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POST-HARVEST TECHNOLOGIES INFLUENCES IN ORGANIC 'TITA' PLUMS QUALITY

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INTRODUCTION

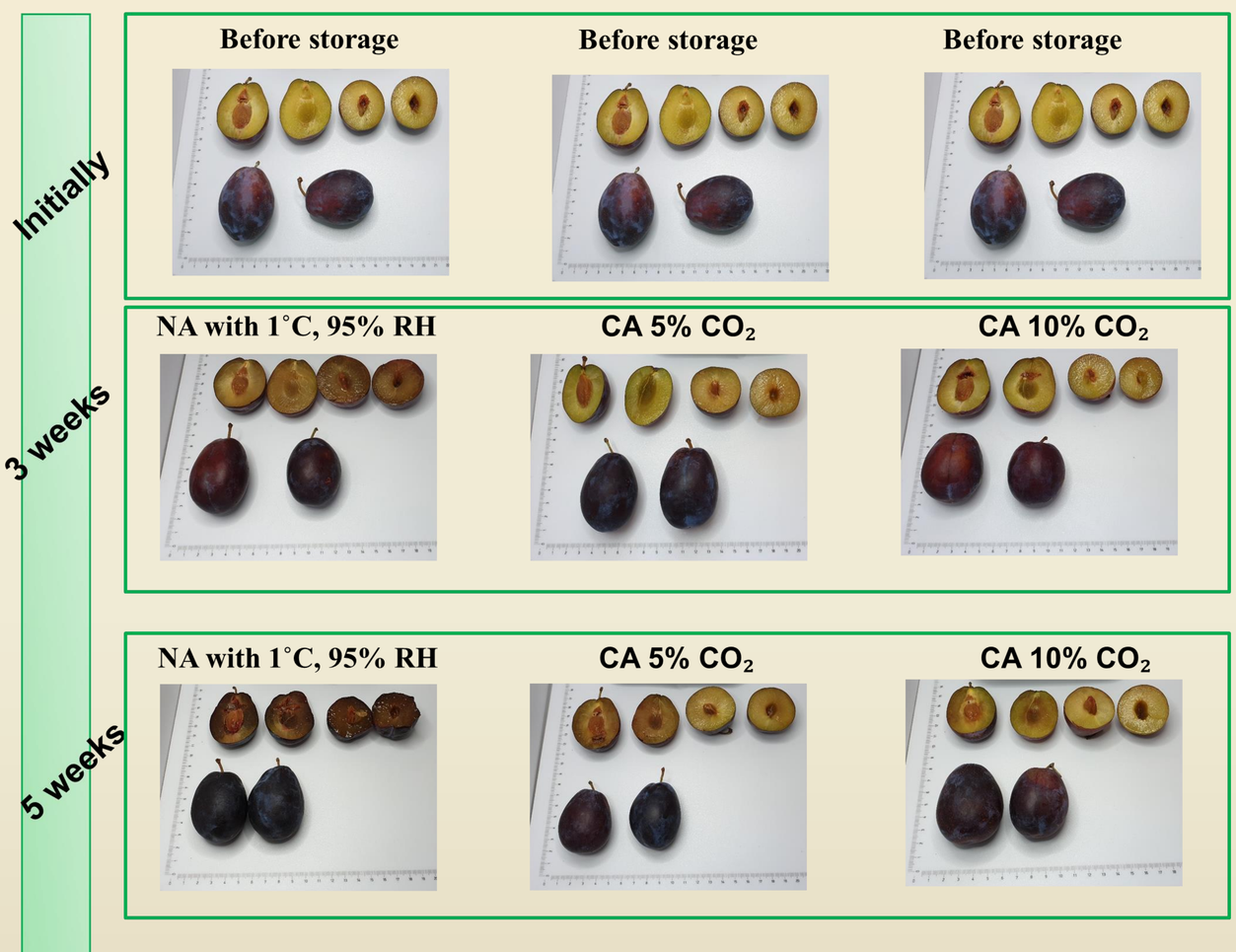
In Romania, plums represent the major fruit species with highest diversity in native cultivars and are very well adapted to climatic conditions and soils (Butac et al., 2019). In order to reduce the losses and to extend the postharvest life of organic plums, postharvest technologies such as controlled atmosphere are more and more used. As many authors reported, cold storage at 0°C combined with controlled atmosphere (CA) conditions are beneficial in extending postharvest life of plums (Peano et al., 2010; Crisosto et al., 2004). The paper aims to present the influences of post-harvest technologies based on cold storage and controlled atmosphere conditions on organic 'Tita' plums during storage period, taking in consideration the variation of quality indicators, physiological parameters, and bioactive compounds.

MATERIALS AND METHODS

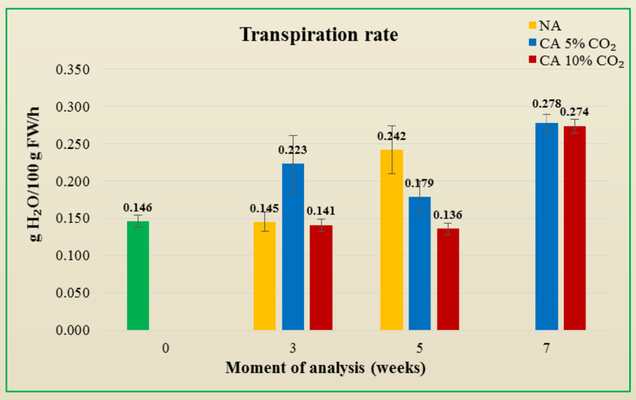
Organic 'Tita' plums were harvested in 2019, at the end of July and stored in three different condition, i.e.: 1) normal atmosphere (NA) with 1˚C and 95% relative humidity (RH), 2) controlled atmosphere (CA) conditions with 1˚C, 95% RH, 3% O_2 and 5% CO_2 (CA 5% CO_2), and 3) CA conditions with 1˚C, 95% RH, 1.5% O_2, and 10% CO_2 (CA 10% CO_2). Organic plum samples were evaluated at 4 moments: initially (before storage), after 3, 5, and 7 weeks of storage.

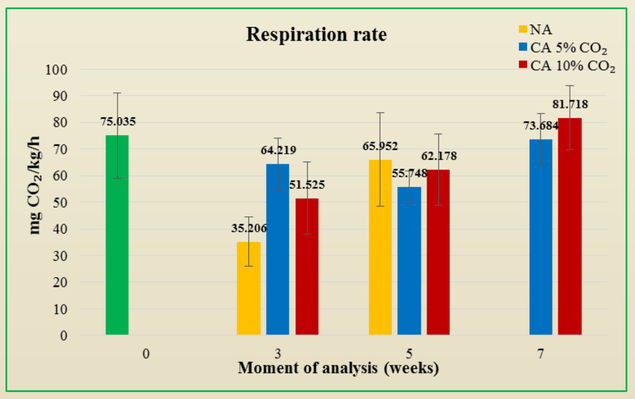
Quality parameters represented by pH, total titratable acidity (TTA), total soluble solids (TSS), dry matter (DM), and firmness; physiological parameters like respiration and transpiration rate; and bioactive compounds like total polyphenol content (TPC) and antioxidant activity were analyzed during storage period.

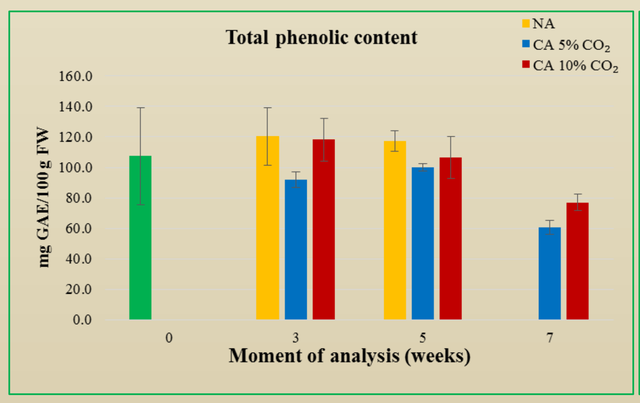
RESULTS AND DISCUSSIONS

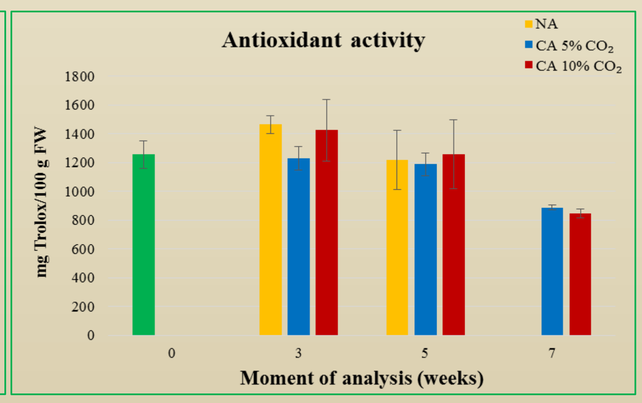


Variety	Storage conditions	Analysis moment (weeks)	pH	TAA (g malic acid/100 g FW)	TSS %	DM %	Firmmnes (N/cm²)
'Tita' Organic		**0**	3.42±0.06	1.16±0.01	17.85±1.10	8.13±1.47	15.14±1.86
	NA with 1˚C, 95% RH	**3**	3.34±0.05	0.95±0.01	15.93±2.29	14.38±0.36	7.54±1.73
		5	3.60±0.20	0.74±0.04	16.87±2.14	15.74±0.87	6.50±2.31
		7	After 5 weeks analysis, no healthy fruits remained				
	1˚C, 95% RH, 3% O_2, 5% CO_2	**3**	3.29±0.09	1.00±0.01	15.91±2.30	13.86±0.24	15.22±4.81
		5	3.46±0.07	0.98±0.005	14.48±1.49	13.48±0.59	16.29±3.79
		7	3.50±0.25	0.87±0.03	16.79±1.62	15.49±4.27	10.59±1.19
	1˚C, 95% RH 1.5% O_2, 10% CO_2	**3**	3.38±0.05	1.11±0.01	12.89±1.07	11.97±0.49	18.97±2.17
		5	3.45±0.01	1.07±0.02	14.07±1.62	12.73±1.50	19.07±8.89
		7	3.36±0.10	0.99±0.02	15.23±1.64	14.57±1.53	16.17±3.93









CONCLUSIONS

- **R**esults showed that total phenolic content and antioxidant activity registered the same variation trend during storage period for all samples. Differences were observed during storage period, which was shorter with 2 weeks for plums stored in NA than for those stored in CA 5% CO_2 and CA 10% CO_2 conditions.
- **P**hysiological disorders as translucency appear after only 3 weeks of storage in CA 5% CO_2 and CA 10% CO_2 conditions, and after 5 weeks appear the overripe disorder. For organic 'Tita' plums stored in NA conditions the overripe disorder was already installed after 3 weeks of storage.
- **P**hysiological disorders observed in our work are related with chilling temperatures. The delayed onset of physiological disorders for plums stored in CA conditions was due to low O_2 and increased CO_2 concentrations which slowed metabolic process.
- **T**aking these results in consideration, present work suggests that plums stored in both controlled atmosphere conditions were better preserved than those stored in NA, but further trials and studies are required.

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