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Plant cell and tissue cultures as experimental models for studies of coumarin and chlorogenic acid biosynthesis in *Mikania laevigata* (Asteraceae) and UHPLC-MS analysis

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Statement of the Problem and Aim: *Mikania laevigata*, guaco, is commonly used as treatment for respiratory system diseases due to its bronchodilator effect, bioactivity assigned to coumarin. Plant cell cultures are very promising tools to produce secondary metabolites in vitro. They allow a rapid cell proliferation, they are under strict controlled conditions and are easy to manipulate. This research aimed to investigate the use of tissue and cell cultures of *M. laevigata* as experimental models applied to the study of coumarin and chlorogenic acids biosynthesis in this plant.

Methodology & Theoretical Orientation: Explants obtained from young leaves were sterilized and maintained on MS medium supplemented with 30 g.L⁻¹ of sucrose and sub-cultured every 30 days. After several tests with different proportions of hormones to determine their optimal concentrations, medium containing 4.52 µM of 2,4-dichlorophenoxyacetic acid and 26 µM 6-benzilaminopurina was established as the best condition for callus induction for this species. Following the successful establishment of the callus culture, cell suspensions were established by inoculating cells from friable calli into liquid MS medium. Analysis for identification and quantification of the phenylpropanoid biosynthetic pathway products were done by UHPLC-MS, using methodology described by Melo.

Findings: The analysis of the chemical profile of *M. laevigata* calli, after 15, 30 and 60 days of subculture, detected mainly coumarin, caffeoylquinic acid and dicaffeoylquinic acid. The highest concentration of coumarin was observed after 30 days, 0.12 ± 0.01 mg.g⁻¹ dry mass. The highest quantification of caffeoylquinic acid was observed after 15 days, which contained 5.53 ± 1.29 mg.g⁻¹ of dry mass, while dicaffeoylquinic acid had a higher concentration after 60 days, with 36.39 ± 4.58 mg.g⁻¹ dry mass.

Conclusion: Tissue and cell cultures of *M. laevigata* are promising biological models for application in studies of biosynthesis of its bioactive secondary metabolites. However, to confirm their full potential, the continuity of the investigations is necessary.

Biography

Aranha Netto L is currently a Master's student in the Plant Biology Program at the Institute of Biology - Unicamp. Her research investigates the use of plant cell and tissue cultures as biological models applied to the study of coumarin and chlorogenic acid biosynthesis in *Mikania glomerata* and *Mikania laevigata* (Asteraceae). She holds a Bachelor's degree in Biological Sciences from the State University of Campinas (2015), including a year studying at the University of East Anglia (UEA), England as part of the exchange program science without borders. Also in England, she did a research placement at Inspiralis Ltd.

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