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Thesis title: Berry size implications for phenolic composition and wine quality of *Vitis vinifera* L. cv. Syrah

Jury members (academic title, name, university / institution):

Abstract

Topic position and objectives: The main goals of this thesis were to quantify the natural berry size variation within a vineyard, to do small scale vinifications with each berry size and a set of controls, and to monitor the development of the wine and the different berry parts throughout fermentation, ultimately relating berry size with berry and wine composition and the sensory analysis.

Methods : Field-grown Syrah berries were collected at equal maturity levels, sorted according to small, medium and large berries, which were later mixed in different control samples; berries were also separated according to different row orientations. Size distribution for each row orientation was attained by weighing the total amount of each berry size category. All samples were analysed for physical characteristics (berry mass, volume, dry skin weight and skin area) and chemical composition (colour, total phenolics, sugar content, total acidity, pH, and °B/TA ratio). The evolution of anthocyanins and total phenolics were analysed throughout alcoholic fermentation and afterwards, final anthocyanin extraction levels were calculated. The finished wines were assessed by chemical and sensory analysis.

Results : All physical berry characteristics increased with berry size. Small berries had higher potential for solute extraction and presented a good extraction during fermentation, but wine quality was poor with wines that were described as alcoholic and unbalanced. Medium sized berries presented an easier transfer of anthocyanins into wine, and the berry composition transferred well into the wines, which were considered to be better wines in the tasting. Wines made from large berries were synonymous with their berry characteristics and were described as diluted. Vineyard microclimate, induced by row orientation, had a clear impact on berry characteristics and the respective wines.

Main conclusions: The composition characteristics of each berry size were found to be significant factors influencing wine quality, even though the transition of berry characteristics into the wines was not always as expected. The complexity and difficulty of direct materialization of physical and chemical berry characteristics into wine was confirmed. However, significant trends on the subject were found.

Keywords: berry composition, row orientation, berry size, phenolic composition, wine quality.

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