

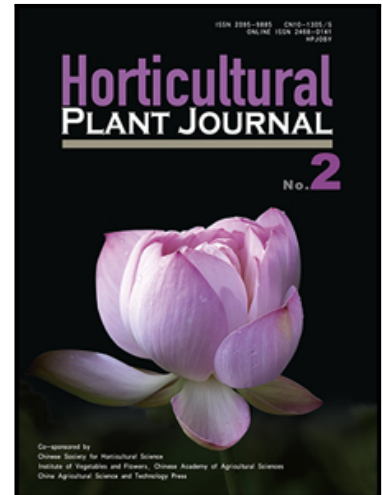
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Melatonin Treatment Enhances the Polyphenol Content and Antioxidant Capacity of Red Wine

XU Lili, YUE Qianyu, BIAN Feng'e, ZHAI Heng, and YAO Yuxin *

State Key Laboratory of Crop Biology, Key Laboratory of Biology and Genetic Improvement of Horticultural Crops (Huang-Huai Region, Ministry of Agriculture), College of Horticulture Science and Engineering, Shandong Agricultural University, Tai'an, Shandong 271000, China

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Abstract

Melatonin and polyphenols are strong antioxidants, and melatonin is also a potential plant growth regulator. The role of melatonin in regulating polyphenol metabolism is unclear. This study assessed the primary impacts of exogenous melatonin treatment on phenolics accumulation and antioxidant capacity of the 'Moldova' wine. It was found that two times of 100 $\mu\text{mol}\cdot\text{L}^{-1}$ melatonin treatment clearly enhanced the endogenous melatonin content of ripened berries and wine. Further experiments indicated that melatonin treatment significantly increased the contents of total phenols, flavonoids and anthocyanins in wine. Additionally, the contents of most of the 20 detected individual phenolic compounds were significantly enhanced by melatonin treatment in wine. Particularly, the content of two non-flavonoid phenolic compounds (syringic and coumaric acid) and four anthocyanin compounds [Mv-3-Glu, Mv-3-(6-Coum)Glu-5-Glu, Dp-3-(6-AC)Glu and Dp-3-(6-Coum)Glu-5-Glu] were largely increased by melatonin treatment. In contrast, only Pn-3-(6-Coum)Glu was significantly reduced. Moreover, melatonin treatment significantly enhanced the antioxidant capacity of wine indicated by DPPH and FRAP assays. In summary, melatonin treatment enhanced the polyphenol content and antioxidant capacity of wine.

Keywords: grape; red wine; melatonin; phenolics; antioxidant capacity

*Corresponding author. Tel.: +86 538 8246258

E-mail address: yaoyx@sdau.edu.cn

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