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# Response of red grape varieties irrigated during the summer to water availability at the end of winter in four Spanish wine-growing regions: berry phenolic composition

## Abstract

Water availability is the most limiting factor for vineyard productivity under Mediterranean conditions. Due to the effects caused by the current climate change, wine-growing regions may face serious soil moisture conservation problems, due to the lower water retention capacity of the soil and higher soil irradiation. The aim of this work was to evaluate the effects of soil recharge irrigation in pre-sprouting and summer irrigation every week (30 % ET<sub>0</sub>) from the pea size state until the end of ripening (**RP**) compared to exclusively summer irrigation every week (**R**) in the same way that **RP**, on berry phenolic composition at harvest. The experiment was carried out during two consecutive seasons (2021 and 2022), in vineyards of Garnacha Tinta (in Badajoz), Tempranillo (in Valladolid), Syrah (in Albacete) and Mencía (in Lugo). Polyphenolic substances were extracted from grapes and then identified and quantified by high performance liquid chromatography. Compounds grouped into anthocyanins and non-anthocyanins were analyzed. In 2021, pre-sprouting irrigation tended to cause a decrease in the concentration of both anthocyanin and non-anthocyanin compounds, although this was only significant in the case of Syrah flavanols compounds. In 2022, the effect of soil water recharge was more noticeable. In relation to anthocyanin compounds, **RP** significantly reduced the concentration of monoglucoside, acetylated and coumarilated anthocyanins in Tempranillo, as well as the values of delphinidin, petunidin, peonidin and malvidin derivatives, while in the rest of the varieties the values remained unaffected. The **RP** treatment, compared to **R**, tended to increase the concentration values of flavonols and phenolic acids in Tempranillo and decrease that of flavonols in Syrah. The effect of pre-sprouting recharge irrigation was highly dependent on the year and the characteristics of each vineyard.

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