

Cinnamaldehyde-loaded nanostructured lipid carriers extend the shelf life of date palm fruit

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Abstract

The effect of free cinnamaldehyde (CA) and CA-loaded nanostructured lipid carriers (NLC) on the post-harvest quality of Mazafati date as a soft date cultivar was evaluated. Date fruits were immersed in sodium alginate (SA) solution alone or incorporated with 1000 and 2000 ppm free CA or CA-loaded NLC, then packed in polyethylene bags and stored for 180 days at 4 and 25 °C. The weight loss and the variations of pH, titratable acidity, and total soluble solids of the coated samples containing free CA and CA-loaded NLC were significantly lower than the treated sample with distilled water as control at the end of the storage period. The CA-loaded NLC treatments reduced the weight loss of the samples stored at 4 and 25 °C respectively by 32.7% and 55.1%, compared to the control. The total sugar content (TSC) significantly decreased, but reducing sugar content (RSC) increased in all samples during the storage period. The TSC and RSC of the samples treated with 2000 ppm CA-loaded NLC (stored at 4 °C) were 15.2% higher and 7.0% lower than the control, respectively. Total bacteria and fungi counts in the treated CA-loaded NLC samples were about 3.5 log CFU/g less than the control. The use of free CA or CA-loaded NLC, especially 2000 ppm CA-loaded NLC, improved the sensory attributes of the date samples. Overall, it can be concluded that edible coatings containing CA, especially CA-loaded NLC, can extend the shelf life of date fruit without any undesirable impacts on sensory attributes.