Role of enzymes in Enhancing Wine Aroma

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Abstract
The aromatic potential of grapes is characterized by the existence in berries of two types of flavors: free (odorous) and related to sugars (non-odorous), also known as "flavor precursors" because they have the ability to turn into volatile compounds, participating in the formation of the aromatic complex in wines after processing the grapes. This characteristic of the wine is essentially determined by the composition of the varietal aroma. Concentrations of precursors are usually higher than their free volatile forms, thereby indicating the potential for increased aroma upon release.
Addition of β-glucosidases can enhance the aromatic profiles of some wines by hydrolyzing the β-1,4 bond, liberating the free volatile component from its conjugate. Most pectolytic enzymes have some β-glucosidase activity, therefore can catalyze hydrolysis. These have the greatest impact on high-terpene white grape varieties.
Flavor enhancing enzymes act on the skin of white grapes and are used for two reasons. The first would be to increase both the amount of quality grape must, as well as the total amount of juice per ton of crushed grapes. The second reason is to extract more varietal aromas from the grape skin and thus increase the aromatic potential of the wine.
Pectic enzymes release the bindings and thus increase the aromatic potential of monoterpenes. These enzymes work best with grape varieties having high monoterpene levels. Glycosidases release aromatic compounds linked to sugars and intensifies cell lysis and increases the extraction of aromatic precursors from the berry. Nowadays in many commercial enzyme preparations, glycosidase activities occur as side activities along with pectinase and glucanase activities.
The use of enzymes during maceration leads to the optimization of the varietal flavors increasing process, resulting in wines with superior sensorial characteristics, the values of terpene compounds increasing by about 40%. Moreover, the use of enzymatic preparations leads not only to significant increases in terpenes in wine, but they also are richer in esters, have very low values of acetaldehyde and volatile phenolic compounds.
In conclusion, use of enzymes during maceration leads to increased efficiency due to increased content of compounds responsible for the profile and aromatic typicality of wines, which is reflected through a value increase of the wine quality.