



### ADVENTITIOUS ROOT CULTURES OF *CASTILLEJA TENUIFLORA* BENTH. AS A SOURCE OF PHENYLETHANOID GLYCOSIDES.

#### ABSTRACT

*Castilleja tenuiflora* is a highly valued medicinal plant that grows in pine–oak woods in Mexico. In this study, we identified for the first time verbascoside and isoverbascoside as the major phenylethanoid glycosides (PhGs) in *C. tenuiflora*. These compounds have proven biological activities, including anti-inflammatory, antioxidant, and cytotoxic activities, which may be related to the traditional uses of this plant. We developed a reverse-phase high-performance liquid chromatography (RP-HPLC) procedure to analyze PhGs, and determined their concentrations in various different tissues of wild plants. Verbascoside accumulated mainly in roots and inflorescences (9.23 and 7.88 mg g<sup>-1</sup> dry biomass, respectively), while isoverbascoside accumulated mainly in the roots (7.13 mg g<sup>-1</sup> dry biomass). To provide an alternative source of material for production of bioactive compounds, we established *in vitro* adventitious root cultures in which roots were grown in B5 medium containing either 10 µM indole 3-acetic acid (IAA) or 10 µM α-naphthaleneacetic acid (NAA). The greatest dry biomass yield (30 g L<sup>-1</sup>) was achieved at 30 days after transfer of roots into IAA-containing medium. The highest specific yields of PhGs were also obtained using this auxin; the maximum level of verbascoside was 14.62 mg g<sup>-1</sup> dry root biomass (438.6 mg L<sup>-1</sup>) at 30 days after root transfer, and the maximum yield of isoverbascoside was 37.32 mg g<sup>-1</sup> dry root biomass (522.48 mg L<sup>-1</sup>) at 23 days after root transfer. Adventitious root cultures of *C. tenuiflora* are a promising system for further studies on scale-up and phenylethanoid glycosides biosynthesis.

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**Autores:** Yenny Adriana Gómez-Aguirre, Alejandro Zamilpa, Manasés González-Cortazar, Gabriela Trejo-Tapia\*

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