

## Cluster and berry morphological parameters as predictors of grape behavior during postharvest dehydration

**Shmuleviz R., Tornielli G.B.**

giovannibattista.tornielli@univr.it

*Department of Biotechnology, University of Verona, Via della Pieve 70, 37029 – San Floriano, San Pietro in Cariano – VR, Italy.*

To make some particular wine styles (e.g., Amarone), grapes may be harvested and stored in dehydrating rooms before vinification, in a process called withering. This practice increases the concentration of sugars and other solutes and encourages the accumulation of unique aroma compounds in berries. The kinetics of grape dehydration highly effects the quality of the produced wine and, hence, it has an important commercial value. Previous investigations provided evidence for a positive correlation between the slow rate of dehydration and the intensity of the changes occurring in grape berries. Along with the well-known effects of the environmental conditions, mainly temperature and humidity, the cluster and berry morphology have an important role in the determination of the grape water loss rate. However, the relative contribution of each cluster/berry physical trait to the dehydration rate and the possibility to predict the latter parameter in advance, are poorly studied aspects.

The aim of this work was to investigate the effect of several grape physical/morphological parameters on the withering kinetic rate, individuating potential predictors of the grapes behavior during partial dehydration. Four red wine grape cultivars, Corvina, Corvinone, Cabernet Sauvignon and Cavrara, were harvested at commercial ripening and their cluster compactness, berry surface area to volume ratio, skin thickness and skin waxes quantity were measured. Furthermore, a novel rapid dehydration test in a controlled forcing environment (50 °C; 400 mbar; 24 h) was applied on grape clusters to assess their intrinsic tendency to loss water. The grapes were then withered for 77 days, under controlled environmental conditions simulating the commercial process, and the dehydration kinetic rates were obtained. Multivariate and correlation analyses were employed to search and score the relation between each measured parameter and the withering kinetic rate. The parameters which were pointed out as good predictors of the grapes water loss attitude were the skin thickness, berry surface area to volume ratio and cluster compactness. However, intra-cultivar analyses performed on Corvina and Corvinone separately have not identified parameters with significant correlations to the withering kinetic rate, likely because of the very low variability observed among accessions of the same cultivar.

**Keywords:** wine grapes, dehydration kinetics, withering, fruit morphology, Amarone.