Characterizing the molecular basis of the differences in aromatic precursors found in commercial clones of *Vitis vinifera* cv. Tannat.

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Abstract (250 words)

Uruguay is known for the production of Tannat wines, which is a neutral variety from an aroma point of view, but capable of providing aromatic precursors that are of interest in the production of wines for ageing. The main aromatic precursors present are glycosidic compounds and carotenoids. The contribution of carotenoid degradation by-products such as norisoprenoids to wine aroma is fundamental, as they are associated with pleasant aroma descriptors and very low olfactory perception thresholds. Several factors have been shown to influence carotenoid concentrations in grapes, such as cultivar, climatic conditions, viticultural region, plant water status, exposure to sunlight and ripening stage. Norisoprenoids can be formed by chemical or enzymatic degradation of carotenoids. In this work, we studied two contrasting clones from the same plot as an experimental strategy to minimize the environmental factor and focus on the genes of interest. We evaluated glycosidic precursors (SPE-GC-MS), carotenoids (HPLC-DAD) and gene expression (RNA-Seq) in the selected clones during four stages of grape ripening. Significant differences in carotenoid and norisoprenoid content were found throughout the ripening period. Comparisons between clones showed significant differences in carotenoid content but not in norisoprenoid content during this harvest. Many genes associated with carotenoid and norisoprenoid biosynthesis showed differential expression throughout the ripening period in each clone. However, no genes were differentially expressed between clones. We conclude that the differences between clones do not manifest themselves every year. This shows that climate plays a fundamental role in aroma biosynthesis in Tannat clones.

Keywords: Carotenoid, Norisoprenoid, Tannat, GC-MS, RNA-Seq.