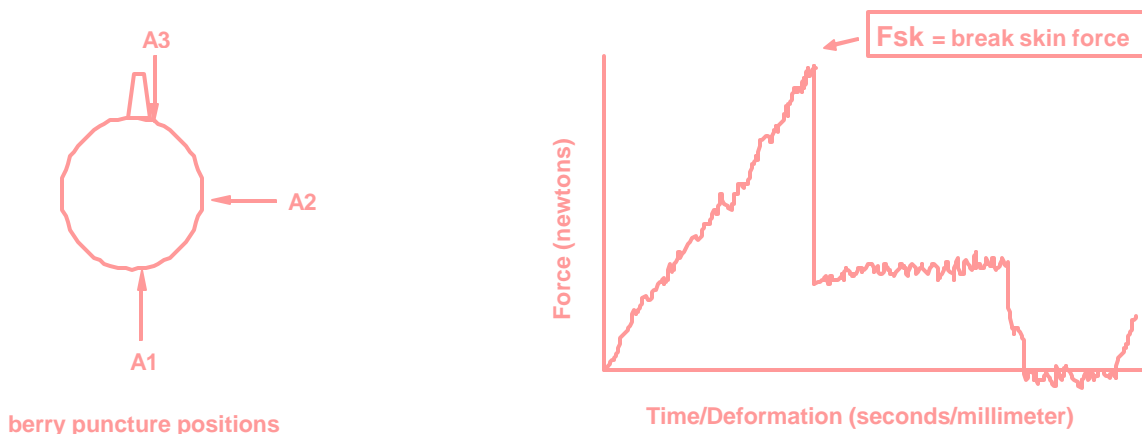


Anthocyanin extractability assessment of grape skins by texture analysis

By: L. Rolle, F. Torchio, G. Zeppa and V. Gerbi

In: International Journal of Vine and Wine Sciences . 42(3):157-162. 2008

- Researchers believe that the structural and chemical properties of the cell walls in the grape berry determine the resistance of berry skin to the release of anthocyanins. So could grape *texture* be used to get information about berry ripeness? The answer, according to some studies, is yes. But the current authors used a slightly different approach. Could berry *hardness* be used to get information about the dynamics of anthocyanin extraction during fermentation? They carried out this study in 2006 in Piedmont, Italy, to find out the answer.
- Using two types of grapes - the local varieties Brachetto and Nebbiolo - the authors first isolated berries with a predetermined sugar content (230 g/L, or 13.5 % potential alcohol) using density flotation. The next step was to use a texture analyzer to divide these “same-Brix” berries into two batches: **hard** and **soft**. The final step was to measure how readily these various batches of berries (Brachetto-soft, Brachetto-hard, Nebbiolo-soft, Nebbiolo-hard) released anthocyanins when placed in a “fake wine” or hydroalcoholic solution. To do this, they used spectrophotometric and HPLC analysis of the anthocyanins extracted at various time points (10, 20 and 30 minutes, and 1, 2, 4, 8, 12, and 24 hours). They also measured the amount of anthocyanins left in the spent skins, so they were able to calculate the anthocyanins extracted as a percentage of the total amount present in the berry.
- **Results:** For the same Brix levels, **hard berries presented a higher extractive capacity than soft berries** in both cultivars (71% versus 59% in Nebbiolo; 88% vs. 77% in Branchetto). That is, even though it seems counter-intuitive, the hardest skins showed the highest capacity to release anthocyanins.



- Discussion points:

- _ a parameter called “cell maturity index” already exists to assess anthocyanin extractability. However, cell maturity index provides information about “how quickly” anthocyanins can be extracted, not about “percentage of recovery”, like the current skin force method does;

- _ in an effort to reproduce the commercial situation, the authors used solutions with different alcohol concentrations for Brachetto (3%) and Nebbiolo grapes (12%) to test extractability. This is due to the fact that Brachetto in Piedmont is used for sweet sparkling wine production, rarely exceeding 7% alcohol;

- _ even though “break skin force” increased as the berry ripened, the authors noticed that, in Nebbiolo, there was a slight decrease in this parameter near “technological maturity” (or desired harvest sugar), that was followed by a renewed increase. The authors admit that, if this were to be confirmed in future vintages, this could pose a limitation to the use of texture as an indicator of ripeness.

- In conclusion, the grapes that required a higher “break skin force” to be ruptured (“hard berries”) produced extracts with a higher total anthocyanin content than those that required less force (“soft berries”). This mechanical parameter is quick and inexpensive to obtain, and it may be a tool to provide information about optimal harvest time. The authors hope to be able to develop a mathematical model which, by entering a “break skin force” value, could predict the “total extractable anthocyanins”.



A needle-probe texture analyzer

Author: Bibiana Guerra, Editors: Kay Bogart, Linda Bisson. This summary series funded by J. Lohr Vineyards & Wines.