COMPOST APPLICATION AS A MITIGATION STRATEGY FOR WATER DEFICIT STRESS IN TOMATO PLANTS

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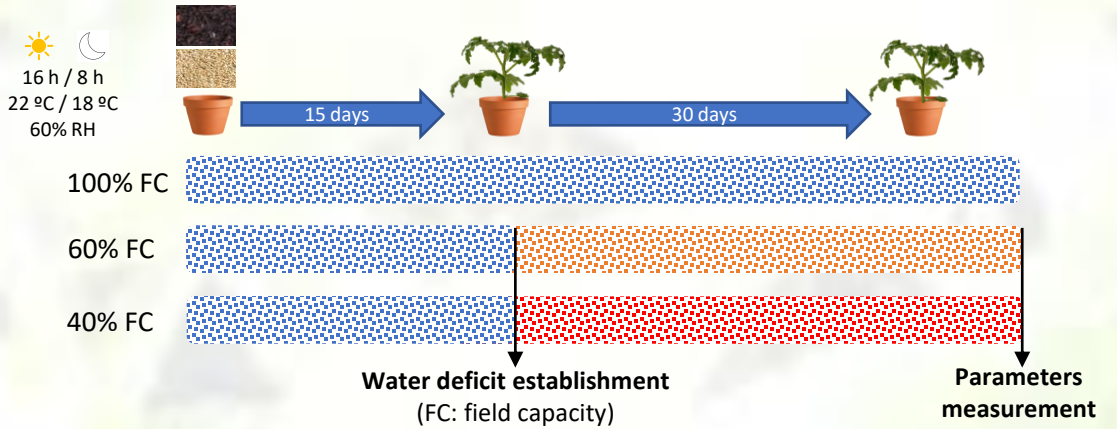
Climate change represents a major challenge for global food security, as it will be accompanied by more frequent, intense, and prolonged drought events.
Revalorization strategies offer the opportunity to reduce waste accumulation and to obtain a final product with great potential to reduce the use of agrochemicals.
Compost contains soluble nutrients, biostimulant compounds, and a great diversity of microorganisms. It has gained attention for their potential to improve soil health, water retention, and plant stress tolerance.
However, there are few studies on the effect of this amendment under abiotic stress conditions.

Examine the effects of green-waste based compost on tomato plants subjected to water deficit conditions.



For each water regime, control plants (vermiculite) and compost treated-plants (vermiculite + 8,45 g of compost) were considered.

RESULTS:

Treatment	FC (%)	Plant height (cm)	Leaf number	Stem diameter (mm)	Aerial fresh weight (g)	Aerial dry weight (g)	Root fresh weight (g)	Root dry weight (g)
Control	100	14.75±1.43^{a}	8.8±0.7^{a}	5.26±0.58	13.14±3.37$^{a/B}$	1.45±0.83	1.41±0.65	0.17±0.07^{B}
	60	12.55±1.35$^{b/B}$	7.8±1.0^{b}	4.73±0.64	9.37±2.28$^{b/B}$	1.14±0.70	1.44±0.90	0.20±0.10
	40	11.48±1.24^{b}	7.3±0.5^{b}	4.62±0.75	7.29±1.39$^{b/B}$	1.06±0.57	1.19±0.69	0.17±0.06
Compost	100	15.88±2.04^{a}	8.9±0.5^{a}	5.51±0.60^{a}	18.43±3.30$^{a/A}$	1.74±0.55^{a}	2.27±1.23^{a}	0.29±0.15$^{a/A}$
	60	15.73±1.77$^{a/A}$	8.0±0.6^{b}	5.17±0.44^{a}	13.22±1.83$^{b/A}$	1.48±0.50^{ab}	1.52±0.72^{ab}	0.16±0.04^{b}
	40	11.91±1.00^{b}	7.3±0.9^{b}	4.40±0.41^{b}	9.22±1.00$^{c/A}$	1.11±0.46^{b}	1.24±0.55^{b}	0.13±0.02^{b}

^{a,b,c} Different letters in the same column mean statistically significant differences $p<0.05$, among treatments, according to Tukey's HSD test.
^{A,B,C} Different letters in the same column mean statistically significant differences $p<0.05$, among field capacities (FC), according to Tukey's HSD test

As expected most of the studied parameters declined with reduced irrigation, showing the general impact of water stress on plant growth.
Under 100% FC and 60% FC, compost-treated plants displayed greater plant height and fresh and dry weights compared to control plants, suggesting a clear benefit of compost in promoting growth and physiological status under optimal irrigation.
Under moderate water deficit (40% FC), aerial fresh weight were higher in compost-treated plants compared to control plants.

This study showed that compost application improved growth parameters under water deficit conditions, validating its role as biostimulant and long-term resilience amendment.

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