DESIGNING OAK AROMA PROFILE OF DISTILLED BEVERAGES

Enartis Vinquiry
Eglantine Chauffour, technical winemaker
ADI, Louisville, April 15
DRIVE YOUR DISTILLATE TO YOUR FINAL DESTINATION

DISTILLATE

TARGET PRODUCT

• Tools to guide you!
1st Step: What is your target?

- What is your chemical signature?
- Which sensory profile?
- How much time do you have?
- How much do you sale it for?
2ND STEP: KNOW YOUR DISTILLATE

- Tastings
- Analysis: Fusel oils, Methanol, acetaldehyde, ethyl-acetate, aroma compounds

1) formic acid
2) acetic acid
3) 2-furaldehyde (wood flavor)
4) benzaldehyde (almond flavor)
5) limonene (orange flavor)
6) 2,3-Dihydro-3,5-dihydroxy-6-methyl-4(H)-pyran-4-one (cocoa flavor)
7) α-terpineol (fruit juice flavor)
8) 5-hydroxymethylfurural (wood flavor)
9) citral (lemon flavor)
DRIVE YOUR DISTILLATE TO YOUR FINAL DESTINATION

- Tools to guide you!
OAK IN SPIRITS
EXTRACTABLE COMPOUNDS

- Tannins
- Aromas
- Other polyphenols
  - Lyoniresinol => Bitterness
  - Quercotriterpenosides => Sweetness
- Polysaccharides

Marchal et al., 2014
Oak composition variability

- Origin
- Age of wood
- Production process
<table>
<thead>
<tr>
<th>Origin</th>
<th>Aromas</th>
<th>Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipids</td>
<td>Whisky lactone (Methyl octalactone)</td>
<td>Coconut (cis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Celeri (trans)</td>
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<tr>
<td>Aldehydes</td>
<td>Nonenal, octanal, decanal</td>
<td>Raw oak, vegetal</td>
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<tr>
<td>Lignin</td>
<td>Eugenol/Isoeugenol</td>
<td>Cloves, anis</td>
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<tr>
<td></td>
<td>Vanillin</td>
<td>Vanilla, cream, cake</td>
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<tr>
<td></td>
<td>Syringaldehyde</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guaiacol/4- Methyl guaiacol</td>
<td>Spices, smoke</td>
</tr>
<tr>
<td></td>
<td>Syringol</td>
<td>Toasted coffee</td>
</tr>
<tr>
<td>Hemicellulose</td>
<td>Furfural/4-Methyl furfural</td>
<td>Almonds, hazelnut, toasted bread</td>
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<tr>
<td></td>
<td>Furaneol</td>
<td>Caramel, toasted, roasted</td>
</tr>
<tr>
<td></td>
<td>Maltol</td>
<td></td>
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</table>
How to use oak?

- Barrels
- Mini-staves: BAREEL BOOST
- Chips: INCANTO CHIPS
- Oak tannins
**Why using ‘Barrel Alternatives’?**

<table>
<thead>
<tr>
<th>Cost</th>
<th>$/gal</th>
<th>$/hl</th>
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<tr>
<td>New barrel</td>
<td>12 - 15</td>
<td>300 - 400</td>
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<tr>
<td>Neutral barrel</td>
<td>2.5 - 6</td>
<td>70 - 150</td>
</tr>
<tr>
<td>Alternatives recommended dosage</td>
<td>0.5 – 1.6</td>
<td>12 - 42</td>
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</tbody>
</table>

- **Contact time**
  - Immediate
  - 4 weeks
  - 6 months
  - years

- **Consistency**
• Selection done by **aromatic profile impact**
  • Type of aromas
  • Intensity of aromas (concentration)

• Important QC on sensory impact

• **Our production process:**
  • Only barrel alternative maker
  • Drying for for 24-36 months
  • Toasting low Temperature/long time
<table>
<thead>
<tr>
<th>Incanto Product</th>
<th>Oakyness</th>
<th>Vanilla</th>
<th>Spicy</th>
<th>smoky</th>
<th>Toast</th>
<th>Fruit</th>
<th>Sweet perception</th>
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<tbody>
<tr>
<td>Natural</td>
<td>*</td>
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<td>*</td>
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<tr>
<td>Vanilla</td>
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<td>Cream</td>
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<tr>
<td>Special Fruit</td>
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<td>Spices</td>
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<td>Toffee</td>
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<td>***</td>
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<td>*</td>
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<tr>
<td>Dark Chocolate</td>
<td>***</td>
<td>**</td>
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<td>***</td>
<td>***</td>
<td>*</td>
<td>*******</td>
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<tr>
<td></td>
<td>µg/L</td>
<td>lactones</td>
<td>eugenol/isodeugenolx10</td>
<td>vanillin</td>
<td>guaiacol/4-methylguaiacolx10</td>
<td>furans/10</td>
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</table>
OAK AROMA PROFILE

- lactones
- vanillin
- eugenol/isoeugenolx10
- guaiacol/4-methylguaiacolx10
- furans/10
Drive your distillate to your final destination

- Tools to guide you!
ANALYSIS = BLENDING TOOL

Incanto Caramel, Brandy

- 21% lactones
- 32% vanillin
- 7% eugenol/isodeugenol x 10
- 7% guaiacol/4-methylguaiacol x 10
- 33% furans/10

Incanto Dark Chocolate, Brandy

- 39% lactones
- 5% vanillin
- 5% eugenol/isodeugenol x 10
- 1% guaiacol/4-methylguaiacol x 10
- 50% furans/10

Dark Chocolate + caramel, theoretical blend, Brandy

- 30% lactones
- 6% vanillin
- 6% eugenol/isodeugenol x 10
- 4% guaiacol/4-methylguaiacol x 10
- 42% furans/10

Dark Chocolate + Caramel Blend, brandy

- 30% lactones
- 4% vanillin
- 4% eugenol/isodeugenol x 10
- 4% guaiacol/4-methylguaiacol x 10
- 42% furans/10
Drive your distillate to your final destination

- Tools to guide you!
OXYGEN DIFFUSION IN BARREL

- Oxygen entry into barrel 20-50 mg/L/year
- 3 routes of $O_2$ entry
  - 21% through bung
  - 63% between staves
  - 16% through staves

Vivas and Glories,
OXYGEN TRANSFER INTO BARRELS


Wood release

OTR (mg/L per day)

Aging time (days)
• Controlled oxygen released
  • Simulate barrel conditions
  • Dosage adapted to the wine

• Can be used in any container

• Can be used at various time
  • Fermentation
  • Ageing
CONTROL YOUR AROMATIC PROFILE

Analysis
- Better understanding, adjustment for a consistent final product

Oak alternatives
- Consistency and controlled Oak aroma profile
- Cost and time of maturation

Micro-oxygenation
- Adapted to your style and base
- Time of maturation
THANK YOU FOR YOUR ATTENTION

SEE YOU AT THE BOOTH 437

Contacts:
Eglantine.chauffour@enartisvinquiry.com
Evaluate the aromas stability

Evolution of oak aromas in wine
A. Prida, 2015. Oak conference Napa
# Oak Aromas - Variability

<table>
<thead>
<tr>
<th>Extractable compounds</th>
<th>Quercus sessile (FR)</th>
<th>Quercus robur (FR)</th>
<th>Quercus alba (USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whisky lactones (µg/g)</td>
<td>77</td>
<td>16</td>
<td>158</td>
</tr>
<tr>
<td>Eugenol (µg/g)</td>
<td>8</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Vanillin ((µg/g)</td>
<td>8</td>
<td>6</td>
<td>11</td>
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</tbody>
</table>

Chatonnet (1991)

![Graph showing b-méthyl-g-octalactone content over years](M.Moutounet, 2012)
<table>
<thead>
<tr>
<th>Product Type</th>
<th>Dosage rates</th>
<th>Trial Volume</th>
<th>Contact time for trial</th>
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</thead>
<tbody>
<tr>
<td>Chips</td>
<td>10-50 g/L</td>
<td>50-200mL</td>
<td>1-3 weeks</td>
</tr>
<tr>
<td>Tannins</td>
<td>10-40 g/hL</td>
<td>100mL</td>
<td>12-24 hrs</td>
</tr>
<tr>
<td>Staves</td>
<td>20-50 g/L</td>
<td>100mL</td>
<td>Min. 1 month</td>
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