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Poster Abstract – C.29

BETA-CAROTENE HYDROXYLASE: ONE GENE…SO MANY PHENOTYPES!

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Xanthophylls are a group of hydroxylated carotenoids which are involved in many fundamental functions in bacteria, plants and animals. The first step in xanthophyll biosynthesis is hydroxylation, which in plants is effected by both cytochrome P450-type enzymes (Cyp) and non-heme iron-containing enzymes (Chy). In tomato, the linear carotene lycopene is accumulated during fruit ripening, and is at least partially under the control of ther ripening hormone, ethylene; no evidences exist about possible influences of carotenoid content on ethylene production. In this work, we produced transgenic tomato plants overexpressing the pepper Chy gene under the control of the tomato Pds promoter. Ripe transgenic fruits show an unexpected alteration in carotenoid -carotene (the bChy substrate) and no variation inβcontent, accumulating xanthophyll content. Expression of endogenous carotenoid genes shows only minor variations, suggesting that the effect is at the post-transcriptional level. Surprisingly, transgenic fruits also show a substantial alteration of signals involved in the control of fruit ripening (such as ethylene biosynthesis), and of the resulting ripening phenotypes. Metabolomic characterization of transgenic fruits showed a drastic alteration in primary metabolism, production of volatiles, and phytohormone content. These data suggest that Chy overexpression severely and globally alters tomato fruit physiology. Further analyses are in progress to understand the real function of this enzyme.

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