

Nº2

## BERRY SKIN THICKNESS: A KEY FACTOR FOR GRAPEGROWERS AND WINEMAKERS

## BERRY RIPENING AND SKIN THICKNESS

Skin plays a fundamental role for the grape composition and wine quality along with the viticulture and winemaking processes, as they are the most important source of aroma and polyphenol compounds. Thickness is one of the most important grape skin morphological characteristics affecting the gas exchange regulation, berry susceptibility to fungal diseases and resistance to mechanical injuries.

Skins and seeds parameters are crucial for a complete grape ripening that cannot be described solely by the berry pulp chemical parameters. These compounds from the solid parts may ripen differently when compared to pulp parameters and need to be extracted during the wine making process; the maceration stage is determinant in obtaining the secondary metabolites from skins and seeds, especially for red wine production.

## FACTORS AFFECTING BERRY SKIN THICKNESS

The skin thickness is first genetically-influenced, and therefore changes depending on variety and clone. Furthermore, the skin thickness seems to be related with the environmental conditions: in the alpine area cv. Nebbiolo berries with similar sugar content showed a generally thicker skin compared to the hillside.

Different viticultural practices have shown to have also an impact on the skin thickness, and subsequently, natural tools are being developed for grape growers and winemakers to achieve this goal. One of these innovative practices is the foliar spray of yeast derivatives at veraison, patent pending: LalVigne™ Mature and LalVigne™ Aroma.

LalVigne™ Aroma and LalVigne™ Mature have demonstrated, in different conditions and varieties, to be a powerful tool to increase berry skin thickness, with all the associated advantages that this entails.

## EXPERIMENTS USING LALVIGNE™ FOLIAR APPLICATION

The University of Torino has conducted extensive studies on the effect of LalVigne™ products treatments on grape and wine quality. Grape assessment at harvest included the determination of the berry skin thickness, in order to evaluate the influence of the LalVigne foliar spray application on it.

The first trial were carried out during harvest 2015 and 2016 on three grape varieties, Chardonnay, Cortese and Nebbiolo. Cortese and Chardonnay were treated with LalVigne™ Aroma and Nebbiolo was treated with LalVigne™ Mature. Berry skin thickness results (Figure 1) showed a clear influence of the treatment for the three varieties, increasing it.

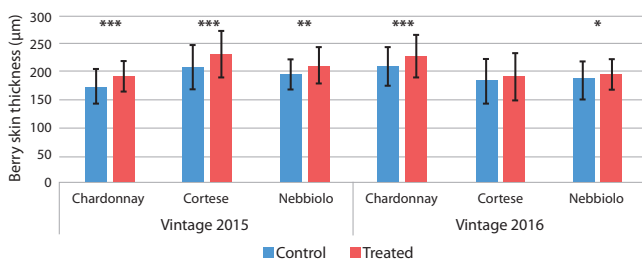


Figure 1. Influence of LalVigne treatment on berry skin thickness ( $Sp_{sk}$ ) on vintage 2015 and 2016

For the red variety Nebbiolo, the extractability study for skin phenolic compounds during 7 days of simulated maceration in a wine-like solution (Figure 2) showed a higher total content and extraction of anthocyanins in 2015 and 2016 in the treated samples with LalVigne™ Mature when compared to control.

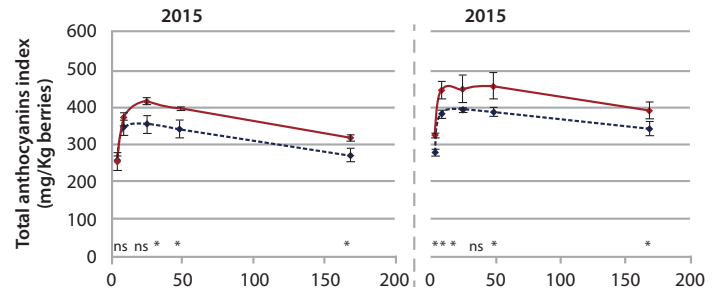


Figure 2. Extraction kinetics of phenolic compounds during skin maceration of control (dashed blue line) and treated (continuous red line) samples for Nebbiolo cultivar.

In general thicker skins are characterized by a lower release of anthocyanin. But the advantage of the foliar treatment besides the increase of skin thickness, is the higher accumulation of anthocyanins in the skins, but without reducing their facility to be released during simulated maceration.

## IMPACT ON DEHYDRATION

During the 2018 vintage, the trials was carried out on Corvina treated with LalVigne™ Mature, where the grapes were postharvest dehydrated as commonly done for the production of Amarone wine. Corvina trials on fresh and withered grapes showed a significant increase in the berry skin thickness with the treatment (Figure 3). This parameter lead to a slower weight loss during the postharvest dehydration process; after 40 days the treated grapes with thicker skin loss just 14% of its initial weight, while the control loss the 25%.

Moreover the treatment induced as previously seen an increase on the anthocyanin and proanthocyanidins content in fresh and as well as in withered grapes.

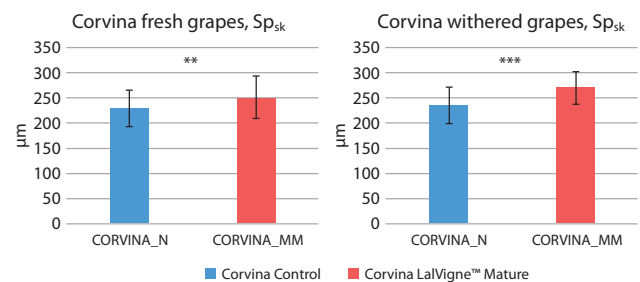


Figure 3. Berry skin thickness of Corvina grape variety for trials conducted in 2018 harvest

The unique composition of LalVigne products allows:

- To increase berry skin thickness
- Higher concentration of compounds located on berry skins, as skin tannins, anthocyanins and aroma precursors.
- Increased extractability of these compounds during the winemaking process
- Lower grape dehydration during last ripening stages, decreasing berry weight and yield loss. Consequently, higher yield and better balance grapes in warm climate conditions.
- Lower susceptibility to fungal diseases and better resistance to mechanical injuries.