affected by Chitosan-nanosilica Composite Fruit Coating

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Abstract

Diffusion Characteristics of Mango (*Mangifera indica* L. cv Carabao) Peel as Affected by Chitosan-nanosilica Composite Fruit Coating: Direct measurement of gas transmission rates of coated commodity under controlled environmental conditions is needed in formulating coatings to extend shelf life of fruits. The gas transmission rate of coated commodities, along with its respiration rate can be used to predict the level of modification of internal atmosphere and the quality of the product during storage. Oxygen (O₂) and carbon dioxide (CO₂) transmission rates of mango (*Mangifera indica* L. cv Carabao) peel coated with different formulations of chitosan-nanosilica under three storage temperatures were estimated using Exponential Decay Method. The coating was prepared by dissolving chitosan (CS) in aqueous solution of glacial acetic acid (0.25% v/v) and blending with nanosilica (NS) dispersion. The resulting films have microcracks and agglomeration of NS throughout the surface. 0.75% CS under 25°C had the highest gas transmission rate (1.136 mL O₂ cm⁻² hr⁻¹ and 3.243 mL CO₂ cm⁻² hr⁻¹) while 1% CS+ 0.03% NS under 15°C had the lowest gas transmission rate (0.406 mL O₂ cm⁻² hr⁻¹ and 1.586 mL CO₂ cm⁻² hr⁻¹). Increasing chitosan concentration decreases O₂ and CO₂ transmission rates by almost 44% and 41%, respectively, while the incorporation of NS decreases the O₂ transmission rate by 10% to 20% and CO₂ transmission rate by 5% to 14%. Gas transmission rates were highest at 25°C and lowest at 15°C.

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Speaker Biography:

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