

Impact of canopy management on thiol precursors in white grapes: a six-year field study

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Abstract

The mechanisms behind thiol precursor accumulation in grapes remain incompletely understood, nor are the ways in which they can be improved by agronomic practices. A six-year field trial studied the physiological response of the Swiss white cultivar *Vitis vinifera* Arvine, rich in varietal thiols and precursors, to canopy management, i.e. leaf removal and canopy height.. Five treatments were set up in a randomized block design to assess the impacts of 1) pre-flowering LR (i.e. pre-flowering or full-flowering stages) and 2) compensating for the leaf area removed in the cluster zone by increasing the trimming height (i.e. 100 or 150 cm canopy height), compared with a non-defoliated control treatment.

Intensive pre-flowering LR severely reduced yield potential (–47% on average) and reduced the concentration of 3-mercaptohexanol precursors (P-3MH) in the must (–21%; p-value < 0.10). Decreasing earliness modulated the impact of LR on yield (–12%) and P-3MH concentration (–6%). Compensating for suppressed leaf area by increasing the trimming height slightly enhanced grape ripening (+1% total sugars; –3% titratable acidity), slightly improved the overall quality of the wine (color intensity, volume), while having no impact on must P-3MH concentration or on wine bouquet. Observing the long-term impact of each LR treatment separately provided insights into the physiological mechanisms influencing fruit development and aroma formation. This trial is part of a larger project on canopy management and its impact on grape composition in temperate Swiss climatic conditions.

Keywords: leaf removal, canopy height, 3-mercaptohexanol, grapevine, wine aroma.