

Wine Enzymes

under investigation

Nº3

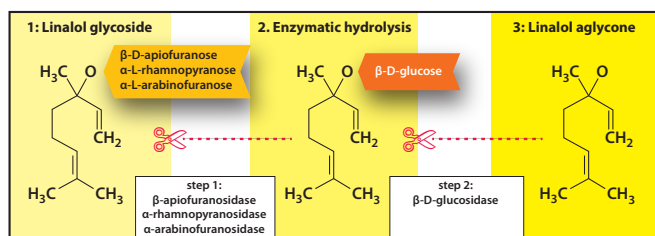
MORE AROMATIC EXPRESSION IN WHITE WINES WITH LALLZYME BETA™

Volatile aromas such as terpenes and norisoprenoids can be found in grapes in the odorless bound form or in the volatile, aroma-rich, free form. The bound forms consist of an aglycone (the odorous molecule) bound to a sugar molecule.

The content of free and bound compounds depends on the variety, the ripening and viticulture conditions. During fermentation and in subsequent phases, aromas bound to sugars (glycosylated) can undergo hydrolysis by glycosidase enzymes and release the aglycone (odorous form), increasing the expression and aromatic complexity of the wines. Those aromas are closely linked to the typicity of the wine (Riesling, Muscat, for example) and are sought after by winemakers for their wine style and variety expression.

THE ACTION OF GLYCOSIDIC ENZYMES

Glycosidases of the grape and most of those of the wine yeasts and bacteria are not very effective in winemaking conditions, mainly due to their low efficiency at the pH of must and wine. The glycosidases of filamentous fungi such as *Aspergillus niger*, from which specific oenological enzymes are obtained, are, on the other hand, very effective and capable of releasing aromatic molecules in wine conditions. When the aroma is in the odourless form, it's mainly linked to disaccharidic moiety. This disaccharidic moiety is composed by glucose (directly linked to the aglycone molecule) and a further sugar such as rhamnose, xylose, arabinose, apiose or glucose. Lallzyme Beta™ possesses the β -glucosidase activity and also the apiofuranosidase, arabinofuranosidase and rhamnofuranosidase activities, which make it particularly effective.



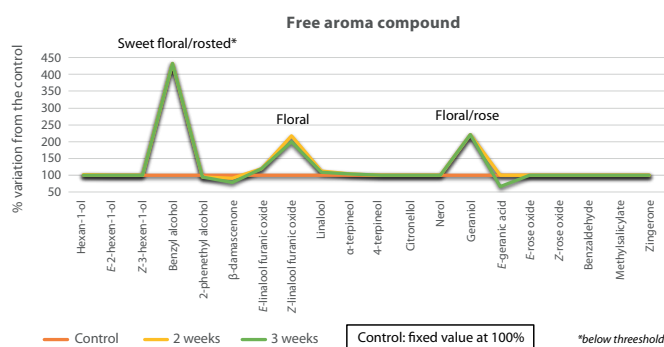
Effect on Lallzyme Beta™ on glycosylated aromas

IN AROMATIC VARIETY – THE RIESLING EXAMPLE

Riesling is a variety characterized by intense aromas and high contents of varietal compounds, which in young wines are described with floral, citrus, and tropical fruit notes. To measure the impact of the use of Lallzyme Beta™ on the release of aroma compounds as well as sensory analysis, the same wine was compared with different contact time of the enzyme: zero time, that means without any enzyme addition (the control), one week after enzyme addition, two weeks and so on up to six weeks from enzyme addition. Lallzyme Beta® was added at a dose of 4 g/hL.

Results significantly showed an increase in free aromas for the treated samples, related to more aromatic complexity, while the two best contact times (2 and 3 weeks) chosen based on the tasting have not presented significative differences for their aroma profile between them.

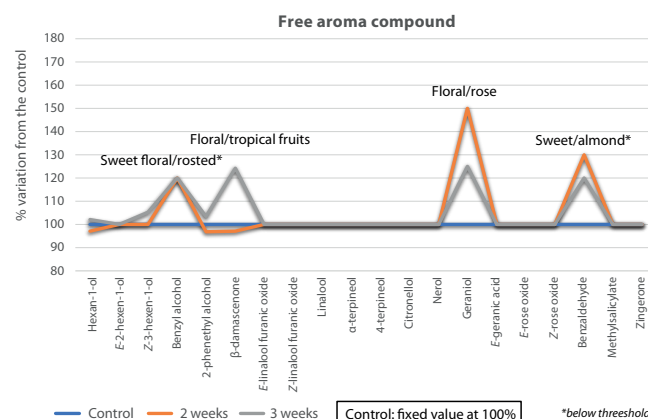
Geraniol (whose content of the glycosylated form decreases), cis furan linalool oxide and glycosylated linalool increase to double their content, while with three weeks of contact the content of trans-geranic acid, responsible for some herbaceous characters, decreases.



IN LESS AROMATIC VARIETY - FRIULANO

Friulano is an Italian wine obtained from Tocai Friulano grapes. The wine obtained from this variety is slightly aromatic, characterized by fruity notes of almond, apple, pear and floral hints of acacia, wildflowers, honey; there are also less vegetal and herbaceous notes, linked to the presence of compounds such as cis and trans hexenol.

The results obtained on Friulano highlight how in a variety with a modest content of terpenes and norisoprenoids, the treatment with 4 g/hL Lallzyme Beta™ increase the content of free compounds with floral aroma (geraniol) and the fruity notes due to benzaldehyde, benzyl alcohol and β -damascenone. Comparing the different treatments, it emerges how the contact time influences the release of the aromatic compounds, much more than in Riesling. The aromatic intensity of the wine increases and changes with contact time. Some notes, such as the floral and rose expression linked to the geraniol content, appear earlier; others, such as the fruity characters related to the release of β -damascenone, showed an increase of 20% compared to the control after only three weeks of contact.



The sensory description showed an increase in aromatic intensity after two and three weeks with Lallzyme Beta™, with fruity notes such as pear and peach. The wine had greater volume and fullness.

Contact time	Wine tasting notes
No enzyme	Regular, light wine, globally less intense than the treated wines
2 weeks	Intense, fruity and equilibrated notes, good palate sensation
3 weeks	Highly intense fruity notes, pear and peach, increase in volume and complex flavors
4 weeks	Intense and pleasant but less balanced flavors

SUMMARY

Lallzyme Beta® increases the sensory profile in grapes. The result may vary depending on temperature and contact time and the dose of enzyme. It is advisable to carry out small tests before the treatment. The evolution of the wine aroma in the tank must be monitored periodically, as the time to reach the desired aromatic profile could be different from that found in the laboratory, by varying the temperature conditions.

Once the desired result has been achieved, the enzymatic activity must be interrupted with a treatment with 5-10 g/hL of bentonite to secure the aromatic impact.