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Investigation of certain elicitor´s effect on some gene´s (TXS, TBT, and DBAT) relative expression level and paclitaxel production in *Taxus baccata* cell suspension culture

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Apparently, identification of involved gene expression profiles under the certain elicitation conditions, can be an impressive step for paclitaxel´s over production. Paclitaxel (Px) is a powerful antitumor diterpene alkaloid, which is usually applied for the treatment of several cancer types. In the current study, using *Taxus baccata* cell suspension in a two-step culture medium, relationships between paclitaxel production and several related gene expression profiles, have been evaluated by qRT-PCR to shed light on mechanisms by which these two elicitors: methyl β-cyclodextrins (CDs) and coronatine (Cor), control paclitaxel biosynthesis. Relative gene expression levels were variably increased by cyclodextrins, but a synergistic effect on transcript accumulation was observed when culture medium was influenced by dual elicitation. *DBAT, PAM, DBTNBT,* and *BAPT*, which encode 10-deacetylbaccatin III-10-O-acetyltransferase, phenylalanine amino mutase, debenzoyltaxol N-benzoyl transferase and baccatin III-3-amino, 13-phenylpropanoyl-CoA transferase respectively, seemed to code the four most important enzymes in paclitaxel biosynthesis pathway. In cell cultures which were induced by mentioned elicitors, total paclitaxel contents (extra and intercellular) were obviously increased by synergistic effects of coronatine and cyclodextrins, achieving the production level of 5.46 times higher than that was found in untreated cultures. This enhancement in paclitaxel contents was the result of 217.4337, 3622.806, and 145.8697 fold changes in *TXS, TBT* and *DBAT* gene expression, respectively. Results showed that there is a strong relationship between *TXS, TBT* and *DBAT* relative gene expression levels and paclitaxel´s increment.

Biography

Mokhtar Jalali Javaran received a PhD in Plant Breeding (Molecular Genetics and Genetic Engineering) from University of London, London, UK in 1999. He is Associate Professor in the Department of Agricultural Biotechnology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran. His research interest areas are Plant Molecular Genetics, Genetic Engineering, and Molecular Farming.

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