



“The effect of pre- and post-ferment additions of grape derived tannin on Shiraz wine sensory properties and phenolic composition”

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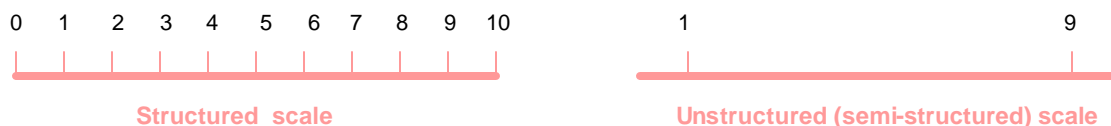
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These authors add enological tannin to a wine, either before or after alcoholic fermentation, and then study the impact on phenolic composition, color, and sensory properties.

- Tannins found in wine can be broadly classified into: 1) *hydrolysable tannins*, like those derived from oak, consisting of galloyl polymers esterified by glucose; and 2) *condensed tannins*, like those derived from grapes, consisting of polymers of flavanol subunits. Commercial tannins used for wine addition (enological tannins or enotannins) can include both types, but the ones in this study belong to the second group (condensed tannins).
- Suppliers of enological tannins report color enhancement, oxidative protection, masking of vegetative characters, mouth-feel improvement (blah, blah) if you use their products. Determining whether this is the case is the purpose of this study.
- The authors added 200 mg/l of grape seed-derived tannin (GseedEX) to 3 of 6 tanks (1100 L capacity) of crushed Syrah fruit (21.9-22.4 °Brix) (“*pre-fermentation addition*”). After alcoholic fermentation, wine from each of the remaining 3 untreated tanks was racked into 2 stainless steel drums (230 L). At this point, one drum in each pair received 200 mg/l of the same tannin preparation (“*post-fermentation addition*”), and the other drum received no addition (“*Control*”). Malolactic fermentation proceeded -in drums and the first 3 tanks-, followed by cold stabilization, filtration and bottling (no oak exposure). The authors took samples from drums and tanks daily during fermentation, and then at significant production points (completion of MLF, after cold stabilization, after bottling, at time of sensory analysis, and 2 years down the road), to analyze: 1) color intensity (A420+A520), 2) CIElab values, 3) malvidin-3-glucoside, and 4) tannins. [*I wish the authors would have moved the pre-fermentation treatment—not just the post-fermentation -from tanks to drums as well*].
- **Effect of tannin addition on color.** There was no effect on color (A420+A520 and CIElab values).
- **Effect of tannin addition on phenols.** 1) Surprisingly, there were no obvious analytical differences among treatments in terms of tannin, polymeric pigment, or anthocyanin concentrations, when the same time point was compared. (This is in agreement with the color spectral data). 2) When all time-point measurements were added up, tannin concentration was overall higher in the post-fermentation treatment than in the pre-fermentation or the control. 3) The way the experiment was set up (multiple time points) allowed the researchers the unique opportunity to observe the changes in phenolic profile with time: *Anthocyanin* concentration decreased gradually throughout the fermentation by about 25%, and an additional 40% from the end of fermentation to the end of the experiment (2 years later). *Tannins* increased throughout fermentation. *Polymeric pigments* doubled from the end of fermentation to the end

of the experiment. This is interpreted by the authors as an incorporation of anthocyanins into tannins, resulting in the formation of polymeric pigments.

• **Sensory evaluation.** A panel of 16 experienced judges generated a list of 10 attributes considered necessary to describe the in-mouth characteristics of the samples. After three subsequent practice sessions, the formal evaluation session took place. During this session, 15 different samples were rated for the intensity of 10 attributes, with triplicate presentations. Each session consisted of 6 samples, with a forced 3 min break between samples. Of the 10 attributes assessed, “viscosity”, “fruit flavor”, “coarseness”, and “fruit flavor persistence” were rated on an unstructured scale (with anchors at 10% and 90%), whereas for the remaining 6 attributes (“acidity”, “hotness”, “bitterness”, “drying”, “adhesive”, and “overall astringency”), the authors used a magnitude scale.



• **Effect of tannin addition on sensory characteristics.** 1) The judges found the pre-fermentation and post-fermentation addition treatments significantly higher in “overall astringency” than the control. The post- and pre-fermentation treatments did not differ from each other. 2) They also found differences in the attributes “dryness”, “adhesiveness” and “coarseness”. But a closer look showed that all of these attributes were highly correlated with each other and with “overall astringency”. 3) The judges could not find any differences among treatments for “acidity”, “bitterness” or “fruit” attributes.

• **4) Effect of different tannin concentrations and different types of tannin.** The authors explored the effect of using different GSeedEX tannin concentrations (50, 200, 500, and 1000 mg/l), as well as the effect of different tannins at the same concentration (VR Supra, Ferco tannin). They found that the wine with 1000 mg/l was rated highest in astringency by the panel. Similarly, the 500 mg/l wine was rated as more astringent than the wine with 200 mg/l. (The 50 mg/l wine was a bit of an anomaly, being rated the same as the 200 mg/l wine). As for the type of tannin, the astringency conferred by 200 mg/l of GSeedEX was rated the same as that conferred by the same quantity of VR Supra or Ferco tannin.

• Some food for thought from the authors:

_ Could visual color change with time? That no changes were observed in a 2 year period does not mean that this will be the case with extended storage. But for their style of wine, most commercial interest is in the first 12 months.

_ Could the fruit under study already have had sufficient tannin to react with anthocyanins, therefore the lack of effect? The authors prefer the explanation that the added tannin might have been lost during the winemaking process, rather than being incorporated into final products.

• In conclusion:

_ The only effect of added tannins was to increase astringency.

_ The authors recommend in-house trials before making commercial decisions on tannin products.

_ They acknowledge that more types of wines and more types of tannins need to be studied.

Not only was this paper extremely well-written, but the care the authors devoted to correctly splitting the crushed fruit into lots (check out chemical composition of individual lots on *Table 2*) is awe-inspiring.

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