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Evolution of phenolic and anthocyanins in port wine

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Port wine is one of the Portuguese gastronomy flagship products, its color being one of the traits that characterizes it and the target of great attention not only by experts of the wine area, as well as scientists, interested in understanding which compounds give such quality. Closely associated with this feature are the phenolic compounds, particularly anthocyanins, as responsible not only for it as well as allies to the antioxidant activity. The evolution from bright red to dark red and brown colors due to oxidation-reduction reactions from phenols, anthocyanins and their derivatives is throughout all the aging process is a relevant issue that needs to be study more in deep.

The samples analyzed in this study were collected at seven important stages of winemaking, during the vintage of 2013, in Quinta da Roeda vineyards, as part of a batch of grapes divided between the two types of methods; the traditional ran in granite lagares by treaders and the mechanical, using technology to imitate the traditional.

Anthocyanins were analyzed by HPLC/Diode Array ^[1]; malvidina was the most prevalent although other anthocyanins were also identified. During wine fermentation the anthocyanin content increased, presenting a decrease after fortification with spirit and during 6 months aging in stainless steel vats. The same profile was also observed for total phenolics performed by the 96-well microplate Folin-Ciocalteu procedure using carbonate buffer as alkaline reagent applied with some modifications ^[2]. The results of both methods were statistically treated with an ANOVA two way to verify the effects of production method (namely, traditional ran in granite lagares by treaders and the mechanical process) and also the effect of Port wine production (fermentation, fortification and aging). No significant differences were observed for both effects ($p < 0,05$).

The formation of new anthocyanins during wine aging needs to be studied in detail by LC-MS/MS. Furthermore, as this wine was only studied for a period of six months it would be appropriate to continue to study its evolution until bottling.

References:

[1] C. Pinho, A.I. Couto, P. Valentão, P. Andrade, I.M.P.L.V.O. Ferreira, Assessing the anthocyanic composition of Port wines and musts and their free radical scavenging capacity. *Food Chemistry* 131 (2012) 885-892

[2] L. M. Magalhães, L. Barreiros, M. A. Maia, S. Reis, M. A. Segundo, Rapid assessment of endpoint antioxidante capacity of red wines through microchemical methods using a kinetic matching approach, *Talanta* 97 (2012) 473-483.