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Title

Alternatives to post-harvest pear disinfection using plasma-activated water and electrolyzed water

Introduction: This study aims to evaluate the use of alternative technologies [plasma activated water (PAW) and/or the combination with neutral electrolyzed water (NEW)] to the use of fungicides in the post-harvest treatment of pears before their storage in controlled atmosphere chambers to prevent rot development. After an initial screening of more than 30 types of PAW and NEW, one type of each one was selected for the product treatments.

Methodology: During the 2018-2019 harvest, 9 different pear batches were prepared, which were treated by starting immersion, at a ratio of 1:2 for 10 minutes, with distilled water (DW), PAW and NEW. The pears were placed in three controlled atmosphere chambers, one batch of each treatment per chamber. The chambers were balanced until the storage conditions were reached (0.5 % CO₂, 0.8 % O₂ and -0.5°C). The relative humidity for each of the chambers was maintained at 95% with DW, PAW and NEW respectively. The chambers were opened at t0, t2, t4, t5, t6, t7, t8 and t9 months. In each exit, aerobic microorganism count, mould and yeast count, color, texture and °Brix were analyzed.

Results: After the initial immersion treatments, a reduction in contamination by aerobic, molds and yeasts is observed. Throughout the evolution time, the samples initially treated with PAW and sprayed with PAW in the chambers have the lowest counts for both aerobic and for molds and yeasts. Over the study time, an improvement was observed in pears stored in chambers with PAW and NEW spraying compared to those sprayed with DW. There is a greater influence on the organoleptic characteristics of the product (texture, color, °Brix) due to the sprayed treatment in the chambers than to the initial immersion.

Conclusions: The PAW and/or NEW application on pears is proposed as an alternative to the use of fungicides in post-harvest treatments prior to storage in chambers.

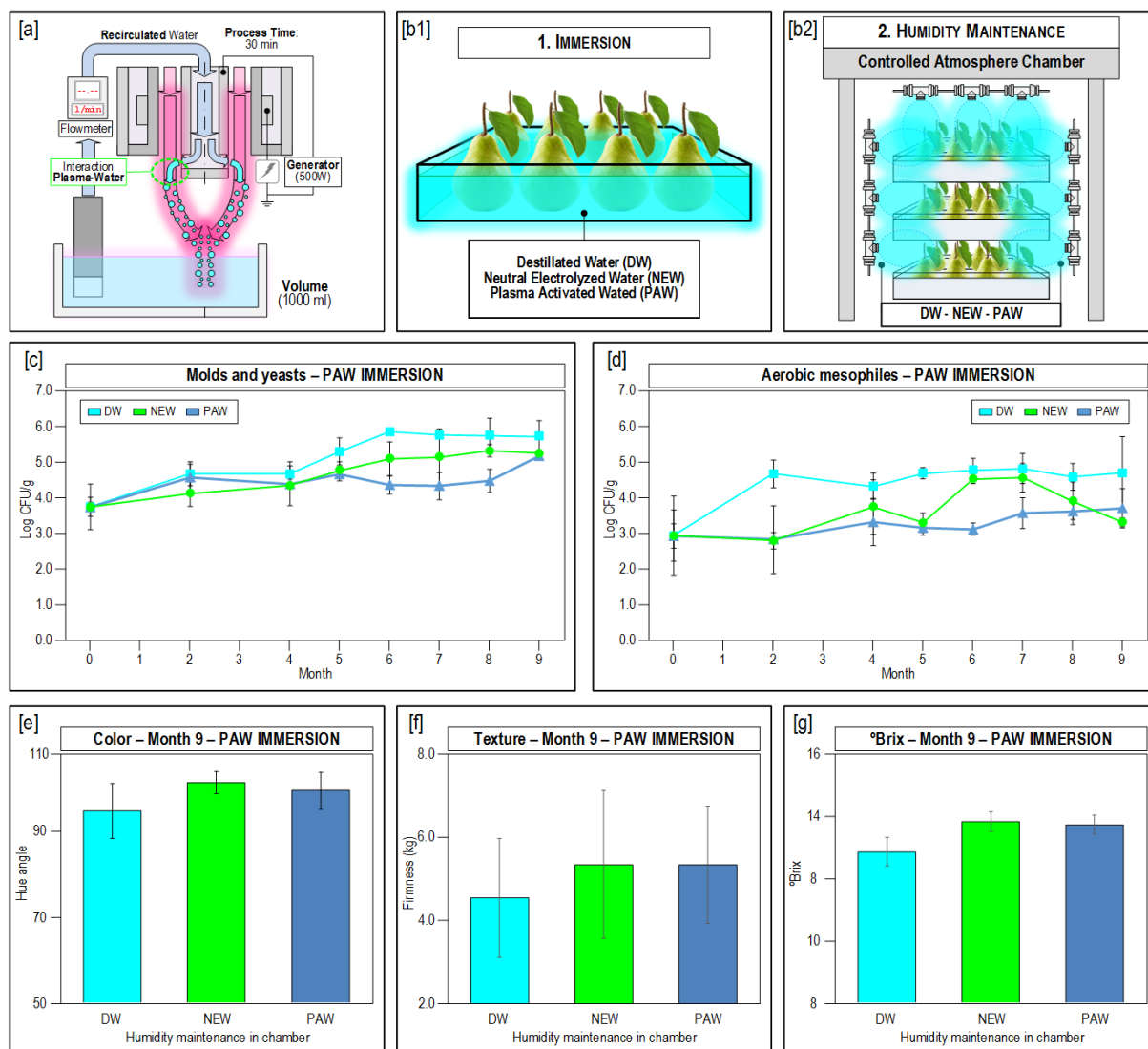


Figure 1.[a] Scheme of PAW generation; [b1] Initial immersion treatment and [b2] Humidity maintenance treatment during storage; Microbial evolution during storage: [c] Molds and yeasts and [d] Aerobic mesophiles; Organoleptic parameters [e] Color [f] Texture and [g] °Brix