

# Custom Barrel Profiling

## Changing Toasting Profiles to Customize Barrels for Rodney Strong Vineyards' Pinot Noir Program

*Rodney Strong Vineyards*



**World Cooperage**

## OBJECTIVE

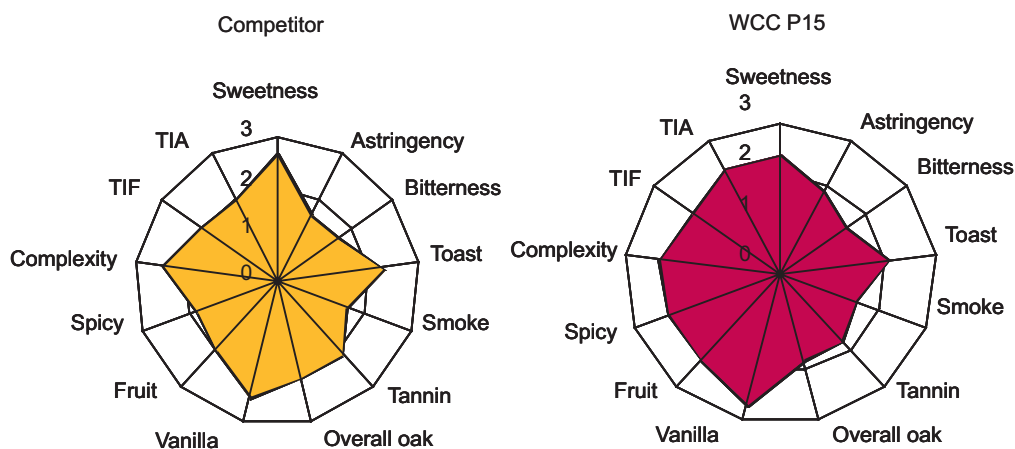
The objective is to compare new, custom profiles and commercial profiles and to create a special toasting profile for Rodney Strong Pinot noir wines.

## SYNOPSIS

This experiment includes six barrel profiles. One was the competitor's barrel product and another was a World Cooperage special profile created for Rodney Strong Pinot noir. The others were existing World Cooperage barrels, including one special profile that had recently been created for another program.

Rodney Strong winemakers like the attributes of a competitor's barrel in their Pinot noir program. This experiment could have been one of emulating the competitor's barrel; it was not, it went one stage further. Figure 1 shows a sensory profile of the competitor's barrel as it presents itself when used for the Rodney Strong Pinot noir and it also shows a slightly different profile. This was the sensory description of the winemaker's preferred barrel. It is slightly different from the competitor's barrel in that it imparts a little more spice, a little more vanillin, less tannin, and a little less toastiness.

*Figure 1. Sensory diagrams of the competitor's barrel and preferred barrel for inclusion in the Rodney Strong Pinot noir program*



## THE WINE

Producer: Rodney Strong Vineyards  
Year: 2003  
Variety: Pinot noir  
Vineyard: Janes Vineyard  
Crush Date: September 17, 2003

### *Harvest Data*

TA: 0.741 g/100 mL tartaric acid  
Brix: 26.5  
pH: 3.36  
Prior to fermenting added: Approximately 30 ppm SO<sub>2</sub> as Potassium Metabisulfite, 1oz/ton Color Pro enzyme  
Days of fermentation: 7  
Fermented with: RC 212 yeast  
During fermentation added: 2 lbs. Superfood, 3 lbs. DAP and 8.345 lbs. tartaric acid/1000 gal  
End of fermentation added: n/a  
Barrel Preparation: 5-to-10 gal. Cold water to rinse. Stand on each head for 4-5 hours.  
Drain and rinse with hot water for 1 min.

### *Wine Analysis as of March 31, 2004*

Alcohol: 14.26% volume  
TA: 0.57 g/100 mL tartaric acid  
Volatile Acidity: 0.040 g/100mL acetic acid  
Free Sulfur Dioxide: 21 mg/L SO<sub>2</sub>  
Total Sulfur Dioxide: 43 mg/L SO<sub>2</sub>  
pH: 3.53  
Residual Sugar: 0.03

### **OAK DATA**

Source: French oak  
Wood Age: 24 months  
Toast Level: Heavy  
Bending Technique: Fire  
Size: 65 gallons

## TRIAL EXECUTION

Sample Size: 4 barrel replicates of each variable

Oak Contact Time: 6 months and 7 days

First Fill: October 20, 2003

Bottling Date: April 27, 2004

## THE TRIAL

WCC P3

WCC P15

Competitor's barrel

T.W. Boswell Legacy with Hickory toast

T.W. Boswell Legacy

T.W. Boswell Côte d'Or

## RESULTS AND DISCUSSION

### *Sensory Analysis*

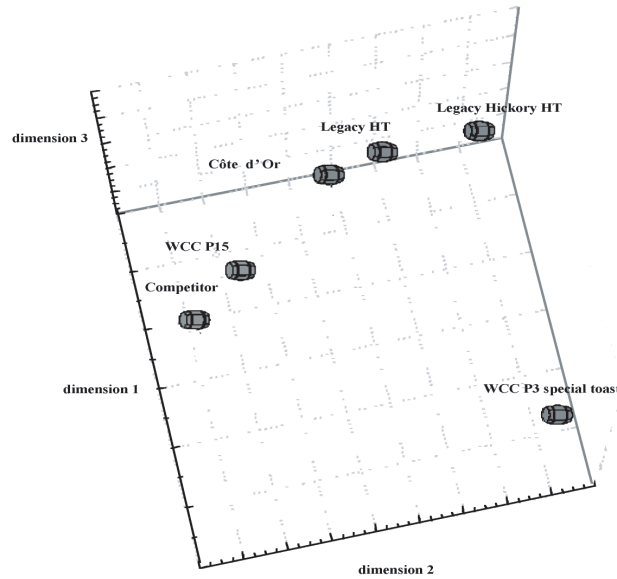
Table 1 shows the analysis of wines from these barrels. Results are in mgL<sup>-1</sup> (parts per million) in the wine on an 'as-is' basis.

**Table 1: Analysis of 26 extractives in the Rodney Strong Pinot noir (in parts per million)**

Compound	Legacy Hickory HT	Legacy	Côte d'Or	WCC P3	WCC P15	Competitor
Tannin breakdown						
Gallic acid	22.21	22.00	22.20	19.34	21.82	21.57
Ellagic acid	93.09	83.47	74.46	67.50	81.03	78.91
Hemicellulose caramelization						
HMF	0.73	0.56	0.54	0.85	0.51	0.48
5-Methyl furfural	0.16	0.14	0.12	0.10	0.10	0.13
Furfural	1.99	2.31	2.29	1.54	1.66	2.53
Wine phenolics						
Protocatechuic acid	3.34	3.02	3.33	2.64	2.83	2.52
Catechin	247.05	256.79	263.89	208.16	256.76	259.75
Epicatechin	24.35	26.23	26.35	22.05	25.54	26.47
Chlorogenic acid	0.14	0.15	0.25	0.16	0.27	0.27
Caffeic acid	11.04	11.17	11.00	10.12	10.85	11.22
Myricetin	0.88	1.16	1.21	1.19	1.33	1.31
Quercetin	12.21	13.21	12.77	11.18	11.03	9.81
Lignin degradation						
Vanillic acid	0.63	0.62	0.62	0.53	0.62	0.61
Syringic acid	3.26	3.06	3.00	2.00	2.27	2.02
Vanillin	1.57	1.57	1.20	1.13	1.21	1.11
Syringaldehyde	8.02	8.15	8.77	7.35	8.54	8.17
Coniferaldehyde	5.43	5.45	5.18	4.64	4.83	6.00
Sinapaldehyde	0.10	0.06	0.06	0.05	0.01	1E-36
Smoke phenols						
Phenol	1E-36	0.01	0.01	1E-36	0.02	1E-36
Guaiacol	0.05	0.07	1E-36	0.01	0.05	0.04
o-Cresol	1E-36	1E-36	1E-36	0.03	0.01	1E-36
4-methyl guaiacol	0.04	0.19	0.14	0.36	0.39	0.44
4-ethyl phenol	0.02	0.01	0.01	0.02	0.21	0.04
4-ethyl guaiacol	0.19	0.06	0.09	0.07	0.24	0.03
Oak lactones						
Trans-lactone	0.072	0.149	0.028	0.03	0.01	0.006
Cis-lactone	0.12	0.175	0.143	0.053	0.079	0.005

Figure 2 shows a 3-D overview of the data evaluation.

Figure 2. Overview (principal components analysis) of the analysis of the six Pinot noir wines



Inspection of Figure 2 shows that the competitor's barrel and the new special toast barrel (code name WCC P15) are quite separate from the other barrels and close to each other. Figures 3 to 6 illustrate the vanillin, toastiness, spice (4-methyl guaiacol), and ellagic acid levels.

Figure 3. Vanillin in the Pinot noir wines from the various barrels (in parts per million)

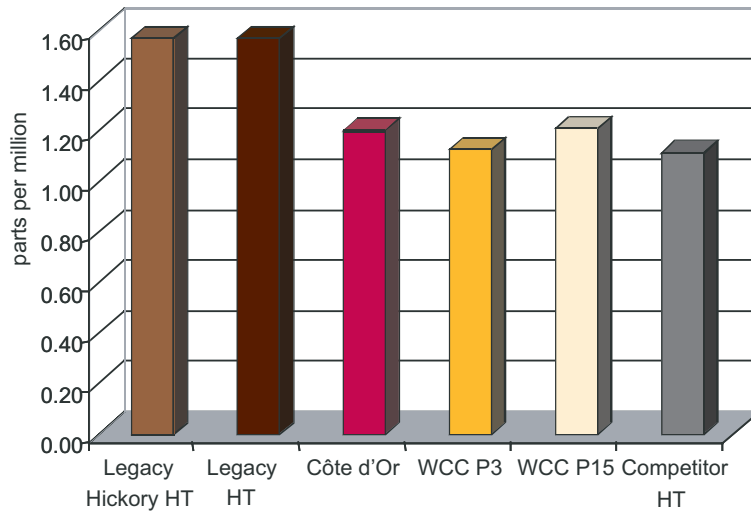
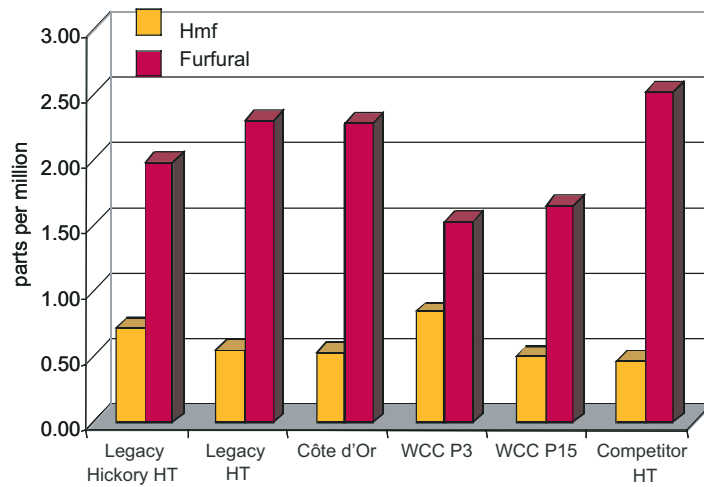


Figure 3 shows that the new special toast imparted a little more vanillin to the wine than the competitor's barrel, although both were lower than the Legacy barrels.

In Figure 4 the desired small reduction in toastiness is shown.

Figure 4. Hmf and furfural in the Pinot noir wines from the various barrels (in parts per million)



The levels of 4-methyl guaiacol (spice) are shown in Figure 5.

Figure 5. 4-methyl furfural in the Pinot noir wines from the various barrels (in parts per million)

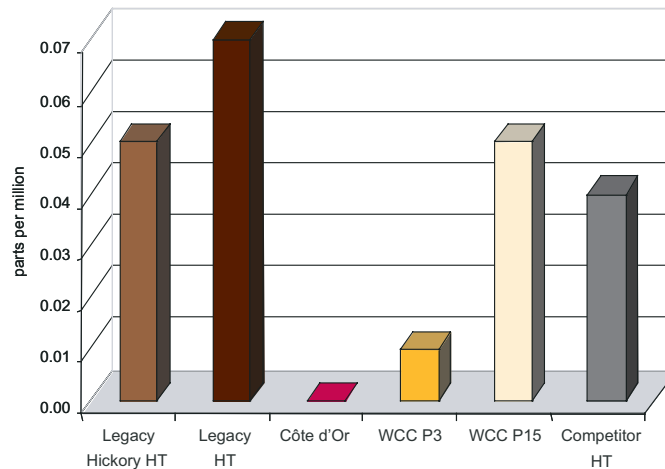
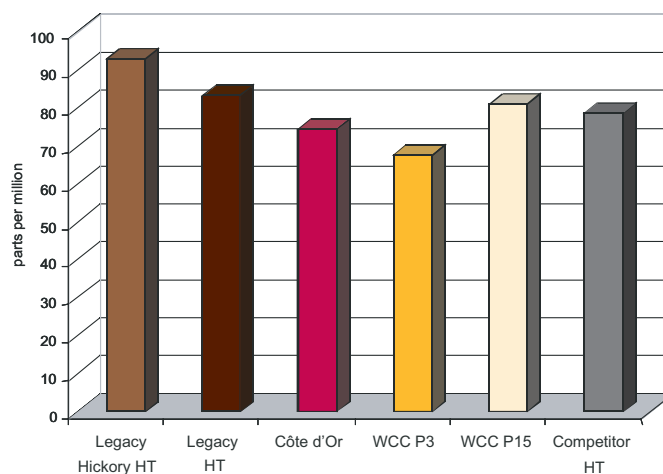


Figure 6 shows a slightly elevated level of ellagic acid, indicating a little more tannin breakdown in the special toast barrel. However, this conclusion requires a similar amount of tannin in the oak used by World Cooperage as in the competitor's stave wood.

Figure 6. Ellagic acid in the Pinot noir wines from the various barrels (in parts per million)



## CONCLUSIONS

These results suggest that the ‘dream’ profile had been realized in this new special toast. Table 2 shows the extent of the difference in the key compounds between the competitor’s barrel and special toast WCC P15 barrels.

**Table 2: Summary of the differences between WCC P15 and competitor’s barrel.**

	WCC P15	Competitor	% Deviation from Competitor
HMF	0.51	0.48	0.03
Furfural	1.66	2.53	-0.87
Ellagic acid	81.03	78.91	2.12
5-Methyl furfural	0.10	0.13	-0.03
Vanillin	1.21	1.11	0.10
Syringaldehyde	8.54	8.17	0.37
Guaiacol	0.05	0.04	0.01
4-methyl guaiacol	0.39	0.44	-0.05
Cis-lactone	0.079	0.005	0.074



## TASTING RESULTS

	Preferences		Total
	%	Count	
<b>1st Choice</b>			
Competitor's Barrel	16%	12	77
World Cooperage P3	17%	13	77
World Cooperage P15	21%	16	77
T.W. Boswell Côte d'Or	14%	11	77
T.W. Boswell Legacy	16%	12	77
T.W. Boswell Legacy Hickory	17%	13	77
<b>2nd Choice</b>			
Competitor's Barrel	14%	11	80
World Cooperage P3	19%	15	80
World Cooperage P15	18%	14	80
T.W. Boswell Côte d'Or	19%	15	80
T.W. Boswell Legacy	13%	10	80
T.W. Boswell Legacy Hickory	19%	15	80
<b>Last Choice</b>			
Competitor's Barrel	20%	16	80
World Cooperage P3	16%	13	80
World Cooperage P15	10%	8	80
T.W. Boswell Côte d'Or	19%	15	80
T.W. Boswell Legacy	16%	13	80
T.W. Boswell Legacy Hickory	19%	15	80