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OPTIMAL STORAGE TECHNOLOGIES FOR ORGANIC APPLES BASED ON QUALITY PARAMETERS

Andreea Stan*, Mihaela Zugravu, Carmen Constantin, Mihai Frîncu, Aurora Dobrin, Violeta Alexandra Ion, Andrei Moț, Andrei Petre, Roxana Ciceoi, Ioana Bezdadea-Cătuneanu, Liliana Bădulescu

Research Center for Studies of Food Quality and Agricultural Products, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Bucharest, Romania

*email: andreea_stan88@yahoo.com

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INTRODUCTION

Nowadays, the consumer demand for organic fresh fruits with better nutritional quality has increased, therefore the market pressure for a prolonged shelf life is growing. For this reason, improving storage conditions and technologies is important and becomes highly relevant.

Controlled atmosphere represent an efficient technology used for fruits and vegetables storage, and is also accepted in organic system when gases like O_2, CO_2, and N_2 are used.

In addition, controlled temperature and humidity enhances the benefits of long-term storage and better shelf life, especially for organic fruits. Apples represent one of the most common organic fruits which requires long-term storage.

The aim of this work was to improve the optimal storage technologies for organic apples based on quality parameters.

MATERIALS AND METHODS

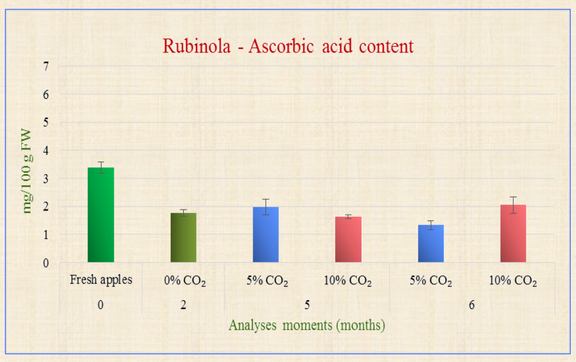
Samples: Two apple varieties like Rubinola and Topaz were harvested, at the optimal ripening stage in the beginning of October 2018, from experimental orchard of University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania, stored and monitored for six months.

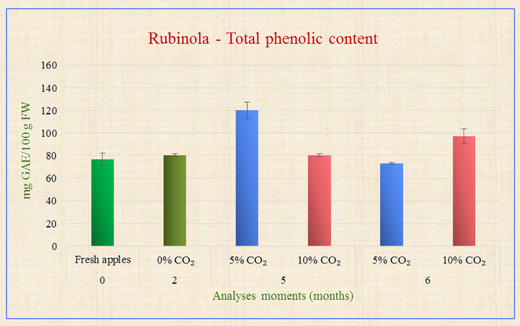
Storage: The storage technologies applied were normal atmosphere, with 1˚C and 95% relative humidity (RH) for 2 months, combined with controlled atmosphere storage for another 4 months with 1˚C, 95% RH, 3% O_2 and two different CO_2 concentrations (5%, respectively 10%).

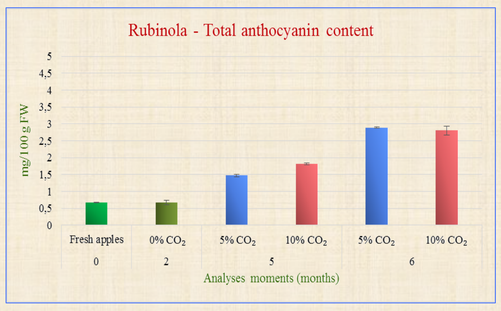
Analyses: firmness, pH value, total titratable acid (TAA), total soluble solids (TSS), dry matter (DM), ascorbic acid, total phenolic and total anthocyanin content.

Moments of analyses: 0 - after harvesting, **2** - after 2 months of storage in normal atmosphere, **5** - after 2 months of storage in normal atmosphere and 3 months of controlled atmosphere storage, **6** - after 2 months of storage in normal atmosphere and 4 months of controlled atmosphere storage.

RESULTS AND DISCUSSIONS

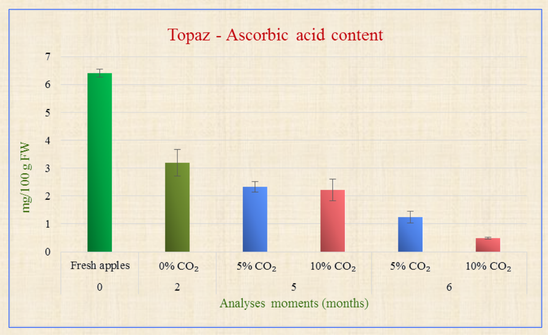


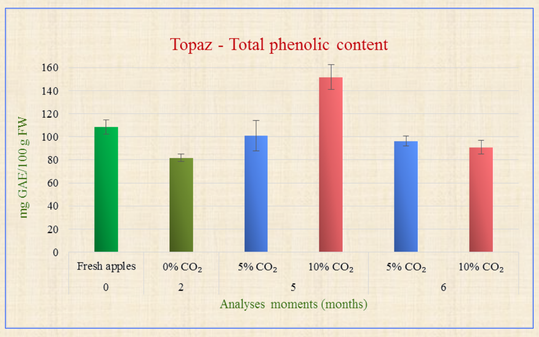


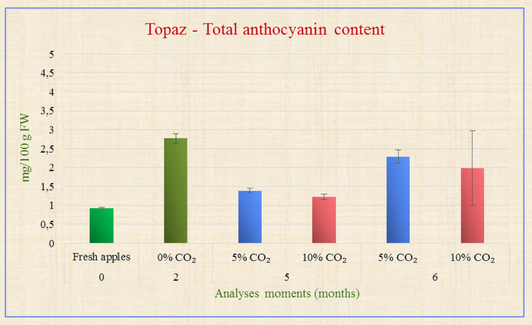


RUBINOLA

TOPAZ







Variety	Months	Storage condition	pH	TAA (mg malic acid/100 g FW)	TSS %	DM %	Firmness kg/cm²
Rubinola	0	Fresh apples	3,65 ±0,02	0,34 ±0,01	14,72 ±0,48	18,51 ±0,16	5,02 ±0,32
	2	0% CO_2	3,48 ±0,03	0,36 ±0,07	13,88 ±0,56	16,21 ±1,16	3,93 ±0,19
	5	5% CO_2	3,57 ±0,08	0,36 ±0,01	11,14 ±0,7	15,25 ±1,64	3,62 ±0,19
		10% CO_2	3,67 ±0,1	0,37 ±0,002	11,86 ±0,83	16,23 ±2,47	3,25 ±0,15
	6	5% CO_2	3,93 ±0,02	0,30 ±0,005	12,56 ±1,44	15,94 ±0,33	3,50 ±0,08
		10% CO_2	3,81 ±0,02	0,47 ±0,004	14,36 ±1,25	17,26 ±0,20	4,42 ±0,22

Variety	Months	Storage condition	pH	TAA (mg malic acid/100 g FW)	TSS %	DM %	Firmness kg/cm²
Topaz	0	Fresh apples	3,31 ±0,1	0,61 ±0,03	14,15 ±1,45	17,46 ±0,53	7,10 ±0,72
	2	0% CO_2	3,25 ±0,09	0,39 ±0,01	14,45 ±1,12	17,36 ±0,65	4,32 ±0,17
	5	5% CO_2	3,56 ±0,06	0,56 ±0,01	10,25 ±1,23	19,4 ±1,75	3,86 ±0,11
		10% CO_2	3,69 ±0,2	0,48 ±0,003	12,18 ±0,89	16,46 ±0,24	4,25 ±0,26
	6	5% CO_2	3,77 ±0,08	0,42 ±0,003	13,68 ±0,69	16,33 ±0,06	4,47 ±0,21
		10% CO_2	3,83 ±0,02	0,24 ±0,003	12,58 ±1,26	15,44 ±0,3	3,4 ±0,26

CONCLUSIONS

- Rubinola variety registered good results in the given experimental conditions, with an increase in anthocyanin content and maintaining the other qualitative parameters at the level of those recorded at 2 months of cold storage.
- Topaz variety is not recommended for these experimental conditions.
- Further studies and trials are required in order to find new postharvest conditions that could decrease the total costs of storage.

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