

Histological Characterization of Leaves and Stems in In Vitro Shoot Cultures of *Micromeria graeca* (Lamiaceae)

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Micromeria graeca (Lamiaceae), a Mediterranean aromatic species valued for its essential oils and bioactive compounds, has been successfully propagated in vitro to enable controlled studies of growth and secondary metabolism. While previous work from our group has described the micromorphology and histochemistry of glandular trichomes on leaves and stems of in vitro-grown plantlets (Uzelac et al., 2022; Janjanin et al., 2019), the internal histological anatomy—including tissue organization, vascular structure, mesophyll differentiation, and potential culture-associated modifications (e.g., cuticle thickness, intercellular spaces, stomatal arrangement in section)—remains undocumented for this or closely related *Micromeria* species under in vitro conditions. The present study provides the first detailed histological characterization of leaf and stem anatomy in axenic shoot cultures of *M. graeca*. In vitro shoots exhibited typical Lamiaceae dorsiventral leaf structure with well-developed palisade and spongy mesophyll, prominent vascular bundles, and abundant non-glandular and glandular trichomes. No severe hyperhydricity was observed, suggesting high-quality propagation. These results represent the first anatomical baseline for in vitro *M. graeca* shoots, facilitating future assessments of culture conditions on plantlet quality and secondary metabolite localization. The findings support the suitability of our micropropagation protocol for producing morphologically competent plants and provide a foundation for linking anatomy to phytochemical output

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