

Wine Enzymes

under **investigation**

Nº4

RED GRAPE MACERATION ENZYME – THE POWERFUL LALLZYME B-620™

Color is a quality parameter, as important as the aroma and flavor of the wine. To maximize color extraction, winemakers will use different processes, and enzymes are some of the tools at their disposal. Lallzyme® B-620® is an enzyme used for red grapes, to increase the extraction of anthocyanins, favoring the expression of an intense and young color and its stability over time.

UNDERSTANDING THE FUNDAMENTALS OF COLOR, ANTHOCYANINS AND STRUCTURE.

Phenolic compounds present in the skin of the grape, such as anthocyanins, proanthocyanidins or tannins are responsible for the color and structure of wine. During winemaking and ageing, these components combine with each other and react with proteins and polysaccharides of grapes and yeast.

The anthocyanins are contained in the vacuole of the skin cells of red grape varieties, while in the same cells, the tannins are bound and interact closely with the hemicelluloses and pectic polysaccharides of the cell wall.

To extract the color and tannins it is necessary to break the cell wall and membrane, allowing the anthocyanins to transfer into the must solution, release the tannins and hydrolyze the pectin and other macromolecules.

THE ACTION OF ENZYME FOR COLOR EXTRACTION

Pectolytic enzymes for the maceration of red grapes are a useful tool for anthocyanins and tannins extraction.

Lallzyme® B-620® is an enzymatic formulation designed for the maceration of red grapes, with high pectolytic activity, an optimized content of hemicellulase, cellulase and secondary activities capable of effectively hydrolyzing the side chains of the pectic polysaccharides present in the cell wall of the skin and pulp. This preparation has a very low level of cinamyl esterase and anthocyanase activity.

MAXIMAL COLOR

A trial was coordinated by the University of Palermo in a winery in Sicily, in an area where the color extraction is not always optimal on Nero d'Avola without any enzyme, with an enzyme found on the market (enzyme A), and with Lallzyme® B-620®. Lallzyme® B-620® showed a higher concentration of anthocyanins and a more stable preservation of the color both in intensity and quality. Six months after winemaking, the Lallzyme® B-620® wine had a greater blue-mauve hue (A620).

The tasting, one year after vinification, showed that the wines treated with Lallzyme® B-620® had a greater aromatic freshness with more intense fruity characters, a more intense color, greater complexity and roundness, and lower astringency.

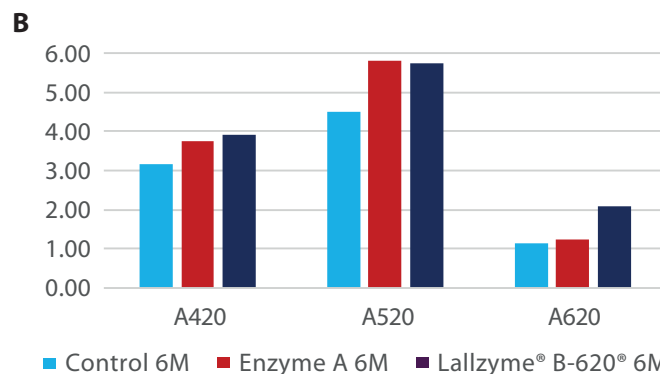
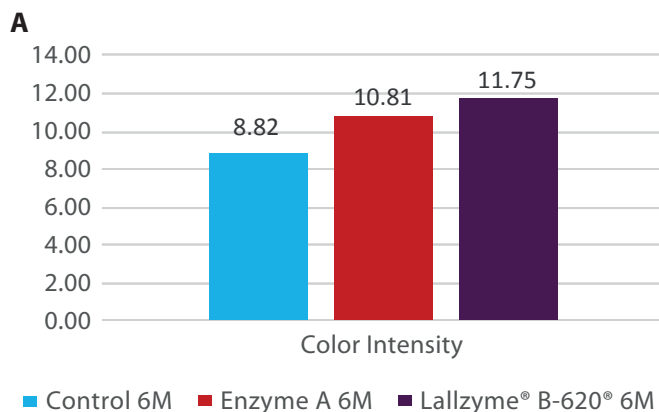
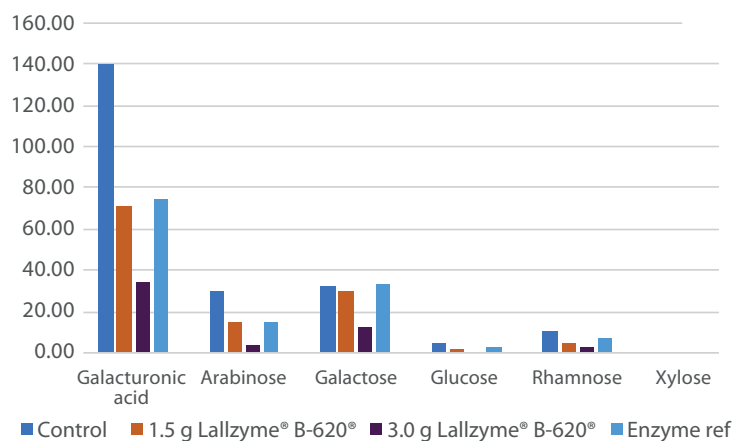


Figure 1. Color intensity (A) and absorbance (B) of 420 nm, 520 and 620 nm of the wines with Lallzyme® B-620® in comparison to a non-enzymed control and a reference enzyme on Nero d'Avola (2021) after 6 months of storage

IMPROVED FILTERABILITY

An in-depth study of the composition of the pectic polysaccharides was done on those Cabernet Sauvignon wines. The wine with Lallzyme® B-620® showed a reduction in pectic polysaccharides compared to the reference enzyme and the control and depended on the dose of used.



The use of Lallzyme® B-620® resulted in a reduction in the monomers present in the side chains of the pectic polymers in wine, mainly RGII (type II rhamnogalacturonans) and AGP (arabinogalactans). From a technological point of view, the number and complexity of the side chains of these macromolecules, also called hairy regions to describe their spatial structure, is negatively correlated with the filterability of wines. The reduction and hydrolysis of the hairy regions leads to a lower presence of carbohydrate monomers and improves the filterability performance of the wines.

SUMMARY

The development of Lallzyme® B-620® was focused on the formulation of an enzyme suitable for all red grapes, capable of increasing the extraction of anthocyanins, favoring the expression of an intense, young color intensity, its stability over time and the filterability of the wine.