

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 dose³, 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

- Potato (*Solanum tuberosum* L.)
 - Cultivar Birgit

- Mechanical processing
 - Peeling, washing, slicing (0,4 cm)

- Antibrowning treatment
 - 2% sodium ascorbate (SA) solution dipping/ 3 min (Control-without SA and UV-C treatment)

- Packaging
 - Vacuum (PA/PE)

- UV-C treatment
 - 0,3,5,10 min / 0, 1.62, 2.70 and 5.40 kJ/m²

- Storage
 - 23 days / +6°C

- 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

Storage time (days)	0	8	11	15	23
3-min UVC/SA	0.37	0.35	0.42	2.01	2.97
5-min UVC/SA	0.36	1.23	2.20	2.99	3.02
10-min UVC/SA	0.45	1.39	2.20	3.17	3.04

Table 1. Log reductions (log CFU/g) in AMBC during storage of UV-C treated FC potato slices.

SA- sodium ascorbate

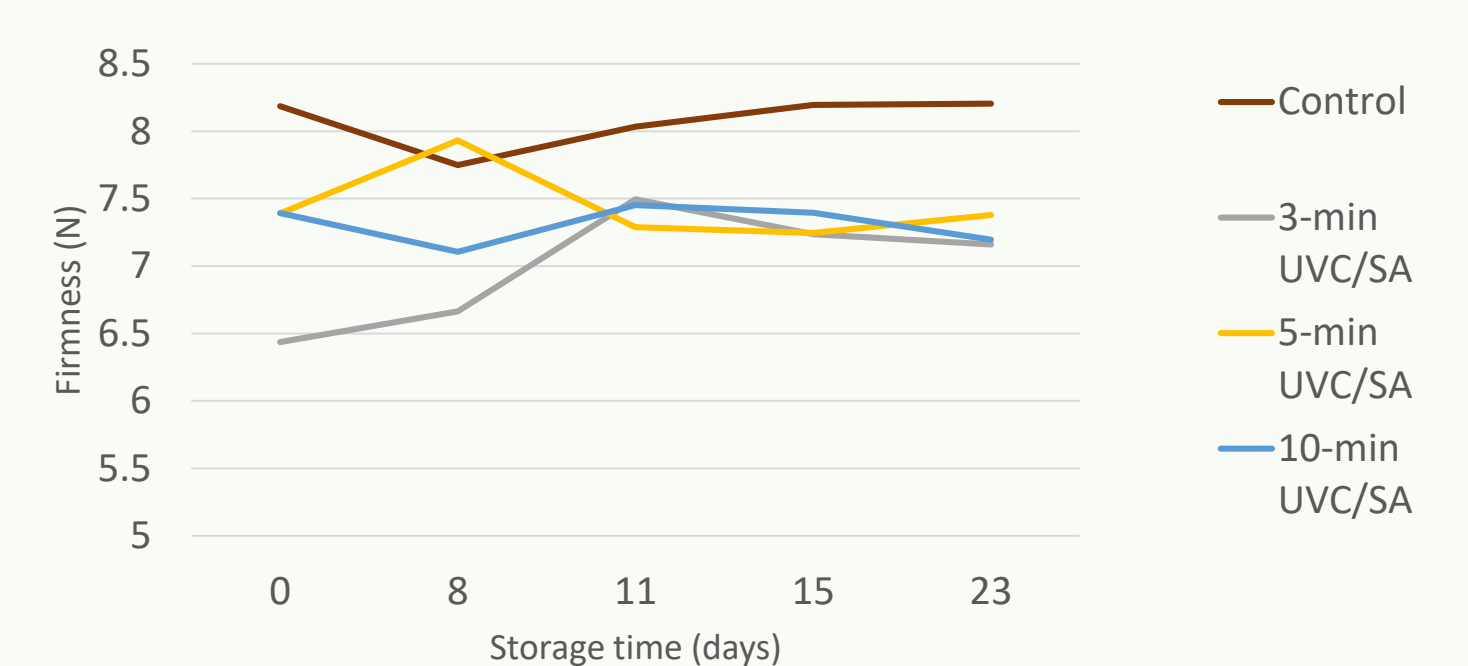


Figure 1. Influence of UV-C treatment on the firmness of FC potato slices during storage

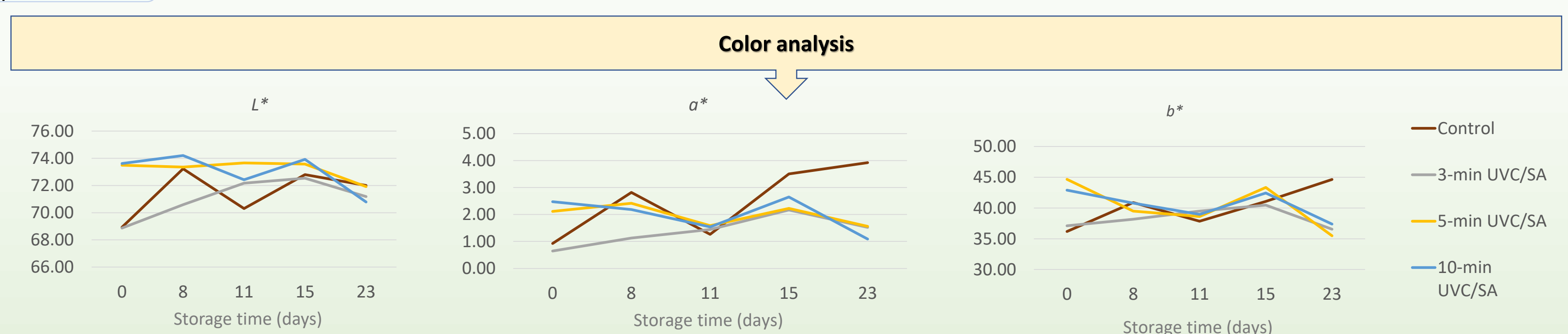


Figure 2. Influence of the UV-C treatment on the color parameters of FC potato slices during storage SA- sodium ascorbate

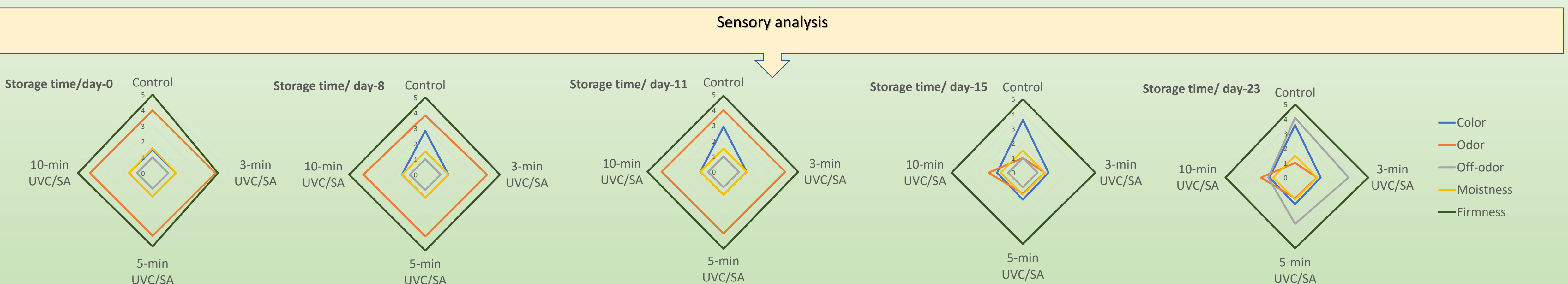


Figure 3. Influence of the UV-C treatment on sensory properties of FC potato slices during storage SA- sodium ascorbate

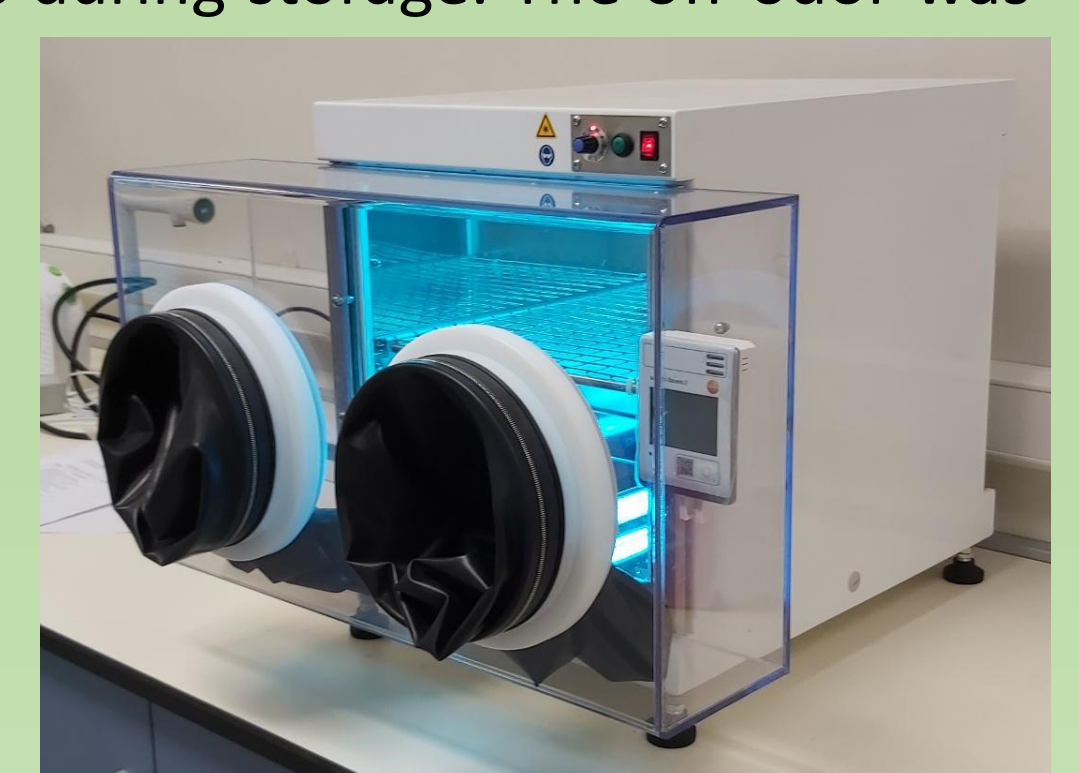
The initial AMBC in the control FC potato was 2.63 log CFU/g and 12.38 log CFU/g at the end of the storage. The 10-min UV-C/SA treatment significantly reduced aerobic mesophilic bacteria count comparing to control. The effectiveness of 5- and 10-min UV-C/SA treatment was more pronounced during storage, 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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