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First evidence of epicatechin vanillate in grape seed and red wine

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Abstract

Flavan-3-ols are units incorporating condensed tannin, which are widely present in grape and wine. They play a considerable role in wine sensory perception such as astringency, bitterness and mouth-feel. In grape and wine, the flavan-3-ols reported to date are (epi)catechin, (epi)galocatechin, (epi)galocatechin gallate and (epi)catechin glycoside. This study now shows the presence of a new flavan-3-ol epicatechin vanillate in grape seed and red wine. A putative unknown flavan-3-ol derived from grape seed was targeted by LC-HRMS/MS. Fractionation and purification by centrifugal partition chromatography and Prep HPLC allowed us to obtain the pure new flavan-3-ol. NMR and HRMS data revealed this compound to be epicatechin-3-*O*-vanillate. Quantification analysis results showed that epicatechin vanillate present in grape seed and red wine in the $\mu\text{g/g}$ dry seed and the $\mu\text{g/L}$ concentration range, respectively.

Key words: Flavanol, condensed tannin, grape, wine, epicatechin vanillate

1. Introduction

Flavan-3-ols derived from grapes contribute greatly to wine sensory perception, such as astringency, bitterness and mouth-feel (Ma, Guo, Zhang, Wang, Liu, & Li, 2014; Vidal, Francis, Guyot, Marnet, Kwiatkowski, Gawel, et al., 2003). Various flavan-3-ol subunits and their proportions in condensed tannins give rise to different wine sensory perception. Usually, flavano-3-ols are present as monomers (Fig. S1) or serve as subunits to be polymerized into condensed tannins (Ma, Waffo-Téguo, Alessandra Paissoni, Jourdes, & Teissedre, 2018). The most well-known flavan-3-ols in grapes are (+)-catechin and its isomer (-)-epicatechin, which account for many of the flavan-3-ols in grapes. Many flavan-3-ols are

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