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Poster Abstract – B.16

HETEROLOGOUS EXPRESSION OF AN ARTICHOKE CYTOCHROME P450 GENE AFFECTS FLAVONOID BIOSYNTHESIS IN TRANSGENIC TOBACCO PLANTS

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Globe artichoke (C*ynara cardunculus* var. *scolymus* L.) is a typical component of the Mediterranean diet, and has interesting applications in pharmacology due to its beneficial properties. These properties have been attributed to the phenolic compounds, among which the flavonoid luteolin has been found to be a powerful antioxidant and inhibitor of cholesterol biosynthesis.

Flavonoids are plant secondary metabolites with essential physiological function, whose central biosynthetic pathway is highly conserved in plants. The luteolin biosynthetic pathway has been elucidated in Arabidopsis and other species and many structural genes have been isolated and characterized (i.e. *flavonoid 3'- hydroxylase*, *F3'H* and *flavone synthase II*, *FNSII*). However, in artichoke this pathway is poorly characterized and no information are available yet about the key genes that are involved in luteolin synthesis.

In this study, we isolated the two artichoke cytochrome P450-encoding genes *F3'H* and *FNSII* by homology-based PCR approach and performed transcription analyses in different tissues and organs of several artichoke local and commercial varieties in order to assess differential expression patterns of the two genes.

To demonstrate whether the putative *F3'H* artichoke gene has enzymatic activity *in vivo* and is involved in luteolin biosynthesis in artichoke, transgenic tobacco plants overespressing *F3'H* were obtained. In some tobacco primary transgenics, changes in flower colour intensity were observed indicating that this gene is involved in flower colour modification in tobacco. Moreover, the main phenolic compounds were analyzed by HPLC in leaves and flowers at different development stages, detecting several significant changes.

Further research will be focused on the full characterization of the activities of the artichoke *F3'H* and *FNSII*-encoded enzymes.