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The Effects of Aloe Vera Gel and Cinnamon Powder as an Edible Coating on the Shelf Life and Quality of Fresh-Cut Chokanan Mangoes (*Mangifera indica* L.)

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Structured Abstract

Background: Fresh-cut mangoes are susceptible to rapid quality deterioration due to moisture loss, enzymatic browning, biochemical changes, and microbial growth following tissue disruption. These factors significantly limit shelf life and commercial value. The market for natural edible coatings made from plant-based materials has grown, as these coatings offer eco-friendly solutions for postharvest product protection. The film-forming properties of aloe vera gel provide effective moisture protection for products, and cinnamon offers antimicrobial and antioxidant effects through its bioactive components. The research assessed how aloe vera gel mixed with cinnamon powder functioned as an edible coating to maintain quality and extend the shelf life of fresh-cut Chokanan mangoes stored at chilled temperatures.

Methods: Fresh-cut Chokanan mangoes were subjected to four treatments which: T1 (uncoated), T2-T4 20% aloe vera with different concentration of cinnamon powder: T2 (3% cinnamon powder), T3 (5% cinnamon powder), and T4 (7% cinnamon powder). Samples were stored at 4°C and analysed for 15 days. Physicochemical analyses including weight loss, firmness, colour parameters, browning index, pH, total soluble solids, titratable acidity, total phenolic content, and total flavonoid content were conducted. Total plate count analysis was evaluated.

Results: The study showed that coated mangoes maintained their quality than the uncoated mangoes. The T4 treatment shown better results which had the lowest weight loss of 1.80% while T1 lost 5.10%. The coated samples showed improved firmness retention because T4 maintained 28.33 N while T1 is 20.33 N. The coated mangoes showed both colour stability and reduced browning. The T4 treatment better protected chemical quality because it showed a slower pH increase from 3.99 to 4.11, a higher titratable acidity of 0.43% citric acid, and controlled total soluble solids. The T4 treatment maintained total phenolic content at 263.19 mg GAE/100 g which was higher than T1 that achieved 89.93 mg GAE/100 g. Moreover, T4 treatment maintained microbial levels under 3.70 log CFU/g.

Conclusion: In conclusion, 20% aloe vera gel with 7% cinnamon powder (T4) effectively preserved physicochemical quality, enhanced antioxidant retention, and inhibited microbial growth, thereby extending the shelf life of fresh-cut Chokanan mangoes during chilled storage at 15 days.

Keywords: Aloe vera gel, Cinnamon powder, Edible coating, Fresh-cut mango, Shelf life

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