Grape and Wine Tannins

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Defining Wine Quality

• According to The Institute of Masters of Wine
  — High quality wines have:
  • Balance
  • Length
  • Intensity
  • Complexity
  • Integration
  • No faults

Robert Parker: 100 Points
Anticipated maturity: 2015-2050.
Price: US $4100-4500/bottle
### Sensory Properties of Tannins

<table>
<thead>
<tr>
<th>Descriptors used to Describe Tannins</th>
<th>Known Sensory Properties:</th>
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</thead>
<tbody>
<tr>
<td>Coarse</td>
<td>Bitter</td>
</tr>
<tr>
<td>Massive</td>
<td>Astringent</td>
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<tr>
<td>Sweet</td>
<td></td>
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<tr>
<td>Harsh</td>
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<tr>
<td>Unripe</td>
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<tr>
<td>Chewy</td>
<td></td>
</tr>
<tr>
<td>Coarse</td>
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<tr>
<td>Ripe</td>
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<tr>
<td>Velvety</td>
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<tr>
<td>Gripply</td>
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<tr>
<td>Silky</td>
<td></td>
</tr>
<tr>
<td>Dusty</td>
<td></td>
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<tr>
<td>Fine-grained</td>
<td></td>
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<tr>
<td>Hard</td>
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<tr>
<td>Fleshy</td>
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<tr>
<td>Soft</td>
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<tr>
<td>Chalky</td>
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<tr>
<td>Chalky</td>
<td></td>
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<tr>
<td>Round</td>
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</tbody>
</table>
Tannin Chemistry

Skin vs. Seed
- Size
  - Seed < skin
- Composition
  - Skin
    - Contains prodelphinidins
  - Seed
    - More ECG

Wine
- Differential extraction

Perception of tannin influenced by many wine components

Tannin Perception in Red Wine
Perception of tannin influenced by many wine components

- Tannin Concentration
- Composition
- Distribution

- Colloid State
- Direct Oxidation
- Glycerol
- Anthocyanin
- Oxidation Products
- Manno-protein
- Residual Sugar

Perceived Tannin
Managing Tannin Quality

Some tannin descriptors suggest that the vineyard has a role in determining tannin quality.
Berry Development

Australian Viticulture from text: “Ripening berries – a critical issue” by Dr. Bryan Coombe and Tony Clancy (Editor, Australian Viticulture), March/April 2001. Illustration by Jordan Koutroumanidis and provided by Don Neel Practical Winery and Vineyard

Inputs Responsible for Wine Quality

Jackson and Lombard, 1993
Influences on Phenolic Development in the Vineyard

- High phenolics
  - High sun exposure
  - Lower levels N
  - Low soil moisture
  - Moderate canopy size
  - Moderate crop load
  - Low soil fertility
  - Small berry size

Jackson and Lombard, 1993

Case Study

Clone/rootstock: DJN 777 / Riparia gloire
Spacing: 3.5 X 6 ft.
Age: 7 years at time of study (planted 1996)

2003 Arcus Estate
Wine Spectator
95 Deep garnet in color intense blackberry, violets and vanilla. An explosion of red and black fruits enveloped in succulent, chewy tannins.
Study Area

Images courtesy of: Mike Halbleib and Gregory Jones

Skin Tannins and Vine Vigor

Low

$39
$75

High

Med
Skin Tannins and Vine Vigor

Cortell et al., J. Agric. Food Chem., 2005
Soil depth (inches)

Andy Gallagher, Red Hills Soils, maps by Mike Halblieb

Calculated water holding capacity (inches)

Tannin and Wine Quality

- Allocation determined by winemaking staff
- Wines analyzed for chemistry related to mouthfeel
- Is there a relationship between tannin chemistry and wine allocation?
- Can you predict wine allocation in the vineyard?

Kassara et al., J Ag Food Chem, In Review

Is there a relationship between tannin chemistry and wine allocation?
Tannin Interaction With Protein

ΔH (kJ/mol)

Molecular Weight

Increasing Association

Aged Wine Tannins
Young Wine Tannins
CR Grape Tannins
PV Grape Tannins

McRae et al., J Ag Food Chem, 2010

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  - Dan Malcolm

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