



## Outline



- Overview of tannin and anthocyanin extraction
- A little history of Flash
- How does Flash Détente work?
- Flash Fermentations
- Quality Outcomes of Flash
- Research
  - Historical Data
  - Analytic Method
  - Bending Branch data
    - Polyphenols
    - Brix
- Vineyard impact
- Other uses for Flash
- Future Bending Branch Winery Research
- Samples of 2016 wines and Flash Water for tasting

## Tannins distribution in Red Grapes



- Skin: 20 -38%
- Seed: 55 – 80%
- Pulp: 7%
- Tannin binding to skin cell walls and in “phenolic vacuoles” and pulp causes typical extraction < 50%

## Why extract more anthocyanins and tannins?



To Enhance Wine:

- Longevity
- Color
- Structure
- Body
- Flavor

## Holy Grail of Red Wine Making



### Enhanced extraction

- Anthocyanins
- Tannins
- Varietal Fruit flavors

### “Golden Ratio”

- 4 tannins / 1 anthocyanin

## Tannins in Red Wines



- Range
  - 30 ppm to greater than 2,500ppm
  - Overall Average = 550ppm
  - Cabernet Sauvignon Average = 675 ppm
  - Pinot Noir = 350 ppm
  - Ave of 7 Cult Cabs = 883 ppm
    - Range (571 – 1150)

Source: Harbertson, J Fet. Al, 2008. “Variability of Tannin Concentration in Red Wines,” AJEV 59: 210 – 214.

## Dan Gatlin, Winemaker, Inwood Estates

### 04.24.17



*"In the fall of 1978, I was visiting Chateau Beaucastel during harvest where I happened upon (what I was told to be) the first Flash machine prototype. My contact there was Danny Haas, son of the famous wine importer, Robert Haas and Associates. Danny and one of his college buddies were there working harvest with the Perrin staff. We walked out of the building and into the crush pad where it was immediately obvious that something was way out of the ordinary.*

*The flash system they had conceived was certainly no "machine" as we would know it today. This was better described as a "shade-tree mechanic's" kind of contraption made up of strung-together parts...*

## Dan Gatlin, Winemaker, Inwood Estates

### 04.24.17



*"...Their concept was to flash heat the must out of the destemmer as it flowed through a 4" pipe to 160F degrees. It was then pumped vertically to the edge of the roofline outdoors, where it trickled down in a "Z" shaped system of jacketed stainless piping over about 4 hours. By the time it got back to ground level, it was 60F degrees as it flowed into the tanks.*

*Anecdotal, also on this day, Danny was pitching an idea to the Perrin family. He wanted to start a vineyard/winery project using their expertise to produce Rhone varietals in California. I guess it was a good idea, years later it became Tablas Creek."*

## Flash Détente used in Europe for many years



- Flash Detent used in Europe for many years, including in Bordeaux and Rhone
- Chateau Beaucastel (sourced from website)

### Vinification

- “The skins of the grapes are heated briefly to 176°F and then cooled to 60°F...”
- Now in the U.S. since 2009 and is used by many leading California producers

## Flash Détente



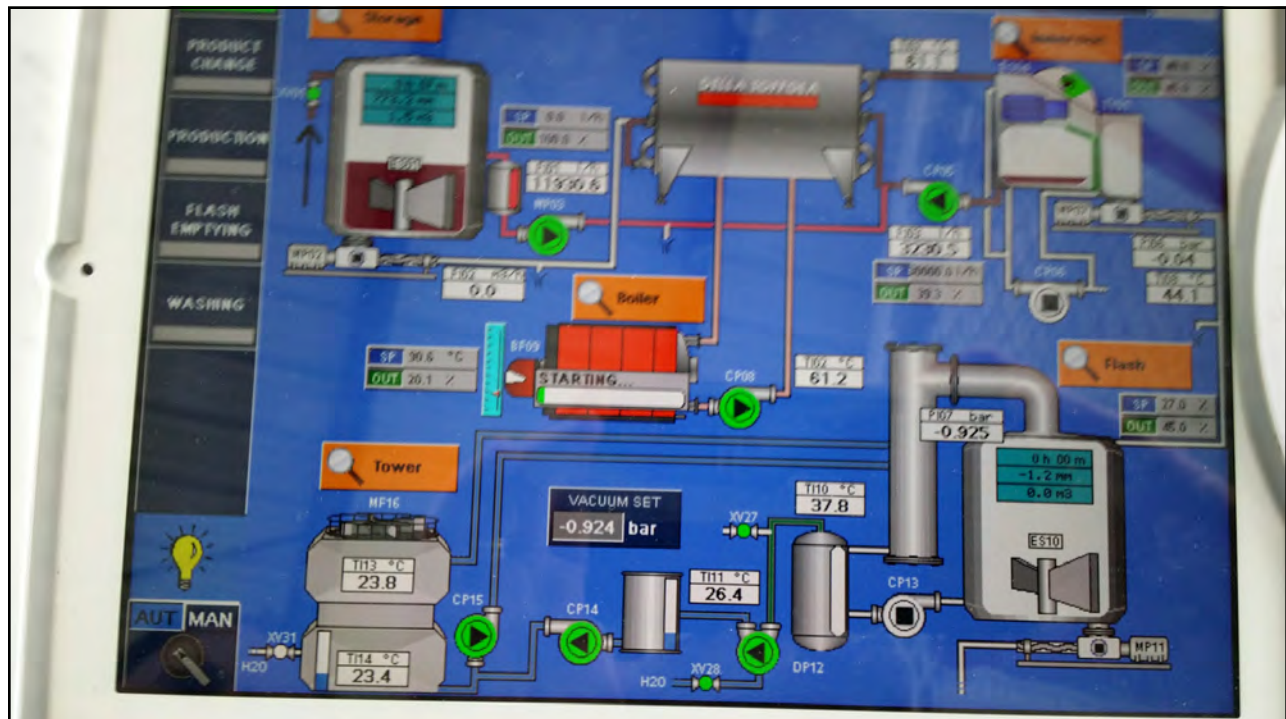
- “Instant Release”
- Rapid heating over 2 – 5 minutes to 185°F
- Followed by vacuum chamber cooling (90°F)
- Skin cells and vacuoles rupture releasing anthocyanins and tannins
- Seed tannins are not extracted
- High color, high nutrient must is produced for fermentation
- “Air-oir” removed and concentrated in Flash Water

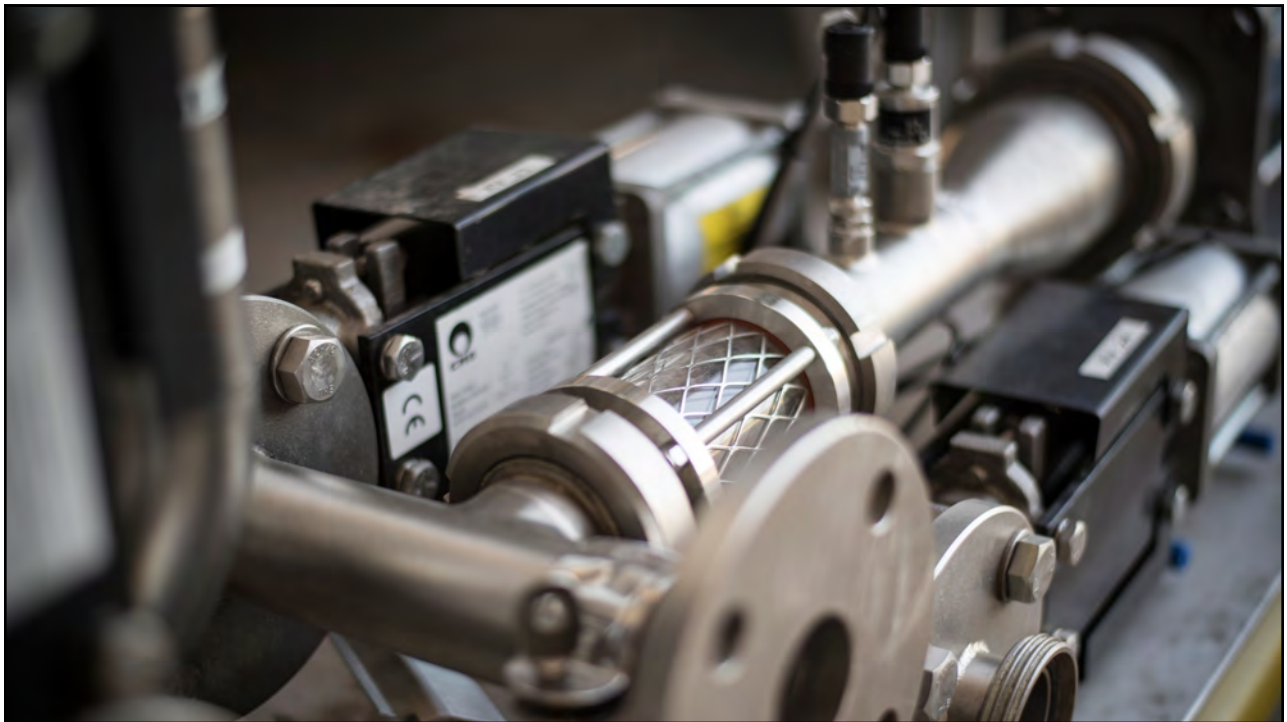


Source: Bending Branch Flash Détente unit



# Flash Team









## Flash Fermentations



- Decreased fermentation time
- Little or no need for nutrient additives
- Supplements needed to fix the color – we use the Enartis protocol for flash
- Optional approaches to fermentation
  - “Liquid Phase” in tank after pressing must
  - Tank fermentation with skins and seeds
  - Barrel fermentation
  - Bin fermentation with 100% flash must or co-fermented with non-flashed fruit



## Quality Outcomes of Flash



- Increased anthocyanin extraction
- Increased tannin extraction
- Basic elimination of Methoxy-Pyrazines and other unwanted flavors in Flash Water
- Elimination of yeast, Acetobacter, Brettanomyces, and Laccase in must
- Increase Brix % (0.8 to 5.5)
- Increased fruit expression (varietal and “amylic” flavors)
- Can help save fruit in years with moderate rot
- Can help deal with under-ripened fruit
- Increased nutrient extraction (YAN)

## Pyrazine Removal IBMP



<u>Cultivar</u>	<u>Grape</u> (ng/kg)	<u>Flash Water</u> (ppb)	<u>Flash Juice</u> (ppb)	<u>Wine</u> (ppb)
Merlot (Central Coast)	7.0	77.1	<1.0	<1.0 liquid 2.3 on-skins 7.8 control
Cabernet (Central Coast)	19.2	112.4	<1.0	----
Cabernet (Lodi)	18.4	100.1	<1.0	----

Rick Jones and Barry Gnekow, Napa Wine Technical Group, Feb. 23, 2011  
Flash Détente: Implications for Luxury Winemaking



## Research measurements

- Total Tannin – all tannins
- Total Phenolics – tannins + color compounds
- Total Pigments – free anthocyanins + pigmented tannins
- Free Anthocyanins – short term color
- Pigmented Tannins – polymeric pigments – long-term color



## Early Flash Results

- 1995 Experimental results after 6 day vinification
- Compared to controls:

	<u>Anthocyanins</u>	<u>Tannins</u>
• Grenach (Rhône)	↑ 26%	↑ 20%
• Syrah (Rhône)	↑ 30%	↑ 22%

## Tannin Analysis of Flash and Control Wines

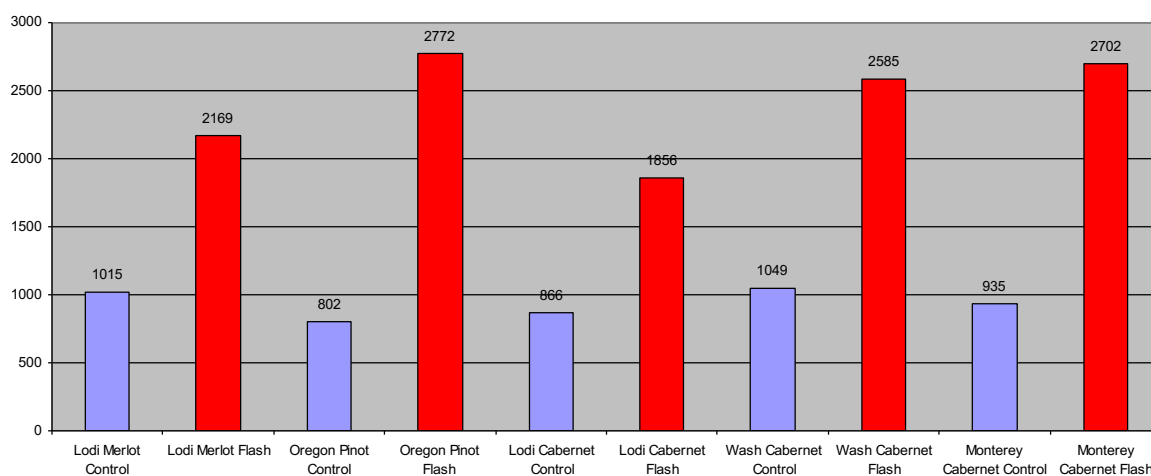


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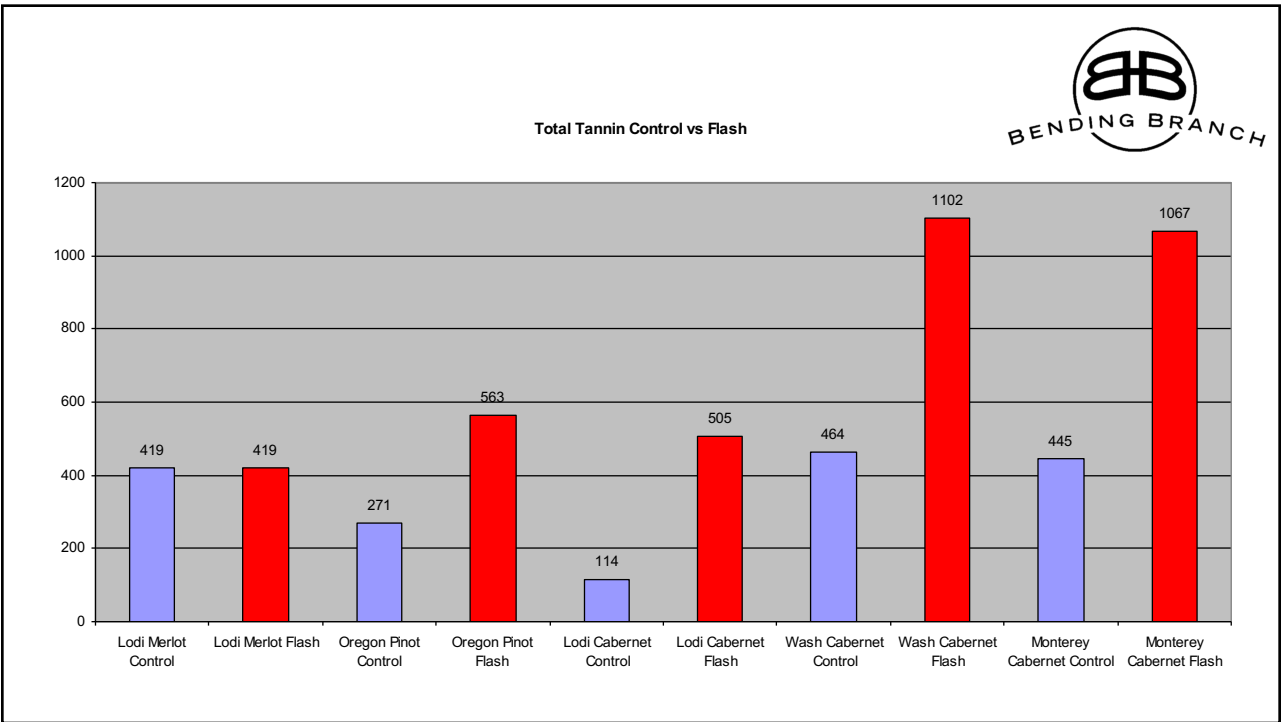
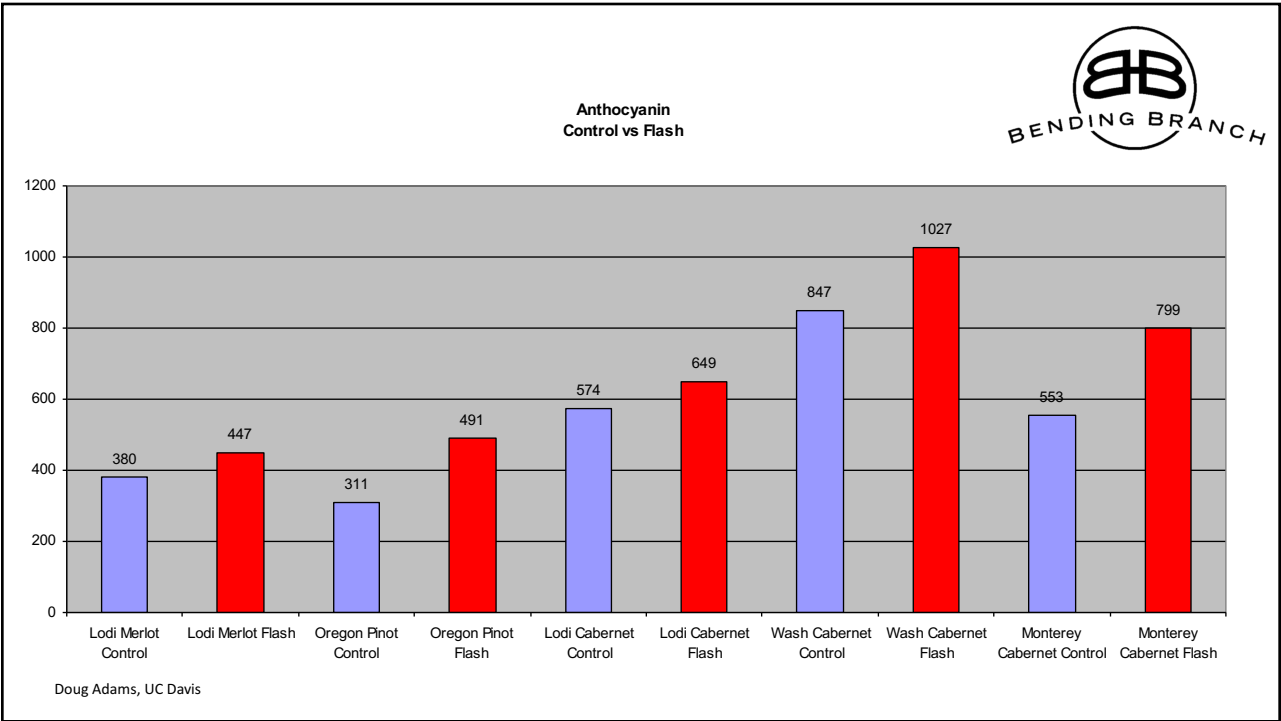
Sample ID	Tannin (mg/L CE)	Iron Reactive Phenolics (mg/L CE)	Anthocyanin (mg/L M-3-g)
Lodi Merlot Control	419	1015	380
Lodi Merlot Flash	419	2169	447
Oregon Pinot Control	271	802	311
Oregon Pinot Flash	563	2772	491
Lodi Cabernet Control	114	866	574
Lodi Cabernet Flash	505	1856	649
Wash Cabernet Control	464	1049	847
Wash Cabernet Flash	1102	2585	1027
Monterey Cabernet Control	445	935	553
Monterey Cabernet Flash	1067	2702	799

Doug Adams, UC Davis

Iron Reactive Phenolics  
Control vs Flash



Doug Adams, UC Davis

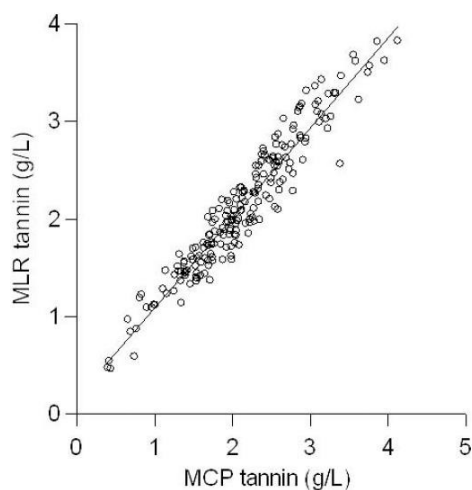




The AWRI WineCloud

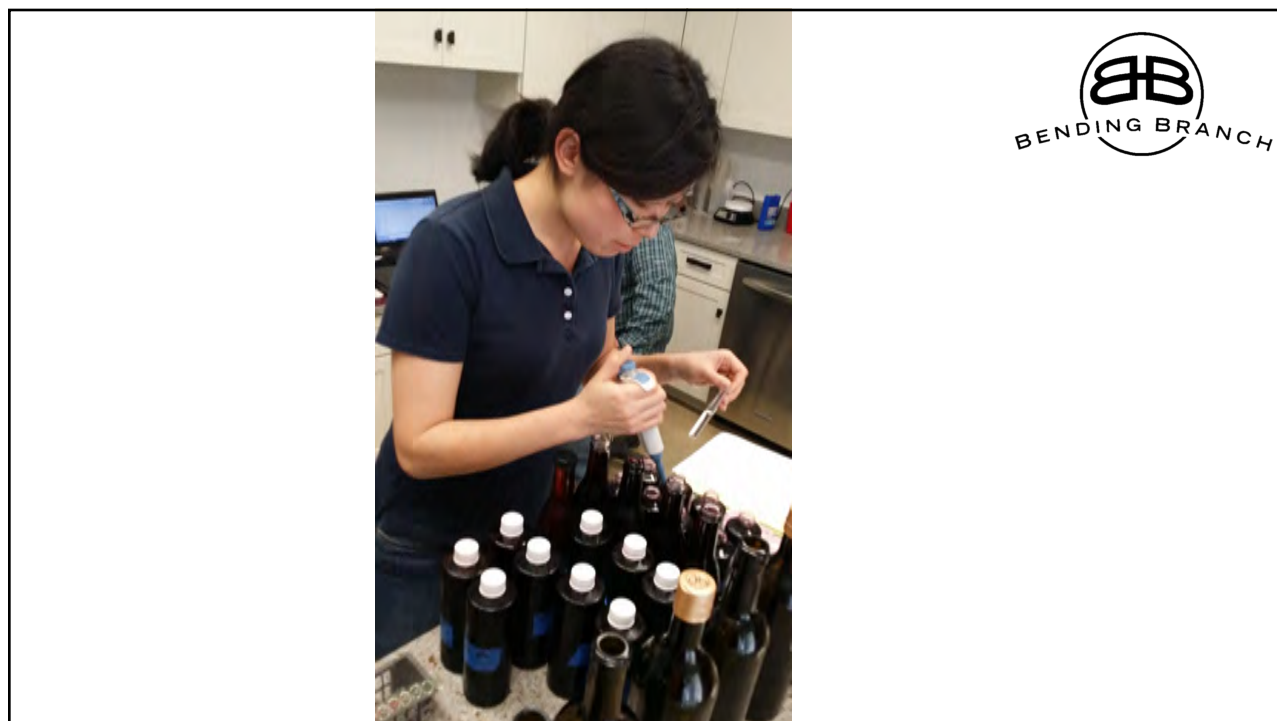


## Wine tannin calibration



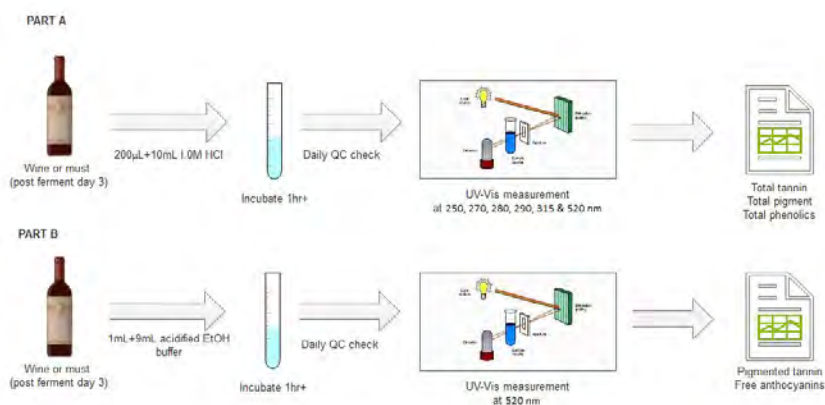
Damberg, R.G., Mercurio, M.D., Kassara, S., Cozzolino, D., Smith, P.A. Rapid measurement of methyl cellulose precipitable tannins using ultraviolet spectroscopy with chemometrics – application to red wine and inter-laboratory calibration transfer. *Appl. Spectrosc.* 66 (6): 656-664; 2012.

Source: The Australian Wine Research Institute



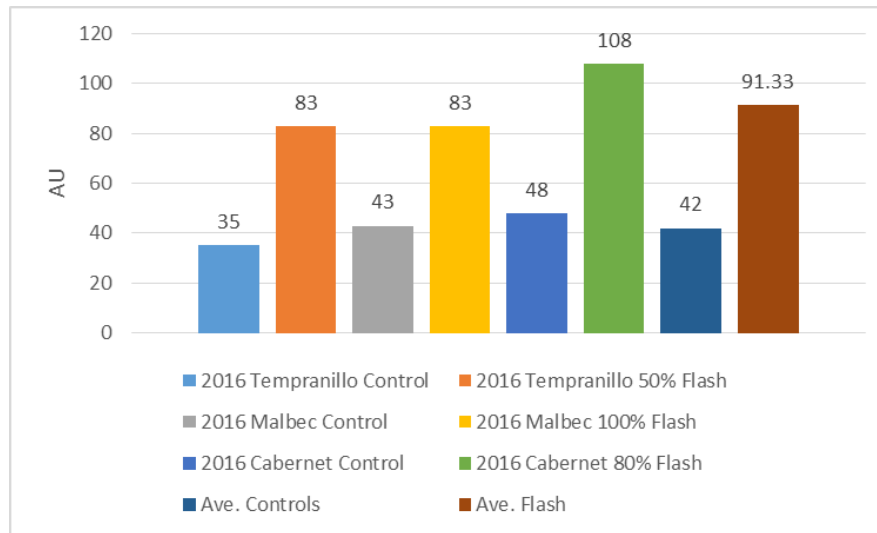
## Wine analysis method

### Wine total tannin

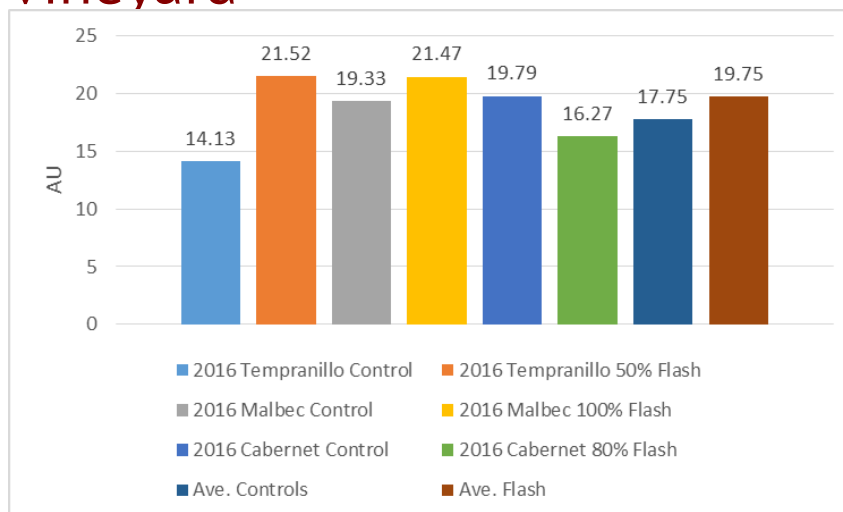


Source: The Australian Wine Research Institute

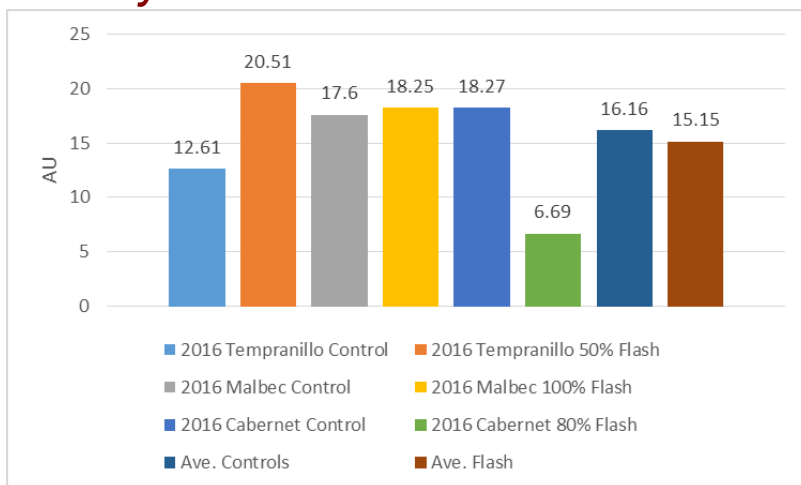
## Total Phenolics – Newsom Vineyard



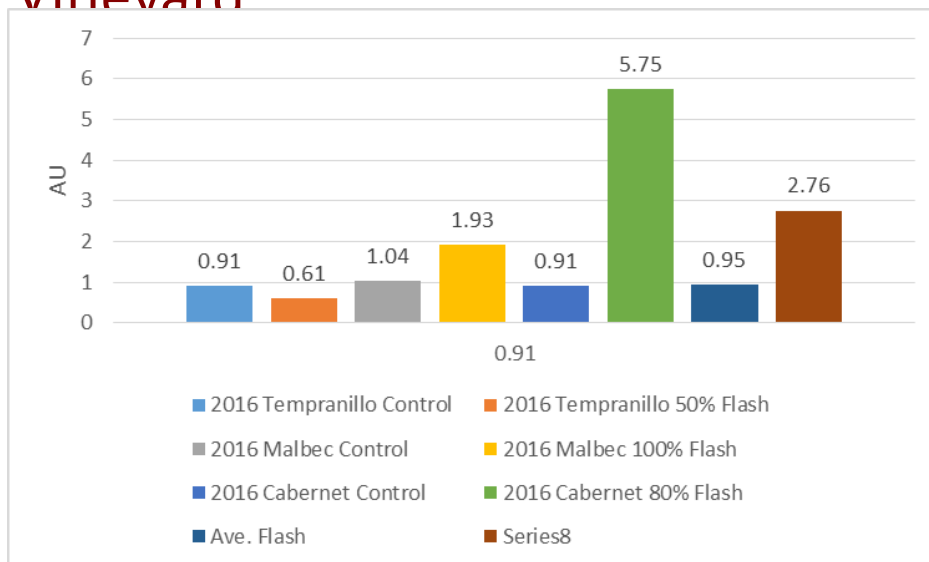
## Total Pigments – Newsom Vineyard



## Anthocyanins– Newsom Vineyard

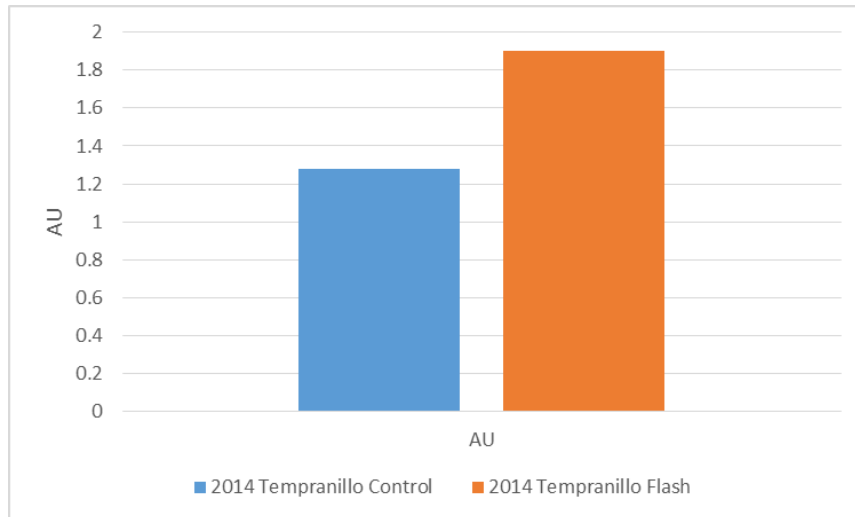


## Pigmented Tannins– Newsom Vineyard

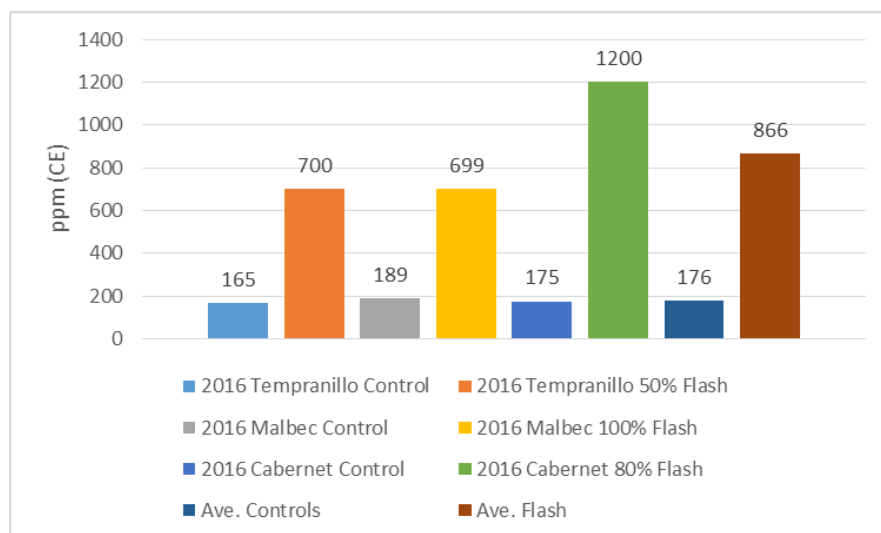




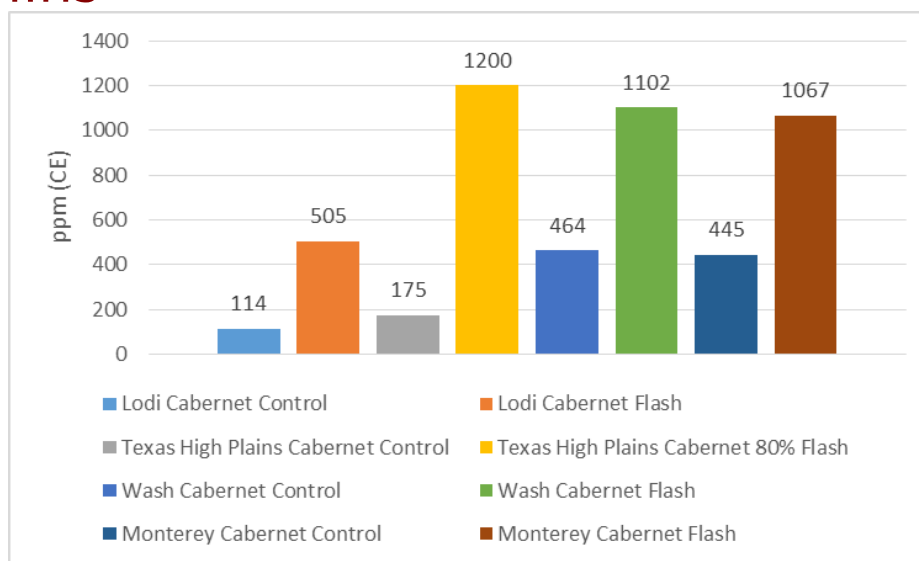
## Pigmented Tannins #2– Newsom Vineyard



## Total Tannins– Newsom Vineyard



## Cabernet Comparisons – Total Tannins



## Top Phenolics Extracted (40 samples)



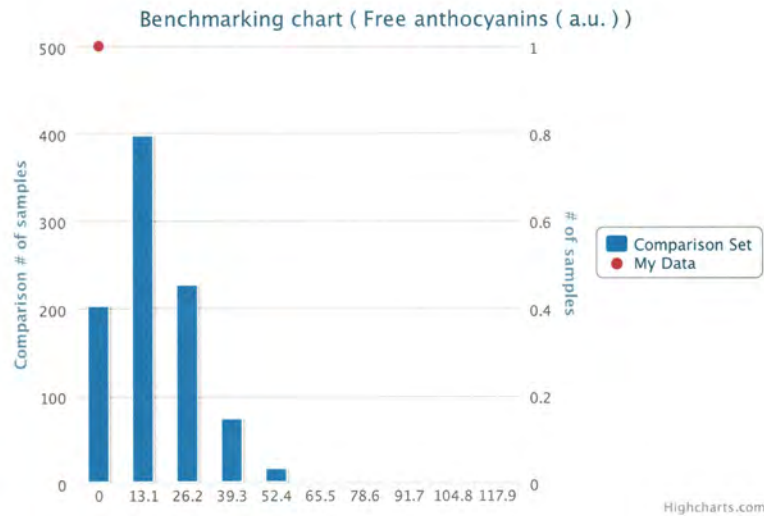
### #1 2016 Reddy Tannat Flash (100%)

<u>Total Tannin</u>	<u>Total Pigment</u>	<u>Total Phenolics</u>
1199 ppm	35.8 AU	114.04 AU

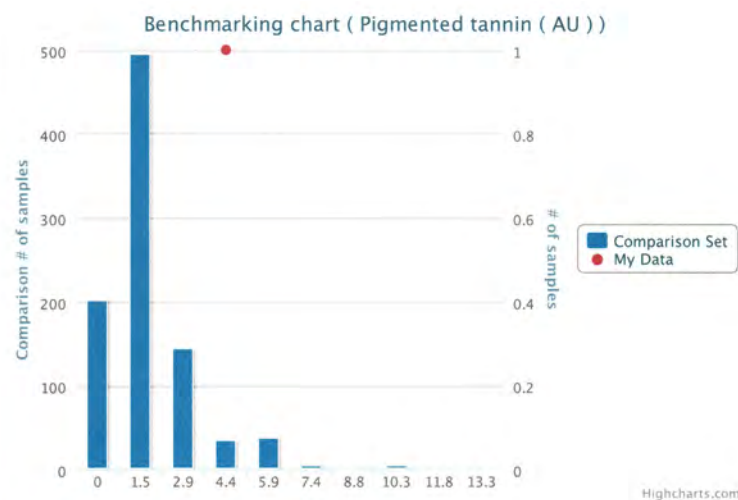
### #2 2016 Newsom Cabernet Flash (80%)

<u>Total Tannin</u>	<u>Total Pigment</u>	<u>Total Phenolics</u>
1199 ppm	16.27 AU	108.32 AU

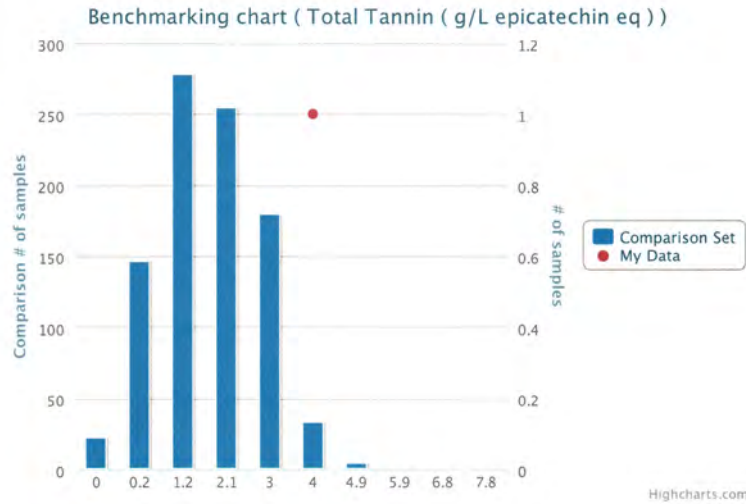
## 2016 Newsom Cabernet Sauvignon – Flash / All 2016 Napa Cabs



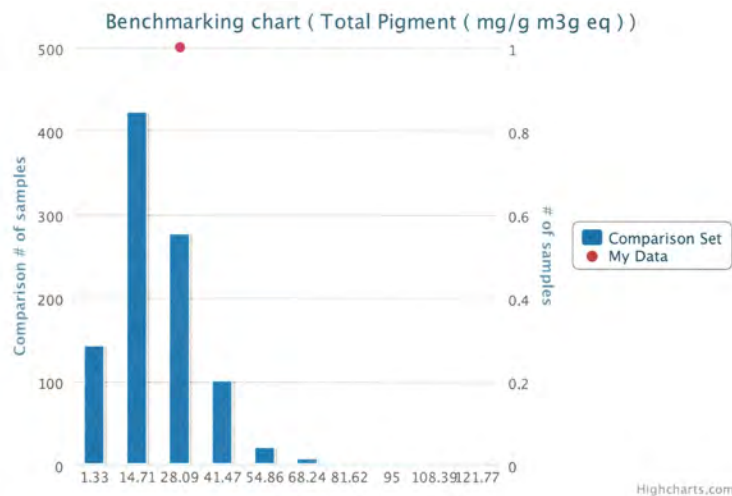
## 2016 Newsom Cabernet Sauvignon – All 2016 Napa Cabs Flash



## 2016 Newsom Cabernet Sauvignon Flash – All 2016 Napa Cabs & Reddy Tannat Flash



## 2016 Reddy Tannat Flash – All 2016 Napa Cabs





## 2016 Brix Increase with Flash at Bending Branch Winery



- 7 varietals
- Range of increase 0.8% to 5.5%
- Average Increase = 10% or 2.2% Brix

## Impact for Vineyards



- Flash extraction can produce a “greater expression of place” (i.e. more of the grapes contents are available for winemaking)
- Negative components of “air-oir” may be removed (e.g. mold, smoke, petroleum, barnyard, etc.)
- Translate less than optimal crops into better wines
  - Low Brix and low maturity
  - Over-cropped conditions
  - Moderate infection (rot)
  - Excessive vegetation
- Potentially expand the life span of a vineyard due to enhanced extraction
- Produce better wines from varietals not well matched to TEXAS climate, e.g.
  - Pinot Noir
  - Zinfandel

## Other Potential Uses for Flash



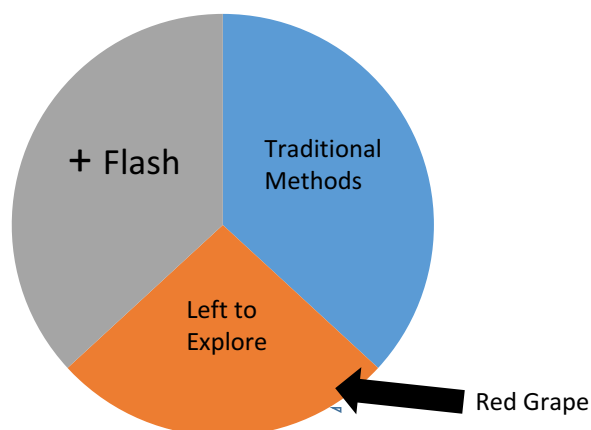
- Will the foxy flavor of Black Spanish come out in Flash water and make “really Black Spanish”
- Can Blanc du Bois be improved by Flash? Foxy removal?
- Could other hybrids grown in Texas be helped by Flash

## Next Experiment for Bending Branch



- Use cryo-maceration followed by Flash

## Let's get more Texas Terroir out of Texas grapes!



## With Special Thanks to:

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**Rick Jones**

Flash Wine Consultant

Della Toffola

**Alison Young**

Bending Branch Winery