EFFECT OF HOT-WATER BLANCHING IN TREHALOSE SOLUTIONS ON BOTH NUTRITIONAL AND TECHNOLOGICAL QUALITY OF SLICED ORGANIC CARROTS

STUDENT: *Giordana Ventriglia* **SUPERVISORS:** *Prof. Riccardo Massantini*

Ass. Prof. Roberto Moscetti

Abstract

The aim of the present work was to evaluate the effect of blanching treatments at 75 and 90°C for 3 min in trehalose solution (4% w/v) on nutritional and technological quality of organic carrot (cv. *Romance*) slices of 5-mm thickness. The following parameters were investigated: [1] residual enzymatic activities of peroxidase (POD) and pectin methylesterase (PME); [2] changes in color; [3] changes in firmness and elastic modulus; [4] total phenols content; [5] total carotenoids content; [6] soluble solids content (SSC); [7] electrolyte leakage and [8] radical scavenging activity (IC_{50}). Statistical analysis was investigated through the principal component analysis (PCA), the analysis of variance (ANOVA) and the pairwise comparison ($P<0.05$).

All the treatments retained better color than control sample, which seemed to blush after treatment and 30 min of exposure to air. Furthermore, thermal treatments showed lower values in the elastic modulus at higher temperature of treatment. However, blanching in trehalose solution seemed to be more effective in retaining the firmness of carrot slice than blanching in water. Both POD and PME residual enzyme activities decreased as the temperature of blanching increased and when the trehalose solution was used as dipping medium. Content of SSC, Ct and Ft showed minimal differences among treatments and control, while REL values were affected by thermal treatments. Finally, all samples showed very low radical scavenging activity.

The first 3 principal components of PCA explained a total variance of 95.9% and allowed to distinguish 3 clusters: [1] control sample, [2] 75-°C blanching treatments and [3] 90-°C blanching treatments.

In conclusion, the 4-% trehalose treatment was reliable in improving color and functional properties of blanched organic carrot slices.

Keywords: *Daucus carota*, residual enzymatic activity, total carotenoid content, radical scavenging activity, principal component analysis