Accepted Manuscript

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PII: S1466-8564(15)00278-7
DOI: doi: 10.1016/j.ifset.2015.12.022
Reference: INNFOO 1445

To appear in: *Innovative Food Science and Emerging Technologies*

Received date: 11 September 2015
Revised date: 29 November 2015
Accepted date: 12 December 2015

Please cite this article as: Tappi, S., Gozzi, G., Vannini, L., Berardinelli, A., Romani, S., Ragni, L. & Rocculi, P., Cold plasma treatment for fresh-cut melon stabilization, *Innovative Food Science and Emerging Technologies* (2015), doi: 10.1016/j.ifset.2015.12.022

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ACCEPTED MANUSCRIPT

COLD PLASMA TREATMENT FOR FRESH-CUT MELON STABILIZATION

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Abstract

The aim of this study was to evaluate the effect of gas plasma treatment on fresh-cut melon stability during controlled storage. Plasma treatments of 15+15 and 30+30 min were conducted on fresh cut melon using a Dielectric Barrier Discharge (DBD) generator. Samples were packed and stored for 4 days at 10°C and evaluated for qualitative, metabolic and microbiological indexes. Qualitative parameters of fresh-cut melon (titratable acidity, soluble solid content, dry matter, colour, texture) were only weakly affected by plasma treatment. Peroxidase (POD) and pectinmethylesterase (PME) activity were slightly inhibited by the treatment up to respectively about 17 and 7%. Tissue metabolic heat production decreased proportionally to the treatment duration, while a partial conversion to anaerobic metabolism was observed. Microbial results showed that a significant increase in microbial shelf-life was achieved following the 15+15 min plasma treatment due to a delayed growth of spoilage mesophilic and psychrotrophic microflora.

Industrial relevance

The demand for fresh-cut products characterized by high qualitative and nutritional values and an acceptable shelf-life has promoted the research for non-thermal treatments.

Fresh-cut melon is considered to be highly perishable and potentially hazardous foods because it can support the growth of spoilage microflora and several pathogens.

Cold plasma has shown its potentiality as an antimicrobial treatment and has been tested on different food products, but the impact on product quality and metabolism is still scarcely known.

The results obtained in this study contributed to deepen the knowledge on the effect of plasma treatment on microbial, qualitative and metabolic aspects of fresh-cut melon.

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