Amended synthesis of vitamin B₆ causes altered antioxidant responses to supplemental UV-B in *Arabidopsis thaliana*

Gyula Czégény¹, László Kőrösi², Åke Strid³, Éva Hideg⁴

¹Department of Plant Biology, University of Pécs, H-7633 Pécs, Ifjúság útja 6., Pécs, Hungary
²Research Institute of Viticulture and Enology, University of Pécs, H-7634 Pécs, Pázmány Péter utca 4., Pécs, Hungary
³School of Science & Technology, Örebro Life Science Center, Örebro University, SE-70182 Örebro, Sweden

We previously showed that UV-B can increase metabolic hydrogen peroxide (H₂O₂) concentrations in leaves and that it is able to convert H₂O₂ to hydroxyl radicals (•OH) (Czégény et al. 2014). Thus, efficient scavenging of H₂O₂ and •OH are expected to be important aspects in a successful acclimation to UV-B. Vitamin B₆ has an essential role both in plant development and stress tolerance (Raschke et al. 2011). In addition to their coenzyme function in several biosynthetic pathways (Drewke and Leistner 2001), B₆ derivates are potent quenchers of ROS (Havaux et al. 2009, Matxain et al. 2009).

In this study, we used *Arabidopsis thaliana* mutants (rsr4-1) reduced in B₆ biosynthesis (Wagner et al. 2006) to investigate how vitamin B₆ derivates of contribute to the plants’ acclimation to supplemental UV-B in growth chambers. In response to UV-B both mutant and wild type (C24) leaves altered their antioxidant profiles – including increases in B₆ derivates. Wild type plants avoided oxidative stress via increasing peroxidase activities. Mutants, however, showed elevated catalase and markedly decreased SOD activities, although these were not sufficient to maintain leaf photochemistry. Responses are also discussed in terms of changes in leaf B₆ profiles and ROS reactivities of these compounds.

References

Acknowledgements
The work was supported by the Hungarian Scientific Grant Agency (grant number OTKA K112309). Gy. Cz. acknowledges the support of the ÚNKP-17-3-III-PTE-229 New National Excellence Program of the Ministry of Human Capacities. Â.S. was supported by grants from the Knowledge Foundation and the Swedish Research Council FORMAS. This work was also supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences.