Few moments are more embarrassing than opening a bottle of wine for guests or customers and finding that it’s corked. The problem is only compounded when a winemaker is opening a 12-liter bottle in front of a large audience with glasses outstretched. “It wasn’t a positive moment,” recalled Christiane Schleussner, assistant winemaker from Silver Oak Cellars in Oakville, Calif., about an occasion that she remembered well. After that happened, her management said, “We can’t let this happen again. Fix it.”

Silver Oak already had an exhaustive program for screening the corks it uses, and Schleussner claims a rate of only 0.66% for faulty bottles at retail. She didn’t know how to completely eliminate trichloroanisole (TCA) cork taint, however. She consulted the literature and found a reference to a process called dry soaking, an oxymoronic term that is pretty descriptive in practice.

Normally, winemakers sample bales of corks by selecting 20 or 50 out of 10,000, soaking them in cheap, neutral white wine, then sniffing each to see if they can detect any taint. If they find more than a small amount, they may reject the whole bale or lot.

Unfortunately, that process is destructive. Corks tested this way can’t be used. The technique Schleussner found, however, wasn’t destructive, so it seemed a potential way to completely eliminate the contamination—at least in the relatively modest production of large-format bottles. Silver Oak, by contrast, produces about 2,600 3-, 6-, 9- and 18-liter bottles per year. Of course most are for special occasions such as charity functions, and they represent very high value to the buyers.

Schleussner worked with Carlos Macku, director of technical services for Cork Supply USA, Benicia, Calif., to try the process. Cork Supply is the world’s largest closure company and No. 2 in the United States.

Macku earned both a Ph.D. in agricultural and environment chemistry and a master’s degree in food science and technology from the University of California, Davis. He also has spent 18 years professionally specializing in analytical and flavor chemistry of natural products, food and wine.

6% bad, 2% TCA

While using sensory analysis to test almost 2,300 corks at Cork Supply with the dry soak method for Silver Oak’s first run in 2007, the team rejected 6% as unacceptable. The 6% unacceptable were described as having such aromas as ashtray, musty, moldy, dirty, minty, vegetative, peppery and wet cardboard. They then checked the accuracy of their noses with a solid-phase microextraction (SPME) gas chromatography/mass spectrometry (GC/MS) instrument. The instrument showed that less than 2% of the corks actually were contaminated by TCA (most between 1 ppt and 5 ppt), but instead were affected by other odorous compounds.

The dry soak process is fairly simple. Corks are placed in small sterile jars with a few drops of distilled water, then sealed to hydrate for 48 hours. “The moist environment volatilizes the molecules, so you can tell right away if there’s a problem,” said Schleussner.
She sniffs each of the large corks at the Cork Supply facilities and eliminates any that are suspect, whether for TCA or other defects. “I reject on anything other than neutrality,” she says. This is tedious work that’s tiring on the nose, and she can only screen about 200 to 300 corks at a sitting—even with breaks.

As this was the first such program in the United States, and it represented the first effort to completely eliminate TCA tainting, she and her colleagues published a paper about it in the Journal of Agricultural Food Chemistry and presented their research at the annual American Society for Enology and Viticulture conference.

Well worth the commitment

“We wanted to share this information with others in the industry, because faulty corks are really an industry issue,” Schleussner said. “This method takes a lot of time and commitment, but it’s well worth it.”

Silver Oak has continued the program for its large bottles for three years, and now it is even taking on the daunting task of recorking all of its library bottles, starting with those from the founding in 1972 until 1993. Each bottle receives a QC sticker after the process, which naturally includes sniffing the opened bottle to make sure it isn’t defective.

Another winery that uses the service now is Joseph Phelps Vineyards in St. Helena, Calif. Winemaker Ashley Hepworth says they use the process for all 3- and 6-liter bottles. They started in December 2008.

Hepworth and her enologist, who are very sensitive to TCA, do the sniffing on the corks. They reject them not only for TCA but also for other undesirable odors like green pepper, while they accept desirable odors like cocoa powder. She sometimes even retests corks using the method after branding and coating.

“I am impressed at how it highlights the defects. It’s even better than regular soaking.”

— Mike Cox, winemaker, Schug Winery

Phelps does a lot of research about corks and works with only four cork suppliers. The winery’s normal quality control method is to sample 50 corks per bale and reject any bales with more than 1% TCA. It pays off. Hepworth said the reject rate at retail is less than 1%.

Mike Cox, the winemaker at Schug Winery in Sonoma, Calif., first used the dry soak process about a year ago and now uses it for all large bottles. “I am impressed at how it highlights the defects. It’s even better than regular soaking, and we’re trying it for the corks we pull from bales to sample, too.”

Cork Supply’s Macku says that 40 or 50 companies take advantage of the service. Cork Supply collects a $1 service charge for each cork accepted.

The process can help ensure that those special occasion large bottles are truly special in a good way. Cork Supply also is advertising it for 750ml and 1.5L bottles of high-value, limited-production wines.

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