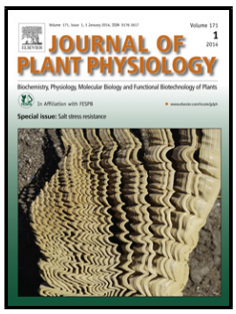

Title: Comparing aryltetralin lignan accumulation patterns in four biotechnological systems of *Linum album*

Authors: Liliana Lalaleo, Rubén Alcazar, Javier Palazon, Elisabeth Moyano, Rosa M. Cusido, Mercedes Bonfill

PII: S0176-1617(18)30291-8
DOI: https://doi.org/10.1016/j.jplph.2018.06.006
Reference: JPLPH 52797

To appear in:

Received date: 22-3-2018
Revised date: 6-6-2018
Accepted date: 9-6-2018

Please cite this article as: Lalaleo L, Alcazar R, Palazon J, Moyano E, Cusido RM, Bonfill M, Comparing aryltetralin lignan accumulation patterns in four biotechnological systems of *Linum album*, *Journal of Plant Physiology* (2018), https://doi.org/10.1016/j.jplph.2018.06.006

Original Paper

Comparing aryltetralin lignan accumulation patterns in four biotechnological systems of *Linum album*

Liliana Lalaleo[1], Rubén Alcazar[2], Javier Palazon[2], Elisabeth Moyano[3], Rosa M Cusido[2], Mercedes Bonfill[2*]

[1]Faculty of Agricultural Sciences, Technical University of Ambato, Ecuador [2]Laboratory of Plant Physiology, Department of Biology, Health and Environment, University of Barcelona, 08028 Barcelona, Spain [3]Departament de Ciències Experimentals i de la Salut, Universitat Pompeu Fabra, Avda. Dr. Aiguader 80, E-08003, Barcelona, Spain

* Correspondence
Dr. Mercedes Bonfill,
E-mail: mbonfill@ub.edu

Abstract

Linum album is a herbaceous plant with medical interest due to its content of podophyllotoxin (PTOX), an aryltetralin lignan with cytotoxic activity. Previous studies in our laboratory showed that cell suspension cultures of *L. album* produced more PTOX than methoxypodophyllotoxin (6-MPTOX), both lignans being formed from the same precursor after divergence close to the end of the biosynthetic pathway. In contrast, the hairy roots produced more 6-MPTOX than PTOX.
Taking into account this variability, we were interested to know if the lignan profile of an *in vitro* PTOX-producing *L. album* plant changes according to the biotechnological system employed and, if so, if this is due to cell dedifferentiation and/or transformation events. With this aim, we established four biotechnological systems: (1) Wild type cell suspensions, (2) transformed cell suspensions, (3) adventitious roots and (4) hairy roots.
We determined the production of four aryltetralin lignans: PTOX, 6-MPTOX, deoxypodophyllotoxin (dPTOX) and β-peltatin.
The results show that *in vitro* plantlets, WT cells and transformed cells predominantly produced PTOX, production being 11-fold higher in the plantlets. Otherwise, the adventitious and hairy roots predominantly produced 6-MPTOX, the adventitious roots being the most productive, with MPTOX levels 1.58-fold higher than in transformed roots.
We can infer from these results that in the studied plants, cell differentiation promoted the formation of 6-MPTOX over PTOX, while transformation did not influence the lignan pattern.

Keywords: Podophyllotoxin, methoxypodophyllotoxin, cell suspension culture, coronatine, hairy roots, *Linum album*.