



The Effect of Foliar Spraying of Walnut Extract on Increasing Chilling Tolerance in Sweet Basil

Banafsheh Heidari Koholi¹, Mohammad Reza Ghalamboran^{2*} and Leila Zarandi Miandoab¹

¹ Department of Biology, Faculty of Basic Sciences, Azarbaijan Shahid Madani University /Tabriz, Iran,

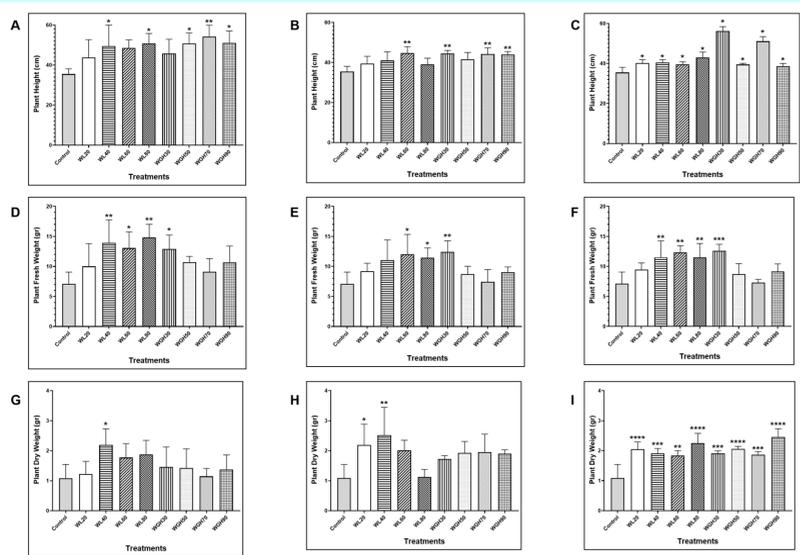
^{2*} Department of Plant Sciences and Biotechnology, Faculty of Life Sciences and Biotechnology, Shahid Beheshti University/ Tehran, Iran,

*Email: m_ghalamboran@sbu.ac.ir

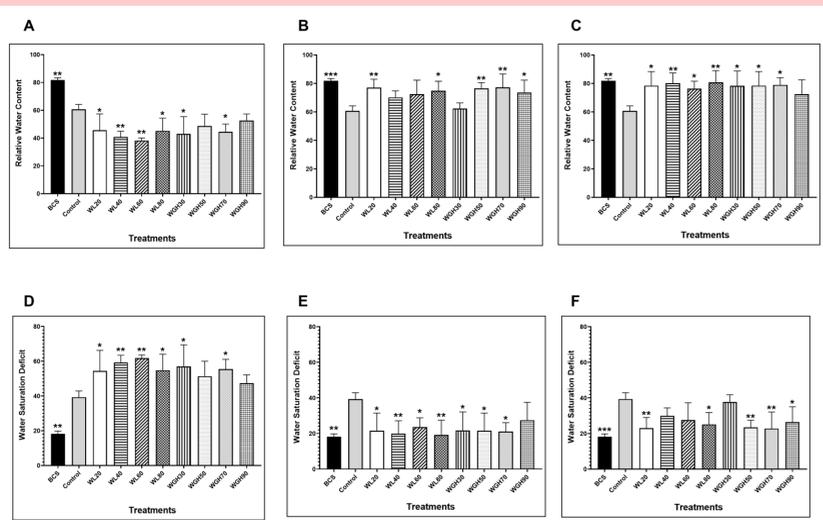
Poster Presentation ID: 1303

Results and discussion

Walnut extracts, especially with repeated applications, significantly enhanced basil height, fresh and dry weight, likely by increasing secondary metabolites.



Chilling reduced basil water status, twice-applied walnut extracts optimally restored RWC and WSD, while single or excessive sprays were less effective.



References

1. Bhattacharya, Amitav. 2022. *Physiological Processes in Plants under Low Temperature Stress*. Springer Singapore Pte. Limited.
2. Coombs, James. 1985. *Techniques in Bioproductivity and Photosynthesis*. 2nd ed. With United Nations Environment Programme. Pergamon International Library of Science, Technology, Engineering, and Social Studies. Pergamon Press.
3. Deveikytė, Justina, Aušra Blinstrubienė, Natalija Burbulis, and Aldona Baltušnikienė. 2025. "Foliar Application of Amino Acids Increases Sweet Basil (*Ocimum Basilicum* L.) Resistance to High-Temperature Stress." *Plants* 14 (5): 739. <https://doi.org/10.3390/plants14050739>.

Abstract

Chilling stress (4 °C) severely impaired water relations and growth in sweet basil by reducing relative water content and increasing water saturation deficit. This study evaluated walnut leaf and green husk extracts as natural biostimulants applied at different concentrations and frequencies. Single applications were ineffective or harmful, whereas double foliar applications significantly improved plant height, fresh and dry weight, and water status. Walnut extracts applied twice enhanced membrane stability and chilling tolerance.

Introduction

Water status is vital for plant function, with Relative Water Content (RWC) and Water Saturation Deficit (WSD) serving as key indicators of hydration, turgor, and stress tolerance. Declining RWC impairs photosynthesis and survival in most plants. Walnut leaf and green husk, rich in phenolic antioxidants, have potential as natural biostimulants to alleviate chilling stress. Basil is an economically important but cold-sensitive crop. However, the foliar use of walnut extracts to enhance cold tolerance remains largely unexplored, representing an important research gap.



Foliar Spraying of walnut leaf extract

Foliar Spraying of walnut green husk extract



Materials and methods

The experiment was conducted under greenhouse and laboratory conditions using sweet basil grown from disinfected seeds. Walnut leaf and green husk extracts were prepared via methanol–water extraction and applied as foliar sprays at different concentrations and frequencies. Plants were exposed to stepwise chilling stress (down to 4 °C). A completely randomized design with four replicates was used. Growth traits and water status parameters (RWC, WSD) were measured and analyzed using one-way ANOVA ($P \leq 0.05$).

