



ON-TREE METHYL JASMONATE APPLICATIONS: ANALYSIS OF PHYSICOCHEMICAL AND PHYSIOLOGICAL TRAITS OF FRESH FIGS AFTER TWO AND THREE APPLICATIONS



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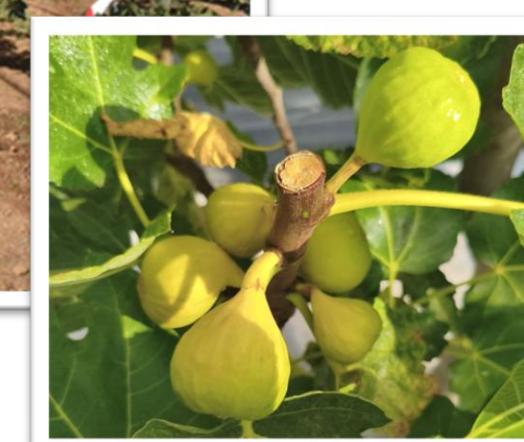
INTRODUCTION

Fresh figs (*Ficus carica*, L.) are perishable fruits with a limited shelf life. The exogenous application of elicitors during on-tree fruit development and growth is a promising strategy for improving fruit quality and shelf life. Elicitors are molecules naturally involved in plant metabolism that, when applied in low concentrations at specific points during fruit ripening, can help to improve fruit resistance to abiotic and biotic stresses.

One elicitor successfully used in other crops is methyl jasmonate (MeJA). MeJA is triggered during stress processes, increasing enzymatic antioxidant activity and phenolic compounds production, thereby scavenging reactive oxygen and nitrogen species. However, there are no studies on its effects on fresh figs.



Experimental test field

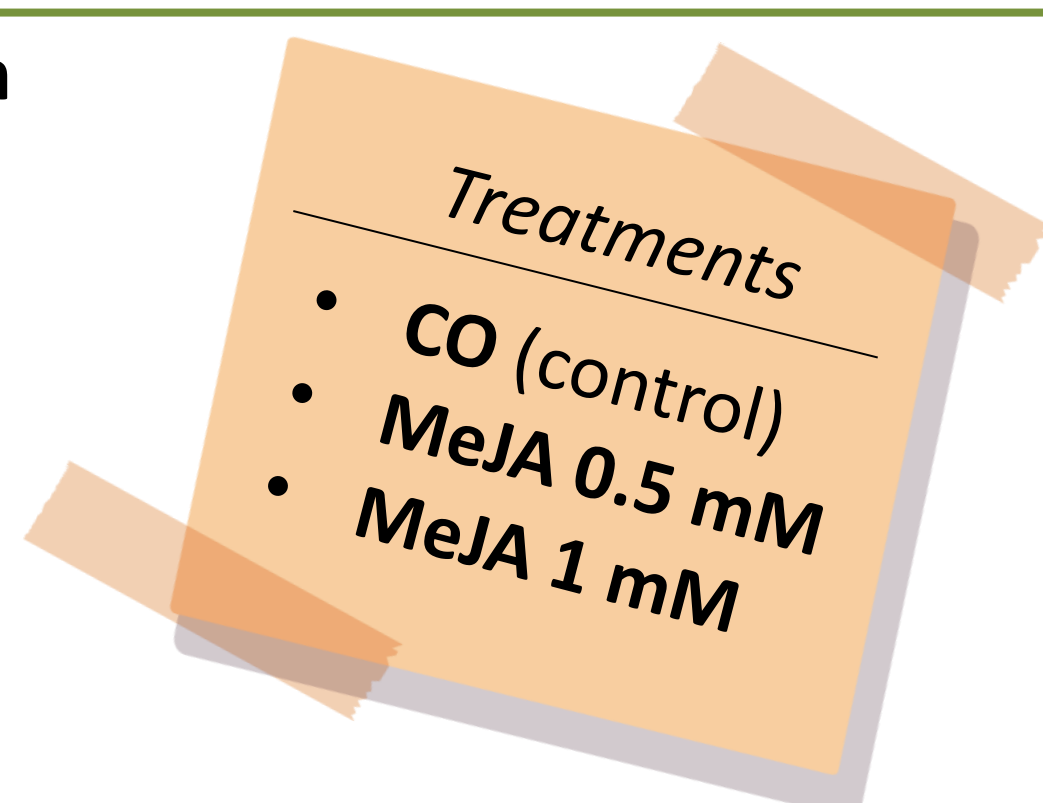


Calabacita figs

MATERIALS AND METHODS

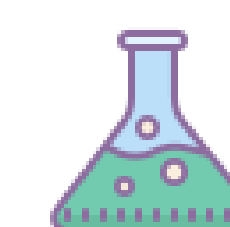
Plant material and experimental design

- *Ficus carica* L., cv. Calabacita
- Finca La Orden (Guadajira – Badajoz)
- Superintensive spalter training
- Planting frame: 3 x 2.5 m
- 6 trees for each treatment
- 2 or 3 applications (APP)



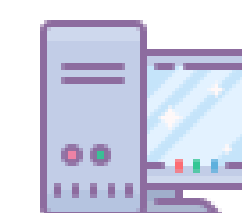
Physicochemical analysis

Firmness (N mm⁻¹)
Weight (g) and size (mm)
Skin colour (CIELab parameters)
Titratable acidity (TA; % citric acid)
Total soluble solids (TSS; °Brix)
Ripening index (RI; TSS/TA)
Chlorophyll index
Moisture (%)



Physiological parameters

Respiration rate
Ethylene production



Statistical analysis

Tukey's test ($p < 0.05$)
ANOVA



RESULTS AND DISCUSSION

		h (hue)	Firmness (N mm ⁻¹)	Weight (g)	Size (mm)	Chlorophyll index (abs)	TSS (°Brix)	TA (% citric acid)	RI (TSS/TA)	Moisture (%)
2 APP	CO	106.0±4.1 a	1.0±0.6	31.8±5.3 b	40.6±2.9 b	1.2±0.3 a	21.0±0.2 a	0.080±0.001 a	263±5 c	79.2±0.2 c
	MeJA 0.5	105.0±4.3 ab	1.0±0.5	33.9±6.0 ab	41.3±2.2 a	1.2±0.2 a	20.6±0.1 b	0.076±0.002 bc	273±9 c	79.3±0.2 c
	MeJA 1	106.7±3.7 a	1.1±0.4	36.6±5.0 ab	43.3±2.6 a	1.2±0.3 a	18.4±0.2 e	0.078±0.002 ab	236±3 d	81.4±0.2 a
3 APP	CO	102.7±3.4 b	0.9±0.4	36.1±5.1 ab	42.6±2.4 ab	0.9±0.2 b	19.5±0.1 c	0.056±0.002 e	348±14 a	80.5±0.2 b
	MeJA 0.5	106.1±4.0 a	1.0±0.4	32.6±5.2 b	41.0±2.8 ab	1.3±0.2 a	19.0±0.1 d	0.0646±0.0007 d	295±2 b	80.8±0.1 b
	MeJA 1	105.3±3.4 ab	0.9±0.3	38.9±7.6 a	43.7±3.3 a	1.2±0.2 a	19.23±0.06 cd	0.072±0.002 c	268±8 c	80.9±0.2 b

Table 1. Mean values ± standard deviation of physicochemical traits. Different letters in the same column indicate significant differences ($p < 0.05$).

Figs with 2- and 3-APP showed differences in the physicochemical profile (Table 1). 2-APP figs presented higher h values (skin with a greener tone), as well as a high chlorophyll index, regardless of the treatment. The application of MeJA treatments reduced TSS and TA, resulting in a lower RI. MeJA 1mM also increased the percentage of moisture.

On the other hand, figs treated with 3 APP of MeJA 1 mM significantly increased their weight and size. As in the case of 2-APP-treated figs, both MeJA concentrations reduced TSS and TA, causing a lower RI, which was also related to the enhancement of the chlorophyll index.

Differences in behaviour were observed between figs treated with 2- and 3-APP in terms of respiration rate (Figure 1A). 2-APP-treated figs presented a lower respiration rate, with no differences between treatments, while in 3-APP-treated figs, MeJA significantly increased the respiration rate, indicating a faster metabolism.

Regarding ethylene production rates (Figure 1B), the trend was similar in figs with 2- and 3-APP, where MeJA significantly reduced the values, implying a delay in ripening.

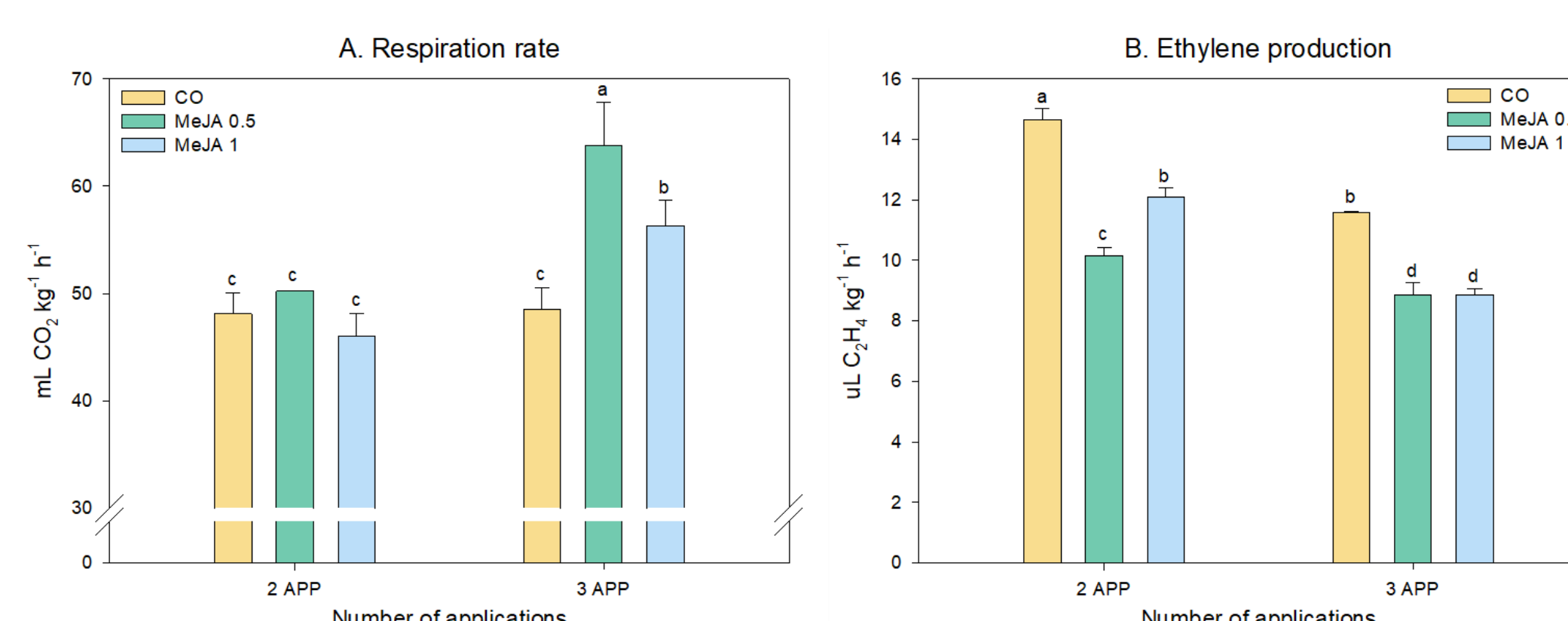


Figure 1. Mean values ± standard deviation of respiration (A) and ethylene production (B) rates. Different letters indicate significant differences ($p < 0.05$).

CONCLUSIONS

1. The number of applications determines the results of MeJA treatments on fresh figs.
2. The application of MeJA treatments reduces TSS and TA, causing a lower RI, which is confirmed by a lower ethylene production rate and a higher chlorophyll index.
3. Three applications of 1 mM MeJA improved the weight and size of figs.

This work has been financially supported by project PID2020-115359RR-C21. CML and MPV are grateful for the award of contracts PRE2021-100318 and JDC2022-049532-I, respectively, both funded by MICIU/AEI /10.13039/501100011033 and by the ESF+ and the European Union NextGenerationEU/PRTR.