



Impact of Soil-applied and Foliar-applied Nitrogen on Grape and Wine Composition

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Abstract:

Context and purpose of the study - Foliar application of urea may be an efficient way to alter grape and wine composition without increasing vine vigor. However, we know little about the impact of this practice on phenolic compounds and yeast assimilable nitrogen (YAN). Adequate YAN is required for an efficient and complete fermentation, while phenolics are particularly important for the sensory profile of red wines. The goal of this study is to test the impact of foliar urea application at veraison, compared to the traditional soil-applied nitrogen fertilization early in the season, on Syrah berry and wine composition in field conditions.

Material and methods - A trial was conducted in a commercial, drip-irrigated, own-rooted Syrah vineyard in arid eastern Washington in 2021 and 2022. We compared 4 treatments of soil-applied liquid urea ammonium nitrate (0, 22.5, 45, 90 kg N/ha), split in 3 applications (5-6 leaf stage, bloom, fruit set) with a 15 kg N/ha foliar urea treatment, split in 3 applications starting at the end of the lag phase of berry development. Wine was produced from all treatments.

Results - Berry weight, cluster number, yield, juice total soluble solids, pH, titratable acidity and malic acid were similar among nitrogen treatments in 2021 and 2022. Must YAN increased with increasing soil applied N, but the foliar N treatment was much more effective at increasing YAN than was soil-applied N. The phenolics concentration in the juice at the beginning of fermentation was similar between treatments. For 2021 and 2022 wines at pressing, tannins were low and decreased as N application increased. Fruit and wine anthocyanins and wine total phenolics were unaffected in both vintages by the field treatments.

Keywords: foliar urea, grape composition, nitrogen, YAN, phenolics