



Effect of Short Term UVB and UVC Irradiations on Hydroxyphenylpyruvate Reductase Expression and Rosmarinic Acid Accumulation in *Orthosiphon aristatus*

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ABSTRACT

Ultraviolet (UV) light is one of the abiotic stresses towards plant communities. Generally, UV irradiation can affect the growth and development of the plants and irradiations above ambient level can cause the activation of plant stress responses through the self-protective secondary metabolism system. One of the products of these responses is rosmarinic acid, which is an important secondary metabolite in the medicinal plant, *Orthosiphon aristatus*. Rosmarinic acid exhibits many pharmacological and biological properties such as antioxidant, anticancer, antiviral, antibacterial, anti-inflammatory and other health promoting properties. The biosynthesis of rosmarinic acid involved two derived pathways, which are phenylpropanoid, and tyrosine-derived pathways. Hydroxyphenylpyruvate reductase (hppr) is an enzyme involved in tyrosine pathway. In this study, we investigated the effects of short-term UVB and UVC treatments on the biosynthesis of rosmarinic acid and the *hppr* gene expression. High performance liquid chromatography and quantitative real time polymerase chain reaction were used. The results showed that rosmarinic acid content increased within one hour of UVB and UVC exposures and declined after one-hour of exposure. On the other hand, *hppr* expression was down regulated upon UVB and UVC treatments. Meanwhile, the expression of *hppr* showed negative correlation to rosmarinic acid accumulation.

Keywords: *Orthosiphon aristatus*; rosmarinic acid; hydroxyphenylpyruvate reductase; UVB; UVC;