EFFECT OF 1-MCP TREATMENT ON TOMATO POSTHARVEST PHYSIOLOGICAL BEHAVIOR

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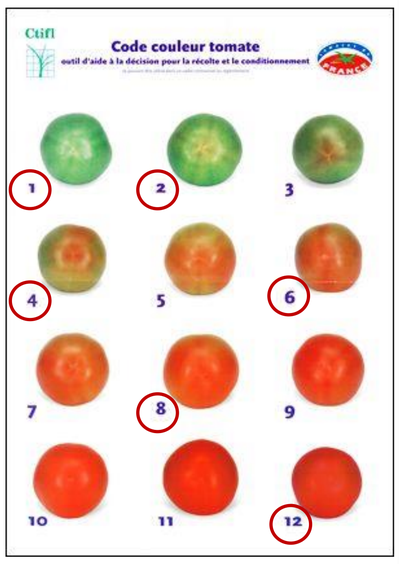
INTRODUCTION

One of the most important fresh vegetables in the world is the table tomato. An important developmental stage of a horticultural produce is ripening, a quality change driven by complex biochemical processes (Papp, 2003). Post-ripening ability is well indicated by the change in respiration intensity of the fruit or vegetable. Tomatoes are post-ripening vegetables and therefore characterised by climacteric respiration. During ripening, the metabolic processes of these fruits accelerate after the pre-climacteric minimum, their respiration intensity increases, and then decreases steadily after the climacteric maximum. Ethylene plays a key role in initiating and accelerating ripening-related processes that are perceived as various qualitative changes (e.g. colour, firmness, acidity and flavour) in tomatoes. Tomatoes, unlike many other climacteric fruits, need a constant ethylene effect to progress ripening. In the light of this, it is possible to use growth regulators that prevent ethylene binding at different stages of ripening. In the experiment, tomatoes of the Pitenza F_1 variety were examined. The freshly picked tomatoes were classified by colour into 6 maturity groups, according to the CTIFL scale from 1 to 12. Subsequently, half of the samples (20-20) were treated with SmartFresh™ /SF/ (1-MCP) for 12 h at 15 °C, except for the red (F) group, which was selected from fully ripe tomatoes as absolute control group. After treatment, they were stored under refrigerated conditions at 15°C for 2 weeks. During storage, the respiration was measured every 2 days using a CO_2 sensor.

MATERIALS



Pitenza F_1 tomatoes at various stages of ripeness

Maturity status		Typical colour	Group
1	Mature green	Dark green	A
2	Breaker	Whiteish green, less than 10% of the tomato is pink	B
4	Turning	10-30% of the tomato surface is pink	C
6	Pink	30-60% of the tomato surface is pink	D
8	Light red	60-90% of the tomato surface is pink	E
12	Red	100% of the tomato surface is red, full ripeness	F

METHODS

SmartFresh™, 1-MCP anti-ripening treatment

The standard for tomatoes is 12h, 15°C, 625ppb

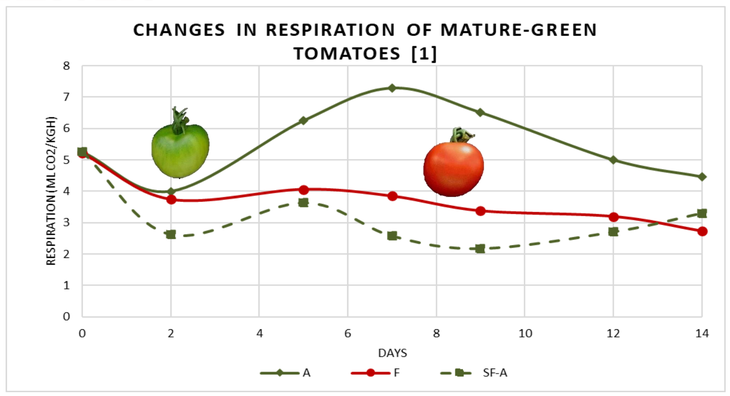
2 weeks cold storage at 15°C

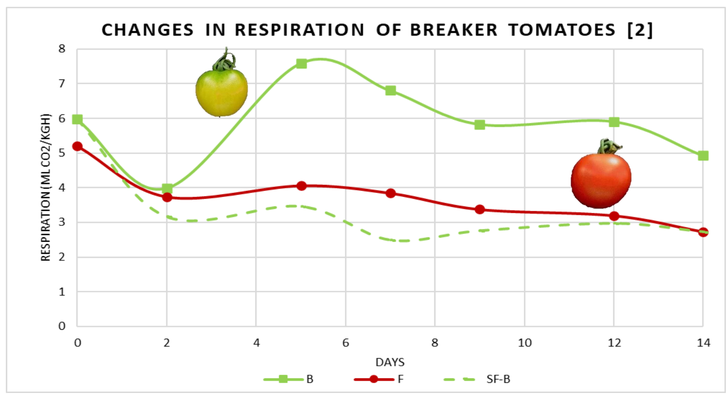
Ahlborn Almemo FY A600 – CO_2H CO_2 sensor

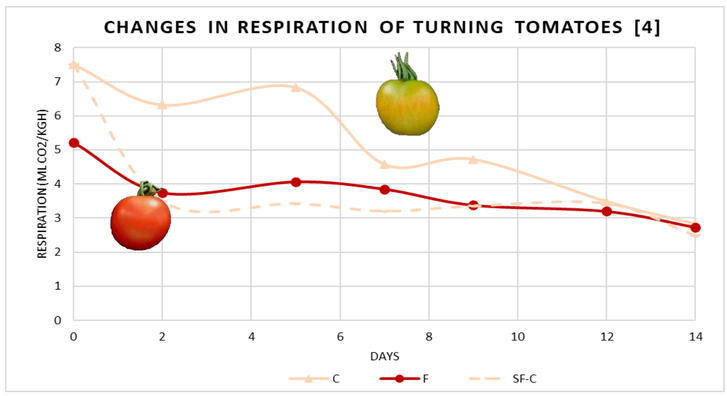
Ahlborn Almemo 3290-8 data logger

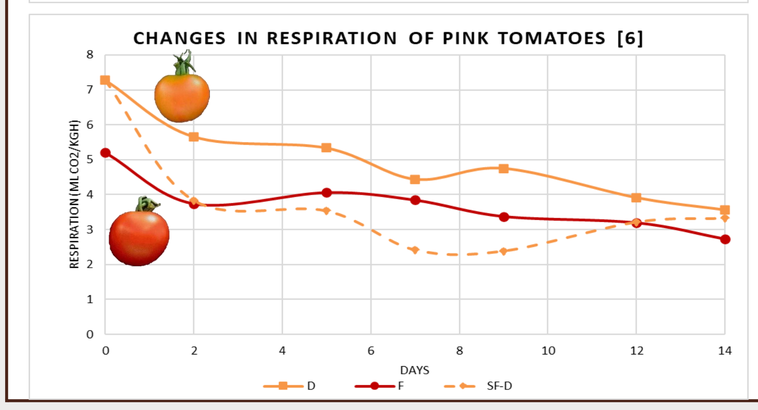
Respiration measurement [CO2; mL*kg^{-1}*h^{-1}]

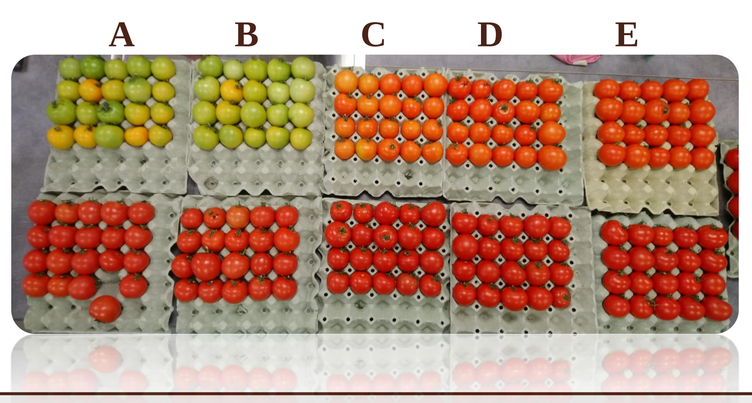
RESULTS

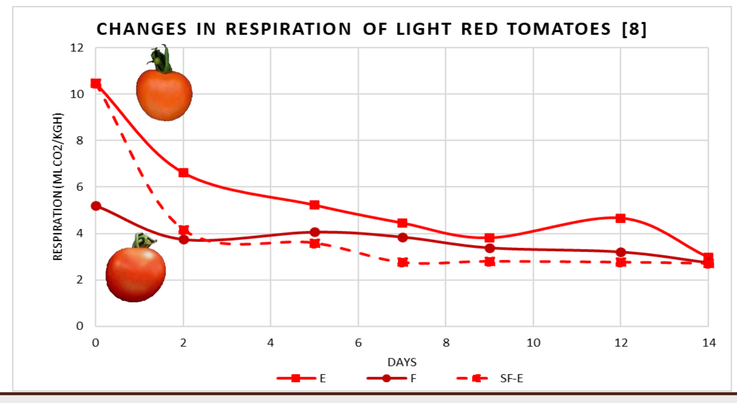












CONCLUSIONS

Acoording to the obtained results, it was concluded that in tomatoes at a stage of ripening prior to climacteric maximum (stage 1,2,4), the anti-ripening treatment helped to flatten the maximum of the curve, with less increase in respiration intensity. Taking all this into account, the anti-ripening treatment is less effective on tomatoes at the stage of ripening that no longer contain green pigment or contain just a little green pigment (stage 6,8). At these maturity stages, the difference between the respiration curve of treated and untreated tomatoes is smaller.

ACKNOWLEDGEMENTS

The authors acknowledge the Hungarian University of Agriculture and Life Sciences's Doctoral School of Food Science for the support in this study.
This research was supported by the European Social Fund (grant agreement no. EFOP-3.6.3-VEKOP-16-2017-00005).

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CTIFL colorchart: https://www.ctifl.fr/Pages/Kiosque/DetailsOuvrage.aspx?idouvrage=839