Title The interactive effects of irrigation, nitrogen fertilisation rate, delayed harvest and storage on the polyphenol content in red grape (*Vitis vinifera*) berries: A factorial experimental design

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Abstract

Polyphenol concentrations, including anthocyanidins, flavonols, flavan-3-ols and stilbenes, were quantified by liquid chromatography/mass spectrometry in two cultivars of red grapes for daily consumption, which were subjected to different kinds of water supply and nitrogen fertilisation rates. Samples from the same vineyards were also analysed after a 6 week storage in a refrigerator and 6 week delayed harvesting. Berry skins and seeds were analysed separately. In order to ascertain whether agronomical treatments, storage condition, and delayed harvesting could have an effect on the concentration of the polyphenol classes, a statistical treatment of the screening kind, namely 2^k full factorial design, was used for the interpretation of results. Storage, delayed harvesting and the different kinds of water supply appeared to be the variables mostly affecting grape polyphenol content. In some cases, results showed that polyphenol content diminished by more than 50% after 6 weeks if the grapes were stored in a refrigerator. This approach also evidenced some interactions among the variables.