

AGROBACTERIUM-MEDIATED TRANSFORMATION OF CARDOON CELL CULTURES ALLOWS ALTERATION OF THE PHENYLPROPANOID PATHWAY.

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Cardoon (*Cynara cardunculus* L. var. *altilis*) is a traditional Italian vegetable crop, with high yields of seed oil with a good fatty acid profile (high oleic acid) and a vigorous lignocellulosic biomass characterized by valuable compounds that can be recovered both from the apical part (*e.g.* chlorogenic acid and other polyphenols) and from roots (inulin). To overcome the hurdles of seasonal availability and high biochemical variability of the biomass, standardized cardoon cell cultures represent an alternative to field cultivation. In this frame, we tested a biotechnological approach via *Agrobacterium*-mediated transformation to obtain stable transgenic cardoon cell lines with the aim of increasing the accessibility of the cellulose fraction and of boosting the production of high-value nutraceuticals. Our strategy revolves around the overexpression of the *Arabidopsis* MYB4 gene, encoding a transcriptional factor known to be a master regulator of the phenylpropanoid pathway. We provide a detailed characterization of the transgenic lines based on molecular, metabolic and transcriptomic comparisons with wild-type controls. This approach is devoted to optimize and scale-up the growth the use of cardoon cell cultures in economically and environmentally sustainable conditions, in line with the principles of Circular Economy.