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Effect of electrolyzed water on the shelf life of cherry tomatoes and pears

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Introduction

Fruit and vegetables (F&V) are easily contaminated by microorganisms at different steps during production, handling and packing process. It has been reported that more than 35% of fresh F&V are lost during harvest[1], transportation and storage due to microbial spoilage, mechanical injury, inadequate storage temperature and relative humidity management.

In particular, Neutral Electrolyzed Water (NEW) can control microorganisms in washing water and other processes, thanks to be a powerful bactericidal agent against most pathogenic and spoilage bacteria.

Herein, we present the effect of NEW as a non-thermal sanitization technology: a potential alternative to other chemicals (such as chlorine) for cherry tomatoes and pears.

Aim

To investigate the effect of NEW in the washing process of cherry tomatoes and pears as an alternative strategy to other chemicals (Figure 1).

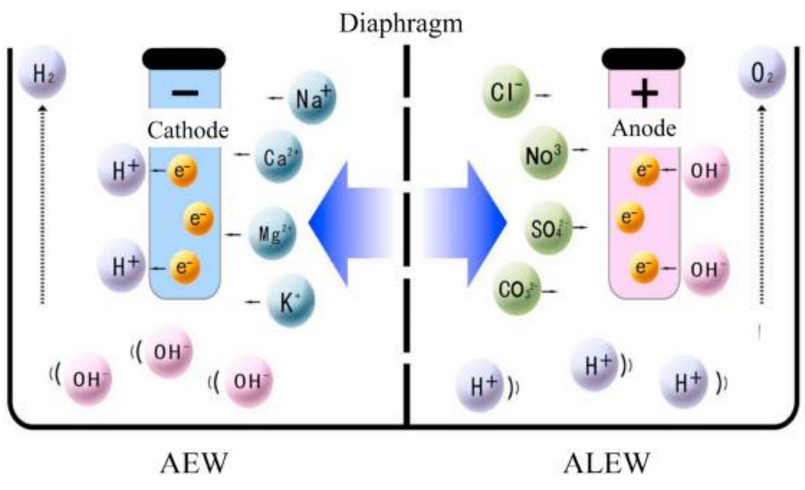

Figure 1. Generation of AEW and ALEW in an electrolytic cell, consisting of anode and cathode connected through an external power supply and separated by a septum or diaphragm.[2]

Methods

Cherry tomatoes were washed in NEW and tap water (control samples) for 1 minute to be subsequently drained and packed in bags of microperforated BOPP (PolyPropilene BiOriented).

The packaged samples were stored at 2°C temperature during 10 days of shelf life and analyzed over time.

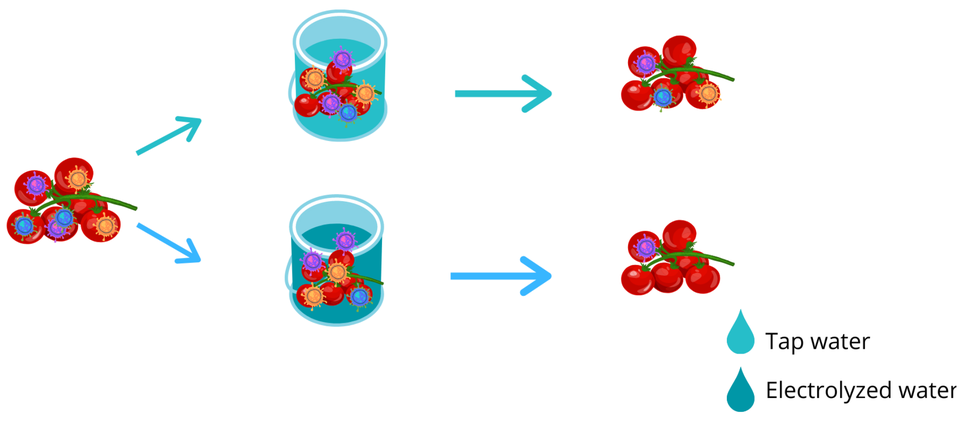

Figure 2. Schematic illustration of the washing process

In the case of pears, *Peras de Rincón de Soto* PDO were used to analyze the effect of NEW. The washing process was carried out simulating the process of drencher washed process for 1 minute to be packed later in bags of microperforated BOPP. The samples were stored at room temperature for 10 days of shelf life and analyzed over time.

Spoilage bacteria (aerobic mesophilic count and moulds and yeast count) and physicochemical aspects (as firmness of pulp, Total soluble solids, instrumental colour and pH) were anal

Figure 3. 'Peras de Rincón de Soto' washed with tap water (right) and with NEW (left) after 10 days of storage at room temperature.

Results

A microbiological reduction in mould, yeast, and aerobic counts of 3.6 Log and 3.8 Log, respectively, was achieved for the cherry tomato samples throughout the shelf-life.

For pears, a reduction of spoilage bacteria, both moulds, yeast and aerobes count, of 2.8 Log and 2.3 Log, respectively, was achieved throughout the shelf life.

In both cases, no significant differences were found neither in firmness nor in instrumental color.

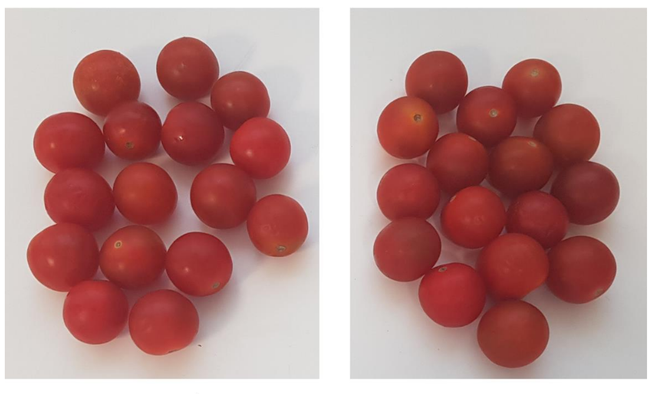

Figure 4. Cherry tomatoes washed with tap water (right) and with NEW (left) after 10 days of storage at 2°C.

Significance

Neutral Electrolyzed Water can be used as a non-thermal sanitization technology as an alternative to chlorine.

REFERENCES

(1) Bernstad A.; Andersson, T. Food waste minimization from a life-cycle perspective, *Journal of Environmental Management* (2015).
(2) Zhang, W., Cao, J., Jiang, W., Application of electrolyzed water in postharvest fruits and vegetables storage: A review, *Trends in Food Science & Technology* (2021).

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