

Effect of the treatment with natural phytochemicals on purple carrots (*Daucus carota* L.) during storage

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INTRODUCTION & AIM

Dark-colored carrots are known by their attractive color and high content in antioxidant pigments such as carotenoids and anthocyanins, which are protector from pathologies [1]. However, both organoleptic and health promoting properties are altered during storage. Deterioration in sensorial quality together with decrease in antioxidant content is usually observed after 5-7 days without refrigeration.

The **objective** of this research was to propose an approach based on the treatment with natural phytochemicals, (methyl jasmonate (MJ) and abscisic acid (ABA), enabling purple carrot shelf-life to be extended with no need for artificial preservatives. For that purpose, MJ- and ABA-treated purple carrots were stored at 5°C for 21 days and compared with untreated samples stored under the same conditions.

METHOD

*PHYSICO-CHEMICAL PARAMETERS

- Visual appearance
- Juiciness
- Moisture content
- Total soluble solids (TSS)
- Total titratable acidity (TTA) and pH
- Maturity index



*HEALTH-RELATED QUALITY PARAMETERS

Carotenoids

Extraction:

- 20 mL of acetone was added to 2 g of ground carrots
- The mixture was homogenized for 5 min
- The mixture was filtered
- 25 mL of hexane was added
- Acetone phase was ruled out
- Hexane phase was up to 50 mL

Analytical determinations

- Total carotenoid content (TCC) by absorbance at 485 nm
- Individual carotenoids by HPLC-DAD

Anthocyanins

Extraction:

- 50 mL of EtOH:H₂O (1/1, v/v) with 0.01% HCl (37%, v/v) was added to 25 g ground carrots.
- The mixture was stirred for 2 h
- The extract was purified with chloroform (2 × 25 mL), pentane (2 × 25 mL) and cyclohexane (2 × 25 mL).
- Aqueous phase was separated
- The solvent was removed at 30°C until a final volume of 25 mL

Analytical determination

- Total anthocyanin content (TAC) by the pH differential method [2].

Antioxidant Activity (AA) by DPPH [3] and FRAP [4] methods.

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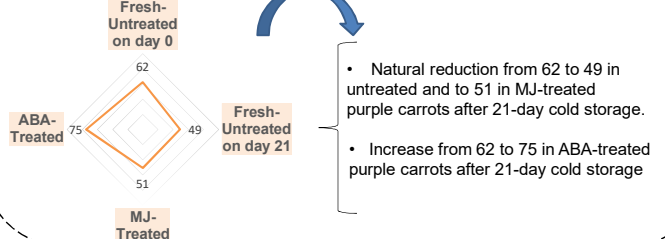
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RESULTS & DISCUSSION

*PHYSICO-CHEMICAL PARAMETERS

- Visual Appearance** → Decay in untreated and MJ-treated carrots, preservation in ABA-treated carrots
- Juiciness and moisture** → Ranging from 86.3 to 88.4% except for MJ-treated carrots (83.8%)
- TSS (%)** → Decrease in MJ and ABA treated carrots.
- TAA (°Brix) and pH** → Decrease in ABA treated carrots.

MATURITY INDEX

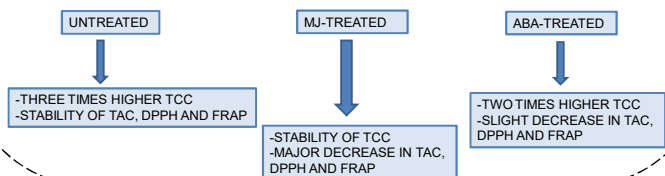


*HEALTH-RELATED QUALITY PARAMETERS

	TOTAL CONTENT OF BIOACTIVE COMPOUNDS					
	UNTREATED		MJ TREATMENT		ABA TREATMENT	
	On day 0	On day 21	Control	Treated	Control	Treated
TCC (mg EBC g ⁻¹ DW)	1.41±0.03a	3.79±0.05b	1.59±0.02a	1.61±0.03a	2.06±0.04c	2.15±0.03c
TAC (mg ECg g ⁻¹ DW)	2.23±0.05a	2.18±0.04a	0.43±0.02b	0.37±0.01b	0.26±0.01b	0.30±0.02b

ASSAY	ANTIOXIDANT ACTIVITY					
	UNTREATED		MJ TREATED		ABA TREATED	
	On day 0	On day 21	Control	Treated	Control	Treated
DPPH (mg TROLOXg ⁻¹ DW)	12.24±0.06a	12.71±0.05a	4.73±0.02b	4.09±0.03b	4.25±0.02b	4.89±0.02b
FRAP (mg TROLOXg ⁻¹ DW)	17.57±0.08a	30.03±0.07a	7.38±0.02b	6.02±0.02b	6.37±0.04b	7.02±0.03b

*Different letters between samples in the same row indicate differences at $p < 0.05$.



CONCLUSION

ABA TREATMENT RESULTS IN A SLIGHT REDUCTION OF ANTHOCYANINS AND AA OF PURPLE CARROTS DURING COLD STORAGE. HOWEVER, THIS ASPECT IS OFFSET WITH IMPROVEMENT IN CAROTENOID CONTENT AND IN PHYSICO-CHEMICAL PARAMETERS, WHICH ENABLES THEIR SHELF-LIFE TO BE EXTENDED