

## **OSMYB4 : A CONSERVED KEY REGULATOR OF THE SHIKIMATE AND PHENYLPROPANOID PATHWAY**

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Besides activating many genes involved in tolerance to biotic and abiotic stress, when constitutively expressed in *Arabidopsis* plants, the rice *OsMyb4* gene, encoding a Myb transcription factor, triggers also the synthesis of secondary metabolites, some of which are of pharmacological interest.

To investigate further the role of this transcription factor in driving the synthesis of secondary metabolites already produced by wild-type plants as well as to induce the production of novel compounds, the *Osmyb4* gene has been over-expressed ectopically in *Arabidopsis thaliana* and *Nicotiana tabacum*. Through a combination of different analytical methods (HPLC-DAD, LC-MS, <sup>1</sup>HNMR) the *Osmyb4* transgenic *Arabidopsis* plants were found to synthesize high level of sinapoylmalate (SM), whereas the transgenic tobacco plants accumulated more chlorogenic acid (CGA) compared to their respective plants transformed with the empty vector. The expression analysis (semi-quantitative RT-PCR) of several genes involved in the SM and CGA biosynthesis indicated that *Osmyb4* is a primary regulator of the phenylpropanoid pathway in the two species examined. Namely transcription of PAL, 4CL1, 4CL2, CHS, CCoAMT, C3H, HQT (catalyzing the last step of CGA synthesis) and SMT (catalyzing the last step of SM synthesis) genes was up-regulated in transgenic *Arabidopsis* and tobacco plants with respect to their wild type plants.

This data suggest that *Osmyb4* regulates expression of genes encoding enzymes leading to common precursors of the plant phenylpropanoid pathway, that are subsequently decorated by specie-specific enzymes to yield different end-products. Therefore, the transcription factor *Osmyb4* has to be considered a conserved regulator of the synthesis of secondary metabolites belonging to the shikimate and phenylpropanoid family and can be a powerful tool to boost the production of these bioactive compounds in medicinal plants, cells and hairy roots.