Effect of the UV-C radiation on the quality and shelf-life of fresh-cut potato

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INTRODUCTION

Mechanical processing during fresh-cut (FC) production lead to a quality loss and limited shelf life of FC products. Number of studies have demonstrated the antimicrobial effect of UV-C radiation as well as its effect on physical and chemical properties of fruits and vegetables 1, 2. Therefore, to obtain the best quality and prolong shelf life of FC products it is necessary to select the adequate radiation dose 3, considering properties of the plants. The aim of this study was to investigate the effect of different UV-C radiation doses on microbial growth, firmness, color and sensory properties of raw FC potato during storage of 23 days.

MATERIAL & METHODS

1. Potato (Solanum tuberosum L.) Cultivar Birgit
2. Mechanical processing
   Peeling, washing, slicing (0.4 cm)
3. Antibrowning treatment
   • 2% sodium ascorbate (SA) solution dipping / 3 min (Control without SA and UV treatment)
4. Packaging
   • Vacuum (PA/PE)
5. UV-C treatment
   • 0, 3, 5, 10 min / 0, 1.62, 2.70 and 5.40 kJ/m²
6. Storage
   • 23 days / +6°C
7. Analysis on 0th, 8th, 11th, 15th and 23rd day
   • determination of aerobic mesophilic bacteria count (AMBC)
   • color (CIELAB)
   • firmness (texture analyzer)
   • sensory analysis (quantitative descriptive method)

RESULTS & DISCUSSION

The initial AMBC in the control FC potato was 2.63 log CFU/g and 12.38 log CFU/g at the end of the storage. The 10-min UV-C/SA treatment significantly reduced aerobic mesophilic bacteria count comparing to control. The effectiveness of 5- and 10-min UV-C/SA treatment was more pronounced during storage, resulted in 3.02 and 3.04 log reduction at 23rd day. The UV-C/SA treatments did not affect yellowness (b*) of potato samples while lightness (L* values) increased in 5- and 10-min UV-C/SA treated potato samples after 15 days of storage indicating lighter color compared to control samples. The redness (higher a* values) was observed only in control samples (3.92) at the end of storage. During storage the UV-C treated samples were less firm compared to the control. The sensory evaluation showed that UV-C treatments preserved the color of potatoes and did not affected on their moistness and firmness during storage. The off-odor was detected in all samples at the end of storage except for a 10-min UV-C treated samples.

CONCLUSION

The results of this study showed that 5- and 10-min UV-C/SA treated fresh-cut potato samples packed in vacuum bags retained color, firmness, good microbial and sensory quality for 15 days at 6 °C.

LITERATURE


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