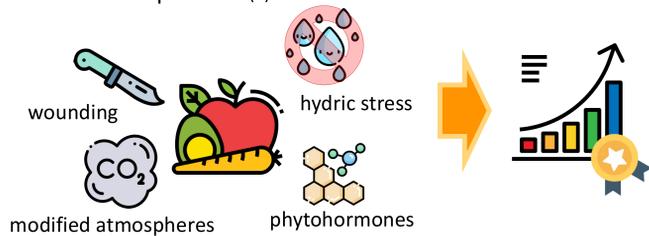
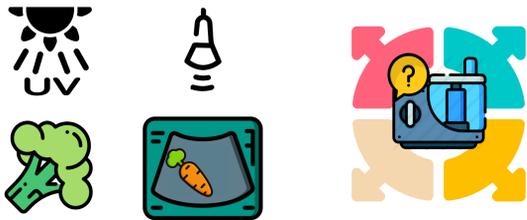


Introduction

❖ Application of postharvest abiotic stresses have proved to be a feasible low-cost strategy to significantly increase the content of bioactive compounds. (1)



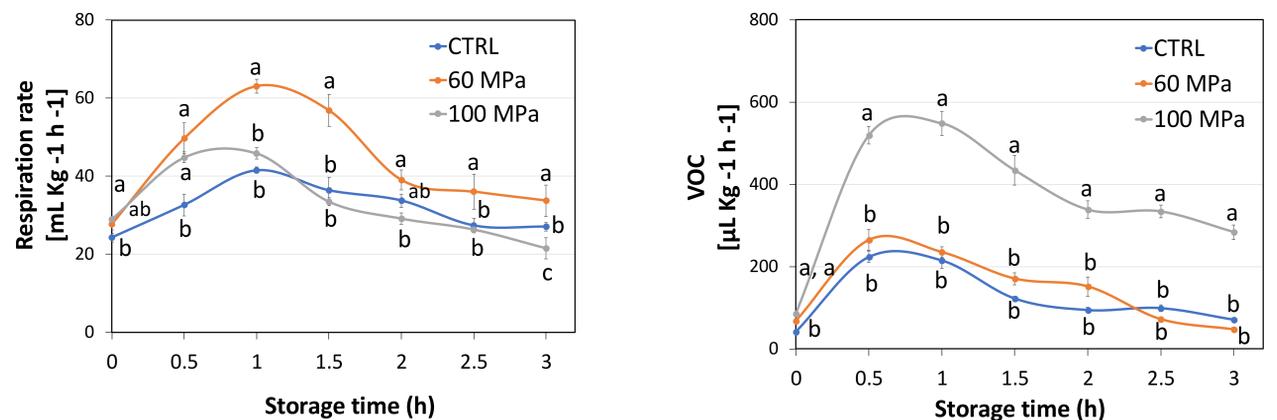
❖ Previous reports suggests that non-thermal emerging technologies such (UV-light, ultrasound, HPP, etc.) induces biosynthesis and accumulation of nutraceuticals in horticultural crops.



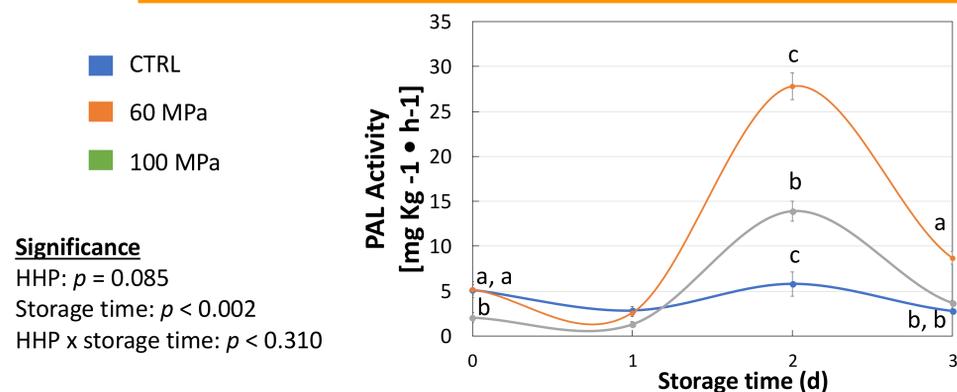
❖ Research in this area is scarce and is still unclear whether the increment of bioactive compounds is due to major extratability or due to elicitation of metabolic pathways.

Results

Respiration Rate, Volatile Organic Compounds (VOCs)



Phenylalanine Ammonia-Lyase, PAL Activity



Significance

HHP: $p = 0.085$

Storage time: $p < 0.002$

HHP x storage time: $p < 0.310$

Respiration rate, VOCs and PAL activity before and during storage (3 d at 15°C) of whole carrots exposed to HHP for the CUT (60 or 100 MPa). Different letters between values indicate statistical difference using Tukey's HSD test ($p < 0.05$)

Methods

Using high-hydrostatic pressure (HHP) Come-Up Time (CUT) strategy, wholes carrots were treated to abiotic stress

1



Purchase of carrots

Fresh carrots of commercial maturity were obtained from a local store.

2



Select and sanitize

Whole carrots without damage were disinfected (chlorine 200 ppm, pH 6.5).

3



Vacuum packed

Sanitized carrots were packed in pairs, 20 in Hg

4



HHP: 60 & 100 MPa

CUT 60 MPa: 4.06 MPa/s; 15.33 s
CUT 100 MPa: 4.61 MPa/s; 20.67 s

5



Respiration rate, VOCs (2)

4 carrots per container (V = 3.8 L)
3 days; Volatile Organic Compounds

6



PAL enzymatic activity (3)

Phenylalanine ammonia-lyase
Phenolics biosynthesis

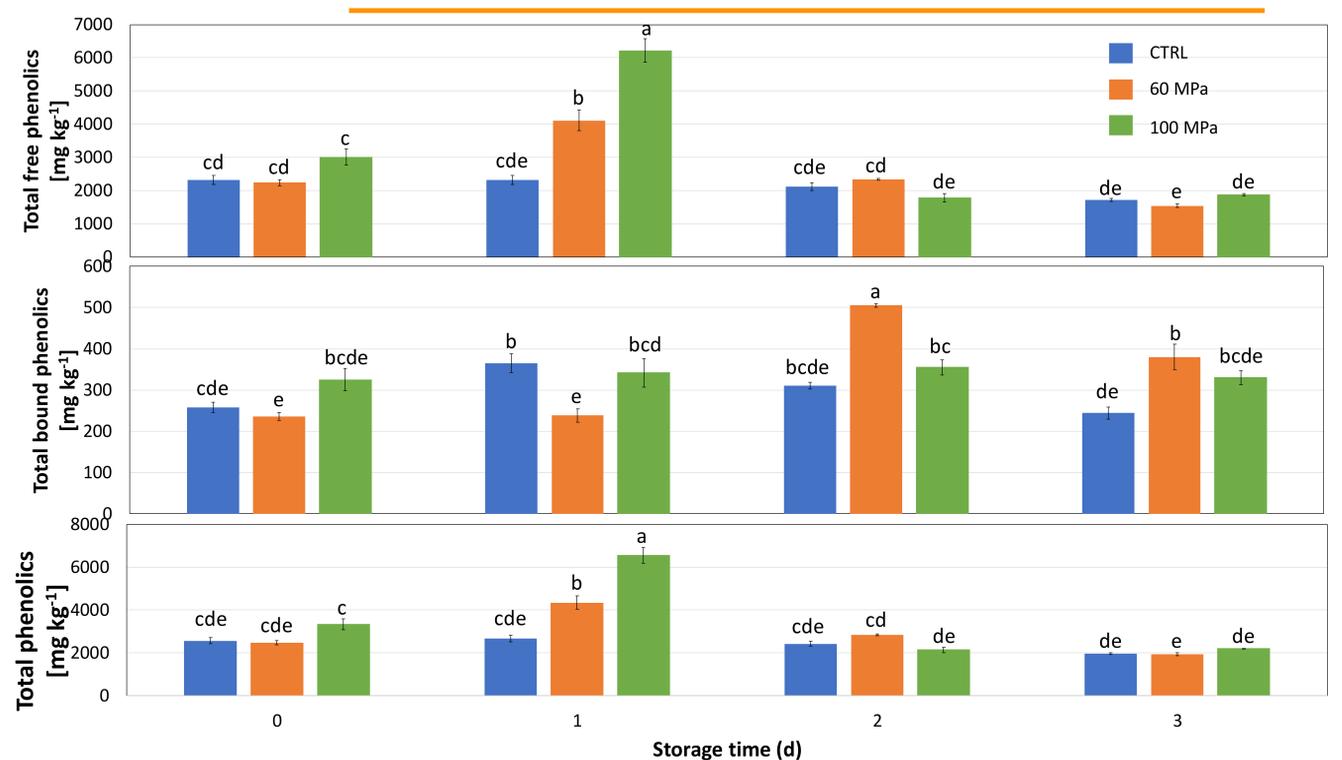
7



Free and Bound Phenolics

Free and bound phenolic compounds were extracted, identified and quantified

Free and Bound and Total Phenolics



Concentration of phenolics quantified before and during storage (3d at 15°C) of whole carrots exposed to HHP for the CUT (60 or 100 MPa). Different letters indicates statistical difference between treatments using Tukey's HSD test ($p < 0.05$). Results are expressed as dry weight basis.

Conclusions

- ❖ HHP induces a dual stress-response, one related with ethylene production and the second related to the enzyme activity.
- ❖ Results presented indicate that proper HHP conditions and storage time promotes the accumulation of specific phenolics.

References

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3. Ortega-Hernández, E., Nair, V., Welte-Chanes, J., Cisneros-Zevallos, L., & Jacobo-Velázquez, D. A. (2019). *International Journal of Molecular Sciences*, 20(21), 5327. <https://doi.org/10.3390/ijms20215327>