

INTERACTION OF LIGHT AND CYTOKININS IN ARABIDOPSIS THALIANA – STRESS AND ANTHOCYANIN BIOSYNTHESIS

INTERAKCE SVĚTLA A CYTOKININŮ U ARABIDOPSIS THALIANA – STRES A BIOSYNTÉZA ANTOKYANŮ

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ABSTRACT

Light and cytokinins interact in a number of growth, developmental and physiological processes in plants. One example is anthocyanin biosynthesis that helps protect against various biotic and abiotic stresses. The involvement of cytokinins in this process is not fully understood. Further, we suppose that not only light but also cytokinins are implicated in oxidative stress. To study the interaction of light and cytokinins in the induction of anthocyanin biosynthesis we employed transgenic *Arabidopsis thaliana* seedlings (line 11.5) with an activable *ipt* system where activation leads to the induction of isopentenyltransferase (*ipt*) expression and consequent increased cytokinin biosynthesis. Plants cultivated in soil under a light intensity of 100 photons $\mu\text{mol m}^{-2} \text{s}^{-1}$ were activated and then cultivated under the same light intensity or under higher light intensity (200 photons $\mu\text{mol m}^{-2} \text{s}^{-1}$). This increasing of light intensity induced *Elip* genes which are expressed only under light-stress conditions so that light intensity of 200 photons $\mu\text{mol m}^{-2} \text{s}^{-1}$ could be assumed as slight light-stress. Increased light intensity as well as activation lead to anthocyanin accumulation and the effect of light and cytokinins on increasing the anthocyanin content was multiplicative. To elucidate whether anthocyanins and other flavonoids are implicated in tolerance to increased light intensity and/or increased cytokinin level we investigated *transparent testa 4 (tt4)* mutant which is deficient in flavonoid biosynthesis. *tt4* mutants did not show any lesions, chlorosis or other marks of severe stress under increased light intensity (350 photons $\mu\text{mol m}^{-2} \text{s}^{-1}$) and/or cytokinin treatment. No changes in content of chlorophyll and total carotenoids were observed in *tt4* mutants. Taken together, anthocyanins do not serve an important function in protection against stress-promoting conditions such as moderate light stress and increased cytokinin levels.

Key words: cytokins, anthocyanins, flavonoids, transparent testa mutants, stress

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