Vineyard Solutions under investigation

Nº2

BERRY SKIN THICKNESS: A KEY FACTOR FOR GRAPEGROWERS AND WINEMAKERS

BERRY RIPENING AND SKIN THICKNESS

Skins play a fundamental role for the grape composition and wine quality along with the viticulture and winemaking processes, as they are a principal 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.

Skin and seed parameters are crucial for a complete grape ripening that cannot be described solely by the berry pulp chemical parameters. These polyphenol originating from skins and seeds may ripen differently when compared to pulp parameters and need to be extracted during the wine making process (the maceration stage).

FACTORS AFFECTING BERRY SKIN THICKNESS

The skin thickness is genetically-influenced, and therefore changes depend on grape variety and clone. Furthermore, the skin thickness can be related to environmental conditions: e.g. Nebbiolo berries with similar sugar content showed a generally thicker skin when grown at high altitude (Alpine region) compared to lower altitudes.

Different viticultural practices have been shown to also impact on berry skin thickness, and subsequently, natural tools are being developed for grape growers to achieve this. 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 been shown, under diverse conditions and in different grape varieties, to be a powerful tool to increase berry skin thickness.

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.

Trial were conducted 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, to increase it.

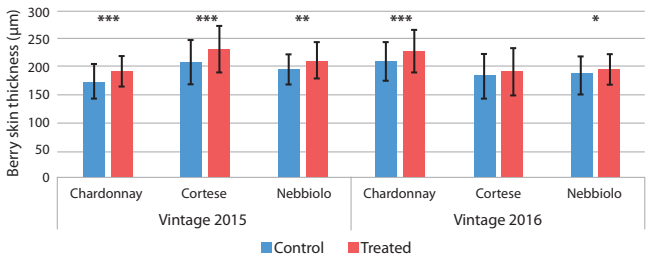

Figure 1. Influence of LalVigne treatment on berry skin thickness on vintage 2015 and 2016

For the red variety Nebbiolo, the extractability of 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.

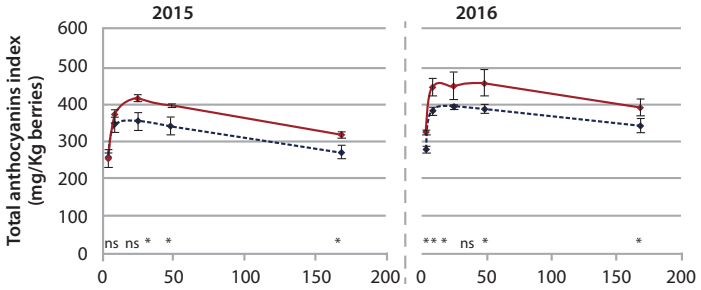

Figure 2. Extraction kinetics of phenolic compounds during skin maceration of control (dashed blue line) and treated (continuous red line) samples for Nebbiolo cultivar.

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

IMPACT ON DEHYDRATATION

During the 2018 vintage, trials were carried out on Corvina treated with LalVigne™ Mature, where grapes were postharvest dehydrated as commonly done in Amarone wine production. 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 was 14% of their initial weight, while the control loss was 25%.

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

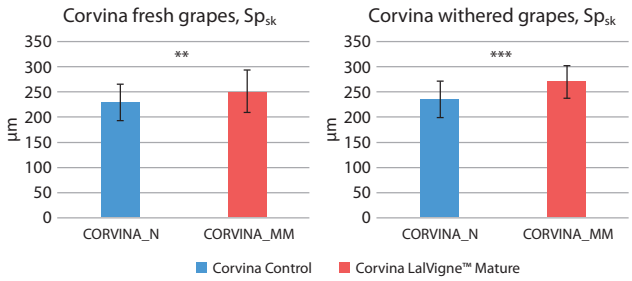

Figure 3. Berry skin thickness (Sp_{sk}) of Corvina grape variety for trials conducted in 2018 harvest

The unique composition of LalVigne products allows:

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