Evolution of Phenolic Composition of Red Wine during Vinification and Storage and Its Contribution to Wine Sensory Properties and Antioxidant Activity

Baoshan Sun,*† Ana C. Neves,† Tiago A. Fernandes,† Ana L. Fernandes,† Nuno Mateus,† Vítor De Freitas,† Conceição Leandro,† and Maria I. Spranger†

†INIA Dois Portos, Instituto Nacional de Recursos Biológicos, L.P., Quinta da Almoinha, 2565-191 Dois Portos, Portugal
‡Centro de Investigação em Química, Departamento de Química, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre, 687, 4169-007 Porto, Portugal

ABSTRACT: The objective of this work was to study the evolution of the phenolic composition of red wine during vinification and storage and its relationship with some sensory properties (astringency and bitterness) and antioxidant activities. Thus, red wine was made by a classic vinification method with Castelão and Tinta Mílida grapes (Vitis vinifera L.) harvested at maturity (3.2; w/w). Samples were taken at 2 and 7 days of maceration, at second racking, at the time of bottling and at 6 and 14 months after bottling. The total polyphenols extract (TPE) in each sample was isolated by column chromatography. The phenolic composition (anthocyanins and proanthocyanidins), in vitro antioxidant activity, and sensory property (astringency, bitterness) of the isolated TPE from different winemaking stages were evaluated through high-performance liquid chromatography—diode array detection, 1,1-diphenyl-2-picrylhydrazyl radical test, ferric reducing antioxidant power assay, total phenolic index, MWI (polyphenol molecular weight index), TSA (tannin specific activity), and sensory panel tasting. The results showed that the phenolic composition of red wine varied significantly during vinemaking. The intensity of astringency (IA) and the intensity bitterness (IB) of the isolated TPE from different winemaking stages increased from 2 days of maceration until second racking and then decreased. Furthermore, MWI and TSA are positively correlated with IA and IB. The in vitro antioxidant activity of the isolated TPE from different winemaking stages maintained unchanged after alcoholic fermentation, which was independent of the variation of phenolic composition and sensory properties.

KEYWORDS: Red wine, phenolic composition, vinification, sensory property, antioxidant activity

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