Practical methods for tannin retention

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The tannin experience

1. What and Why
   Tannins in wine

2. Winemaking from 2018

3. Winemaking from 2019

4. Current work
Tannins: What and Why

- Secondary metabolites found in skin, seed, pulp, and stem tissue

- Can bind with salivary proteins, giving astringent mouthfeel
  - Smaller oligomers (<5) are bitter
  - Larger polymers = more astringency
    - Skin polymers up to 85
    - Seed polymers up to 12

- Copigmentation and antioxidant

Catechin, monomer

Condensed tannin
Tannin retention is still an issue

Improving tannin extraction and retention in hybrid red wines has been an industry want and need for years and still is.

- Poor extraction/retention when compared to vinifera reds

Current research theories:

- 1. Cell wall material
- 2. Protein

No practical solution has been identified
Can we improve native and exogenous tannin retention?
1. Exogenous tannin addition
   - Added 1400 mg/l of Enartis Tan UVA (350 mg/l condensed tannin)
   - Treatments included 8 different time points from must to 3 months post pressing

2. Blended must
   - Also known as Accentuated Cut Edges (ACE), developed in Tasmania
   - Very simply uses a hand blender to increase juice:skin surface area and increase extraction
   - Used a stick blender to blend at must and 24 hours to pressing
2018 Results: Exogenous tannin additions at 6 months post-press

Lower level for V. vinifera [tannin]
2018 Results: ACE treatment 6 months post-press

![Graph showing tannin levels in mg/l CE for different treatment conditions. The graph compares Control, ACE 24 hours to pressing, and ACE at crush treatments.](Image)

- Control: Treatment A
- ACE 24 hours to pressing: Treatment B
- ACE at crush: Treatment B

The graph indicates that ACE treatment reduces tannin levels compared to the control.
2019 Winemaking
2019 Chambourcin provided by Les Bourgeois Vineyards

1. ACE and exogenous tannin addition
   • Added 1400 mg/l of Enartis Tan UVA (350 mg/l condensed tannin)
   • Crush and 1-month post press additions
   • ACE at crush
   • Combination of ACE and tannin addition

2. Double tannin add
   • In collaboration with Les Bourgeois Vineyards and Oak Solutions Group
   • Added 400 mg/l of trū/tan F² (300 mg/l condensed tannin)
   • Crush and 4-months post press additions
   • Combined additions in one treatment for 2, 400 mg/l additions
2019 Results: ACE and Exogenous tannin addition

TANNIN CONTENT AT BOTTLING

Lower level for V. vinifera [tannin]

Control

ACE

Crush tannin +

ACE and Crush tannin +

1-month Post Press Tannin +

ACE and 1-month Post Press Tannin +
2019 Results: Double exogenous tannin additions

[Tannin] mg/l @ post tannin addition

- Control
- 400mg/l crush add
- 400mg/l 4 months post press add
- 400mg/l crush and 400mg/l 4 months post press adds
Early tannin additions have low impact on wine tannin content
Current work

• Wine Protein
  • What impact does protein have on tannin retention?
  • Method optimization for juice and wine protein extraction, quantification, and identification

• Using Syrah and Chambourcin to understand protein impact and extraction

• Fermentation size in relation to extraction
Correlation of wine protein and tannin content (2019)

\[ R^2 = 0.2041 \]
Thanks!

- Les Bourgeois Vineyards
- Oak Solutions Group
- Missouri Grape and wine Institute
- Missouri Wine and Grape Board
- Missouri Department of Agriculture
Results: Bentonite treatment 6 months post press

![Bar chart showing the comparison of tannin levels in mg/l CE between Bentonite treatment and Control. The chart indicates a P value of 0.066.](chart.png)
Quantification Results: [Protein] quantification

- Control: 50 mg/l BSAeq
- 4000 mg/l must: 100 mg/l BSAeq
- Blended at crush: 150 mg/l BSAeq
- Bentonite: 200 mg/l BSAeq

- **Juice [Protein]**
- **Post Press [Protein]**
Enzyme treatment

enzyme treatment/tannin adds

[tannin] mg/l

Control  Addition 1 week post pressing  Lallzyme at pressing, tannin add @ 1 week

A  B  B

0  50  100  150  200  250  300