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ELUCIDATION OF THE BETA-CAROTENE HYDROXYLATION PATHWAY IN *ARABIDOPSIS THALIANA*

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The first dedicated step in plant xanthophyll biosynthesis is carotenoid hydroxylation. In Arabidopsis thaliana, this reaction is performed by both heme (LUT1 and CYP97A3) and non-heme (CHY1 and CHY2) hydroxylases. No mutant completely abolishing alpha- or beta-carotene hydroxylation has been described to date. We constructed double and triple mutant combinations in CHY1, CHY2, LUT1, CYP97A3 and LUT2 (lycopene ε-cyclase). In chy1chy2lut2, 80% of leaf carotenoids is represented by beta-carotene. In chy1chy2cyp97a3, beta-carotene hydroxylation is completely abolished, while hydroxylation of the beta- ring of alpha carotene is still observed. The data are consistent with a role of CYP97A3 in beta-ring hydroxylation, and with the existence of an additional hydroxylase, acting on the beta-ring of alpha-, but not beta-carotene.