

# Evaluation of alternative postharvest treatments (water heat treatment, ultrasounds, thermosonication and UV-C radiation) to improve safety and quality of whole tomato

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## Introduction

Tomato is a climacteric fruit, which is reflected in the increase of respiration rate, accompanied by an increase of carbon dioxide and ethylene production, during the ripening process. These increased metabolism rates lead to accelerated physiochemical, physiological and sensorial changes, namely colour and texture, limiting commercial fruits shelf-life period. Control of postharvest decay is increasingly becoming a difficult task, since the number of pesticides available is rapidly declining as consumer concern for food safety is increasing.

The aim of this study was to evaluate the postharvest preservation treatments: water heat treatment (WHT: 40 °C / 30 min), ultrasounds (US: 45 kHz, 80%, 30 min), thermosonication (TS: 40 °C / 30 min, 45 kHz, 80 %) and ultraviolet radiation (UV-C: 0.97 kJ.m<sup>-2</sup>), as alternative to conventional chlorinated-water treatment (Ctr: 150 ppm chlorine, 5 °C, pH 6.5, 2 min) on the overall quality of tomato (cv. Zinac) fruits.

## Material & methods

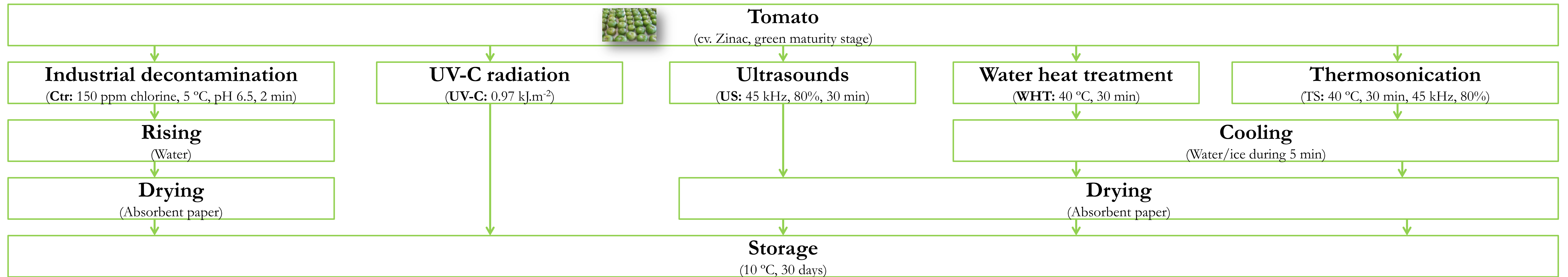


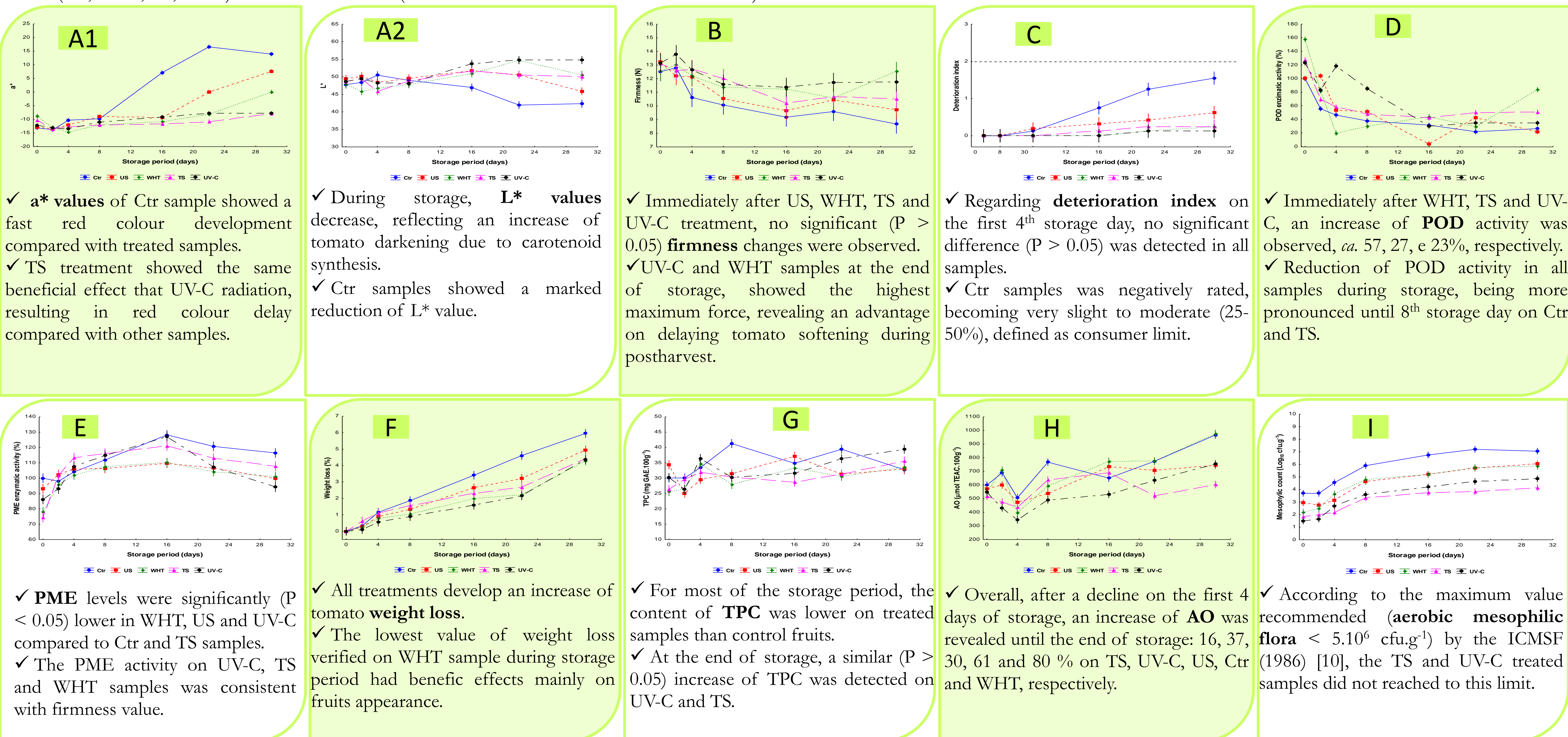
Fig. 1 – Experimental set-up for untreated and treated tomato fruits.

**Quality factors evaluated:** Colour, texture, sensorial analysis (deterioration index) [1, 2], peroxidase (POD) [3] and pectin methyl esterase (PME) [4] enzymatic activities, weight loss[5], total phenolics content (TPC) [6], antioxidant capacity (AO) [7] and mesophylic count [8].

**Data analysis:** Variance (two-way ANOVA) using Statistica v.7.0 [9] to assess treatments and storage period effects on tomato quality. Tukey test was used to determine significant differences between samples ( $P < 0.05$ ).

## Results

Changes in a\* and L\* colour (A1 e A2), texture (B), sensorial analysis: deterioration index (C), POD (D) and PME (E) enzymatic activities, weight loss (F), TPC (G), AO (H) and mesophylic count (I) of control (Ctr) and treated (US, WHT, TS, UV-C) stored tomato at 10 °C (vertical bars denoted 95% of confidence intervals):



## Conclusions

This study presents alternative postharvest technologies that improve tomato (cv. Zinac) quality during shelf-life period and minimize the potential negative impact on human safety, health and on the environment comparing with conventional chlorinated water.

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