

Fresh cut mangoes: evaluation of edible coatings

Very little is known about the physiological behavior, potential shelf life and quality changes of fresh-cut mangoes. Investigations about the use of edible films in fresh-cut mangoes are still lacking. Therefore, the aim of this work was to evaluate the use of edible coatings to preserve the quality of this product stored under refrigeration, by analyzing some physic-chemical, sensorial and microbiological characteristics.

Raw material

Mangoes (*Mangifera indica* L.) cv. Kent from Ivory Coast cleaned and washed in a 200 ppm chlorine solution and were manually sliced with a sharp knife, cut in pieces (2 x 2 cm) and immersed in 40 ppm cold chlorine water (5°C).

Edible coatings

The mango pieces were dipped for two min in the cold-coated solution, drained and placed on a 0.5 L polypropylene plastic tray (130 to 140 g/tray). Trays were sealed with polypropylene film (thickness 40µ) and stored at 4°C for up to nine days.

Four treatments were evaluated:

- T1: Distilled water was used as a control treatment.
- T2: 1% Sodium Carboxy Methyl Cellulose (CMC) + 0.5% citric acid + 0.05% estearic acid + 0.5% ascorbic acid;
- T3: 0.75% Chitosan + 3% citric acid;
- T4: 1% Dextrin potato starch + 1% calcium lactate + 0.5% ascorbic acid.

Analytical procedures

O₂ and CO₂ concentrations were measured by withdrawing air samples through a gas analyser Checkmate 9900 PBI (Dansensor Danemark).

Sensorial evaluations: appearance (color) and texture (firmness) analysis. Colour (*L** and *b** values): Minolta CR-300 Chromameter (Minolta, Japan). Ten pieces per replicate were evaluated from each treatment. Firmness: Texture Analyser TA-TX2 (Texture Technologies Corp., Scarsdale, NY, USA) with a system of inox probe (2 mm diameter) with the insert distance of 10mm.

Résultats

Chitosan and Dextrin treatments showed a continuous decay up to 4% and 7% for Oxygen levels. The CO₂ levels increased more rapidly in control and CMC treated fruits than in Chitosan and Dextrin. The firmness results showed no difference between the treatments. During all the storage period, the firmness variation coefficient of the samples ranged from 40% to 50% (Figure 3).

After nine days of storage at 4 °C, fresh-cut mangoes treated with Chitosan resulted in better visual quality, the maintenance of yellow colour (value *L** and *b** more positive) and fewer symptoms of browning and decay, followed by CMC treatment (figure 4).

Respiratory rate decreased when chitosan coating is used (table 1)

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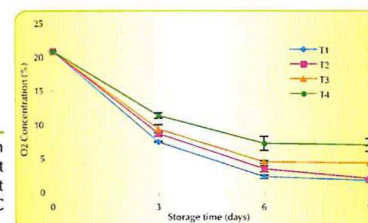


Figure 1. O₂ concentration in the packages of fresh-cut treated mangoes, storage at 4°C

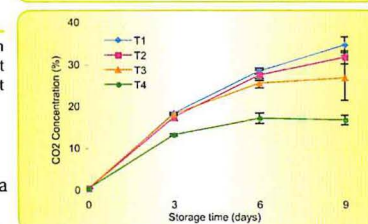


Figure 2. CO₂ concentration in the packages of fresh-cut treated mangoes, storage at 4°C

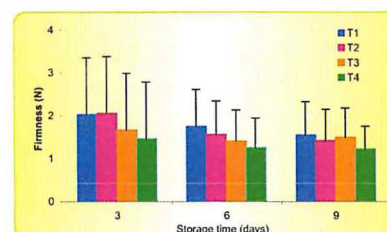


Figure 3. Firmness of fresh cut treated mangoes, stored at 4 °C.

Table 1. Changes in respiratory intensity (IR O₂ and IR CO₂) and respiratory coefficient (RQ) for fresh cut mangoes treated with coatings and storage at 23°C.

Products	T (°C)	IR O ₂	IR CO ₂	RQ
Mature mangoes	23	1.50	3.92	2.61
Control	23	1.34	2.29	1.71
Carboxy methyl cellulose	23	1.19	2.02	1.70
Chitosan	23	1.24	1.71	1.38

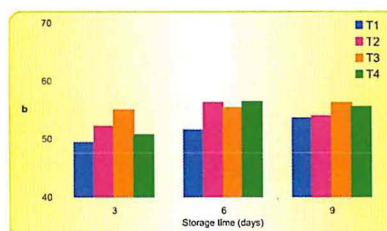


Figure 4 Colour (*b** value) of the treated mangoes storage at 4°C.

Conclusion

According to the results obtained in this study, the chitosan treatment shows the best results in comparison with the other treatments after nine days of storage at 4°C and it could be used to maintain the quality of fresh-cut mangoes without detrimentally affecting physico-chemical and sensorial characteristics.



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