Oak Add-in Trials

Two wineries looking to boost the oak impact of neutral barrels presented trial results at recent Oak Conference

Paul Franson

ALL WINEMAKERS ARE AWARE of the many alternatives to expensive oak barrels for aging and flavoring wine, but few are aware of the varied possibilities they offer—and the results of using different oak alternatives.

Attendees at the Wines & Vines Oak Conference, held in February in Napa, were given the opportunity to learn more about alternatives as well as taste wine made with different oak alternatives at the “Afternoon Technical Tasting: Oak Add-in Trials.” The session was moderated by Jim Gordon, editor of Wines & Vines, and featured oak expert and winemaker Eglantine Chauffour of Enartis Vinquiry, with assistant winemaker Victoria Wilson of Wilson Winery, who conducted trials with her wines.

To set the stage, Chauffour provided a short primer on oak aging in which she disclosed some important, but little-known, properties of oak. She noted that we age wine in oak barrels to modify aromas, polyphenols and polysaccharides that add oak flavors, increase structure and increase complexity. At the same time, barrels introduce minute quantities of oxygen that develop aromas, soften structure and tannins, and increase complexity.

Many alternatives to oak barrels exist, including large staves in tanks, mini-staves inserted in barrels, blocks, chips and oak tannins.

Benefits of Oak Add-ins

The main reason for using forms of oak other than barrels is obviously cost, but doing so can also speed up aging and ensure consistency. According to Chauffour, while barrels can take years to impart the desired effect, while mini-staves take only months, and the tannin impact is nearly instant.

In terms of cost, new barrels run $200 to $400 per hectoliter (26.4 gallons), neutral barrels cost $40 to $100, and alternatives can cost $0.30 to $12 per hectoliter. These alternatives can be used to boost the oak properties of neutral barrels or as an alternative way to provide oak aromas in stainless steel tanks; though you would need to use microoxygenation to better replicate the effect of barrels.

Chauffour pointed out that the extractable component of oak consists of only 5 to 10 percent of its composition. Other inert components are lignin (25 to 30 percent), cellulose (40 to 45 percent) and hemicellulose (20 to 25 percent). The extractable portion contains aromatic compounds, ellagitannins, other polyphenols, such as lyoniresinol, that contribute bitterness and quercotriterpenosides that add sweetness.

However, the impact of the oak on wine depends on many characteristics, including the origin, forest and species of oak, the age of the wood and how it’s processed (such as whether it’s sawn or split), how long the pieces are aged and how, and the type and degree of toasting.

As an example, French and American oak species differ significantly in extractable compounds, notably the so-called Whiskey lactones that give American oak (and Bourbon) its characteristic flavor (TABLE 1).
### TABLE 1

<table>
<thead>
<tr>
<th>Extractable compounds</th>
<th>Quercus sessile (French)</th>
<th>Quercus robur (French)</th>
<th>Quercus alba (USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellagitannins (mg/g)</td>
<td>8</td>
<td>15</td>
<td>6</td>
</tr>
<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>Vanilline (μg/g)</td>
<td>8</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

(Source: Chatonnet, 1991). Note that the units are different. The first substance is tannins, while the three others are aromas.

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*dull*

ÉvOAK transforms ordinary wines into extraordinary wines.

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*dazzle*
Different components in wood also deteriorate at different rates. Ellagitanins, for example, drop linearly from 55 μg/g in 30-year-old wood to about 3 in 180-year-old wood. However, β-methyl-γ-octactone actually rises from 30 to 45 years then deteriorates by half at 120 years (Moutonnet, 2012).

Different compounds contribute the flavors and aromas we associate with wine aged in wood (Table 2).

While barrel alternatives can’t contribute to the same slow addition of oxygen that barrels can, microoxygenation will, and in a more controlled manner. In addition, oxygen is added when the alternatives are added.

One of the most interesting aspects of using oak alternatives instead of traditional new oak barrels is that the winemaker can choose different flavor additions, the same way a chef can add spices. These flavors are determined by the drying time and length and temperature of toasting the oak chips or staves.

Enartis Vinquiry, for example, selects its oak alternative range by aromatic profile to offer a range of consistent flavors (Figure 1).
<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>Celery (trans)</td>
</tr>
<tr>
<td>Aldehydes</td>
<td>nonenal</td>
<td>Raw oak, vegetal</td>
</tr>
<tr>
<td></td>
<td>octanal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decanal</td>
<td></td>
</tr>
<tr>
<td>Lignin</td>
<td>Eugenol</td>
<td>Cloves</td>
</tr>
<tr>
<td></td>
<td>Vanillin Siringaldehyde</td>
<td>Vanilla, cream, cake</td>
</tr>
<tr>
<td></td>
<td>Gaiaol</td>
<td>Spices</td>
</tr>
<tr>
<td></td>
<td>Methyl gaiaol</td>
<td>Spices, smoke</td>
</tr>
<tr>
<td></td>
<td>Syringol</td>
<td>Toasted coffee</td>
</tr>
<tr>
<td>Hemicellulose</td>
<td>Furfural</td>
<td>Almonds, hazelnut, toasted</td>
</tr>
<tr>
<td></td>
<td>Methyl furfural</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Furaneol</td>
<td>Caramel, toasted, toasted, roasted</td>
</tr>
</tbody>
</table>
Trials with Wineries

The speakers discussed trials at two wineries that both had the objective of boosting the oak impact of neutral barrels. One trial was at Wilson Winery in Dry Creek Valley and the other from an unidentified winery in Napa.

The wine was in contact with either mini-staves (Barrel Boost) or chips (Incanto). The contact time, at tasting time, was a relatively short four to six weeks; a longer infusion would have had more of an effect. In each case, the trials were on the same wine, same barrel vintage and same cooper. They also included barrels with no inserts as a control.

The first wine was a Wilson Molly's Vineyard 2013 Zinfandel from the southeastern section of Dry Creek Valley grown in gently rolling hillsides composed of alluvial and volcanic composite. The rootstock was 110R and clone was 6. The vines are trellised, were planted in 2004 and the yield was about 2.5 tons per acre.

The wine had a pH of 3.72, TA of 0.60 percent and 14.8 percent alcohol. It was fermented in a 12-ton stainless steel tank with a closed top and received two pump-overs per day.

Chauffour described it as a complex, nice wine to start with, having consistent fruit quality from the vineyard.

For the trials, mini-staves in four flavors—vanilla, toffee, special fruit, dark chocolate—were inserted into four neutral oak 2005 and 2008 Seguin Moreau barrels. The wine was racked off lees before the inserts were added, and it had six weeks of contact time by the time of the tasting.

The objective was to enhance the phenolic properties of the wine using Barrel Boost mini-staves and Incanto chips. Wilson noted that effects were noticeable after two weeks of contact time and said that the combined effects of the four staves are representative of aging in a new, French oak barrel.

Chauffour added that the wine had a pretty full extraction of flavors by six months and tannins were softer. After that, there’s not much extraction from the oak, but the wine continues to age naturally.

Attendees at the tasting were furnished four samples to taste:

- Control: neutral oak barrel,
- Barrel Boost Special Fruit,
- Barrel Boost Dark Chocolate,
- A blend of Barrel Boost-infused wines:
  - 33 percent Barrel Boost Vanilla
  - 33 percent Barrel Boost Special Fruit
  - 16.5 percent Barrel Boost Dark Chocolate
  - 16.5 percent Barrel Boost Toffee.
The largest number of attendees, who were mostly winemakers, preferred the last sample.

The second wine sample was a 2014 Sangiovese from an unidentified winery in Napa Valley. It went into barrel in November, and the additives were inserted in January for four weeks of contact. The wine had an alcohol level of 14.59 percent, a pH of 3.68, TA of 0.609 percent, FSO₂ of 28 ppm and TSO₂ of 56 ppm.

In this case, attendees could taste four samples:
- Control: neutral oak barrel,
- Barrel Boost Special Fruit,
- Barrel Boost Dark Chocolate,
- Incanto Chips Dark Chocolate.

The attendees didn’t seem to have strong preferences, though with perhaps a slight nod toward the first and fourth samples. “The wine was a bit young,” noted Chauffour, “and hadn’t had long contact with the oak augmentation.”

At the end of the session, Chauffour asked how many in the audience were using alternatives to new oak barrels. About half raised their hands. Clearly, the technique is gaining wider acceptance even if little disclosed to consumers.

The trials were very interesting to those in the audience; some regretted that the wine hadn’t been given longer contact with the alternatives, a suggestion for next year’s conference. WBM