



## TOWARDS THE DEFINITION OF A TERROIR OF GRAPE DEHYDRATION FOR THE PRODUCTION OF 'PASSITO' WINES IN VALPOLICELLA (ITALY)

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### Abstract

**Aim:** The aim of this study was to investigate the relationship between the molecular response of grapes during postharvest dehydration and the specific environment of two naturally ventilated rooms (called 'fruttai'), located in two different sites in Valpolicella.

**Methods and Results:** Grapes of Corvina and Corvinone were harvested in the same field in 2018 and placed in two different 'fruttai', equipped with stations for constant registration of internal temperature and humidity. The expression of genes encoding terpenoid synthase, stilbene synthase, pectin metylesterase and laccase, previously reported to be highly dependent on the environmental condition during dehydration, were analyzed. The results showed that the four genes increased their expression during withering in both genotypes, with clear differences in the pattern of expression associated to the two 'fruttai', and sometimes highlighting a genotype-per-environment interaction.

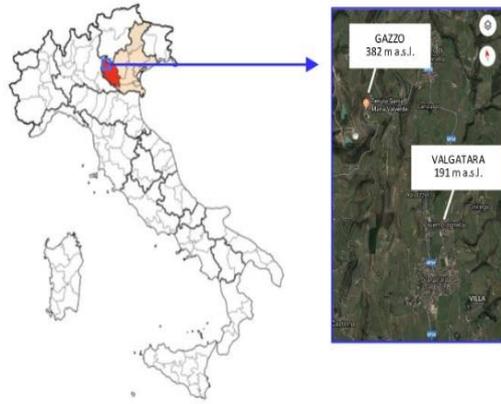
**Conclusions:** This experimental plan revealed important relationships between the natural climatic conditions of the site where the dehydration takes place, and the molecular response of dehydrating berries.

**Significance and Impact of the Study:** The postharvest dehydration of grape berries is a traditional method used to produce 'passito' wines such as Amarone and Recioto in the Valpolicella area of Italy. This technique allows the concentration of sugars and other solutes in the berry and promotes the synthesis of metabolites and aroma compounds unique to these wines. These dynamic changes are dependent on environmental parameters such as temperature and relative humidity. In Valpolicella, the dehydration process is made in naturally ventilated rooms called 'fruttai', where the internal environmental conditions are strictly dependent on the external meso-climate. This study improved our understanding of the influence of the geographic location of the 'fruttai' on the expression of quality biomarkers of dehydrated grapes. In this context, the molecular analytical approach represents a powerful tool to explore the ongoing metabolisms of grapes dehydrated in different conditions and may allow to highlight and preserve the typicality of the wine by linking its quality to a "postharvest dehydration terroir."

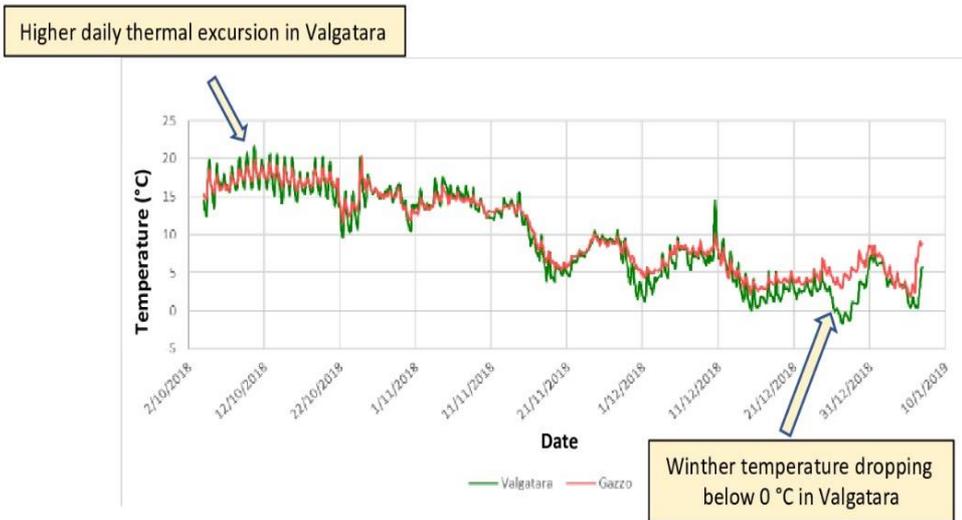
**Keywords:** Postharvest dehydration, appassimento, Valpolicella, Amarone, gene expression



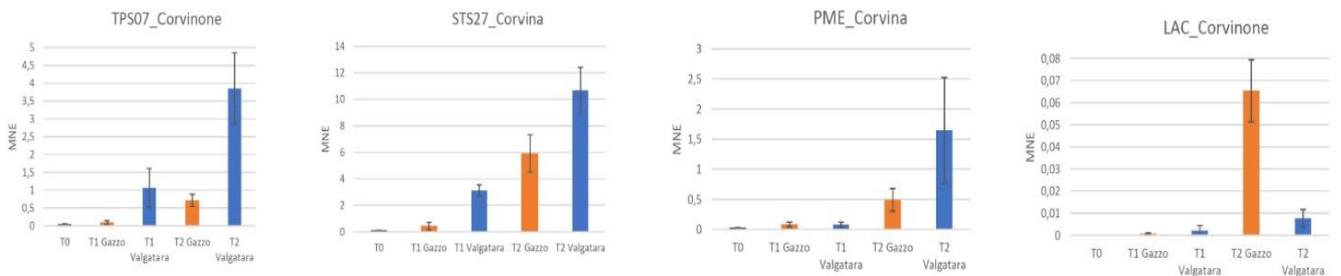
Grapes placed to dehydrate in wood boxes inside the naturally ventilated rooms ('fruttai').



Geographical localization of the two 'fruttai' where the grapes have been placed to dehydrate after harvest. The Verona province within Veneto is indicated in red.



Natural temperature fluctuations inside the two 'fruttai' during the postharvest dehydration period



qPCR analysis of Terpene Synthase 7 (TPS07), Stilbene Synthase 27 (STS27) Pectin methylesterase (PME) and Laccase (LAC) gene expression in Corvina or Corvinone berries at harvest (T0) and at 15% (T1) and 30% (T2) of weight loss. NME: mean normalized expression. Expression values were normalized to ubiquitin.