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Cultured Yeast

Examining Conflicting Perspectives

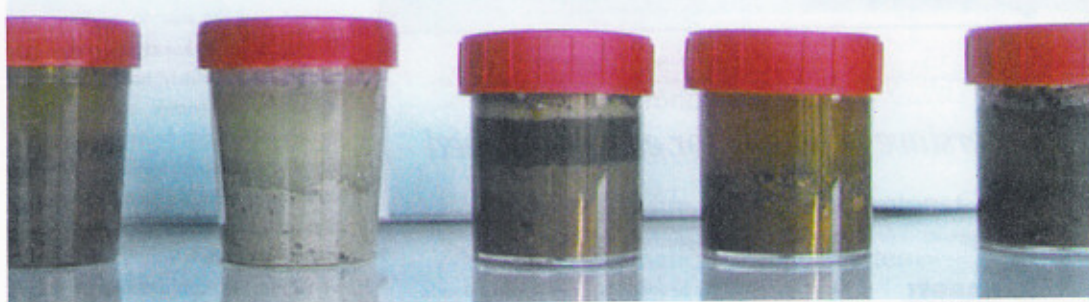
Christy A. Canterbury

Winemakers in the US and other "New World" countries shop for cultured yeast the same way they shop for groceries. It's a bit like shopping for a recipe. You need nuts for a pie? Something subtle like almonds or something rich like walnuts? Should the nuts provide texture, as in a pecan pie, or should they simply provide flavor, as in finely processed shavings added to a crust?

In France, the motherland of classic winemaking, vintners' opinions vary from indifferent to adamant regarding cultured yeast. On one side of the fence stands **Jean Gonon**, who produces some of the most flavorful **St. Joseph** whites of the Northern Rhône. He declared, "I add as few elements as possible from the outside." **Madame Bridgette Roch** of **Clusel-Roch** in Côte-Rôtie simply shrugged when asked if she exclusively uses indigenous yeast. "The fermentation just takes off. There is no point in trying to redirect nature."

At the other end of the spectrum, **Dominique Delteil**, scientific manager of **Montpellier Institut Coopératif du Vin (ICV)**, stated, "Most local producers think about cultured yeast as a sin." To his point, on a recent, month-long tour of seven French wine regions, I encountered only one producer who admitted inoculating a single tank of white juice with yeast in 2003.

The French, of course, have a certain luxury being able to ferment with indigenous yeast. Their cellars and vineyards have collected and bred ambient yeast over the millennia. Fermentations resulting from these indigenous yeast are docile, producing predictable results. A few centuries behind, California producers introduce yeast in their vats of must not only to nudge fermentations into action, but also to control certain aspects of the fermentation process. While potentially a necessity due to lack of ambient yeast,



Sterile grape juice inoculated with soil samples from different vineyards, from which the ecological yeast ICV-D21 was isolated. ICV-D21 improves color stability and tannin structure.

this practice is at least partially attributable to many California winemakers' education at the science-oriented University of California at Davis and Fresno State, where control is an advocated practice.

Cultured yeast are "living organisms that are sleeping," Delteil said. Sold by specialty distributors like **Scott Labs** and **Vinquiry** in a variety of forms, from freeze-dried to encapsulated yeast hulls.

What Yeast Contribute

According to Delteil, cultured yeast do far more than simply start fermentations. Today, winemakers choose yeast to facilitate certain vinification procedures in addition to considering the grape to be fermented and the desired wine style. Specific strains produce predictable outcomes, giving winemakers better control of their vats by ensuring, for example, smooth, low-frothing fermentations for the secondary fermentations of sparkling wine or low temperature fermentations without interruption. One typical criteria for California winemakers is the ability to fully ferment high-alcohol wines as yeast often becomes sluggish when ethanol levels climb into the 12-17 percent range. Eliminating the risks of a stuck fermentation due to yeast dying from high-alcohol can preserve the character of the final wine. Volatile

acidity resulting from a stuck fermentation can substantially alter the profile of a wine, as delicate aromas are pushed up and out of the tank.

Once inoculated, tanks take off quickly, shortening any lag time. Inoculated yeast also promotes steady fermentations. Add the benefits of high tolerance to SO₂ and limited nutritional needs, and the use of cultured yeast resolves a lot of potentially problematic issues from the outset of fermentation.

The ability of cultured yeast to produce glycerol provides yet another incentive, especially for "international" style wines. "Indigenous yeast don't necessarily give the sensory effects many people want or look for in a wine," stated Delteil. Certain strains of cultured yeast better integrate the ethanol and glycerol components, producing a rounder, silkier mouthfeel.

For 20 years, Delteil has conducted research on over 1,000 samples of yeast isolates in the Rhône Valley. "Many people take considered risks in the vineyard, waiting for their harvest, for example. Then, they take unconsidered risks relying on natural yeast for fermentation. Eighty percent of the value of a wine over \$50 is in the image and culture held by wine consumers. That's shaky ground. Why risk mistakes?" Factor in the cost of land, labor, equipment and the loss of con-

sumer confidence, and producers might ferment up a catastrophe, according to Delteil.

The Pros and Cons

Producers against cultured yeast worry about the standardization of wines. Standardization, however, is subjective. Grenache, for example, can be fresh and fruity or cooked and bitter. Which is better? Though one can argue cultural references, the fresh and fruity wine is technically the "pure," more "correct" wine. A winemaker confronted with a truckload of overripe grapes can virtually guarantee a fruity wine using cultured yeast. Leaving the job to native yeast, varied in their sensitivity and ability to operate in temperature-controlled vats or high pH musts, leaves room for error. Stewed fruit and burning alcohol could result. To insure individuality, Grenache producers can select from a number of commercial yeast, each producing different sensory levels of acidity, dryness and bitterness. According to the Scott Labs website, Delteil's ICV-GRE promises to deliver "a big fore-mouth impact" in addition to minimizing "the risks of vegetal and undesirable sulfur components" commonly found in Grenache fermentations. To create complexity and ensure individuality, winemakers can also vinify different tanks with different yeast and blend after fermentation.

How Cultured Yeasts are Developed

The ICV studied Grenache—widely cultivated in southern and southwestern France—for years in hopes of improving wine quality in the area. The objectives were to avoid:

- Ether aromas (burning prunes) and the pungency of volatile acidity;
- Harsh, burning tannins;
- Overly aggressive ethanol, leaving wines lacking in sugar and mouth-feel.

Delteil and his associates distributed their findings widely, but sales of their isolated yeast never caught on in France. Perhaps winemakers were simply complacent; perhaps some fell into the widely misperceived notion that ambient yeast in the Old World is a component of terroir. The University of Dijon, in conjunction with the *Interprofessional Bureau of the Wines of Burgundy* (BIVB), and the ICV maintain that this latter belief is entirely unsubstantiated by science. As for standardization, Delteil insists that of the 100-150 commercially available yeast, only 30-40 are really standardizing strains. This hasn't always been the case: until 1990, no more than 10-15 yeast were sold commercially. Many were, indeed, standardizing, but they were popular enough to remain on the market today. The popular ICV-K1 yeast, selected in the 1980s, is a prime example. However, with the plethora of choices available on the market, winemakers can now control their wines' destiny while retaining their authenticity.

While France never caught on to the research of Delteil and others, California listens closely. ICT-D254, isolated from Syrah, works well on grapes that come in with green notes but have 16 percent-plus potential alcohol. Most of the yeast strains are isolated from juice, but one of the ICV's recent successes was isolated from soil. The ICV-D21 improves color stability and tannin structure. This strain is highly unique in preventing jammy notes and burning alcohol in overripe grapes by contributing high acidity and polysaccharides.

Years of research go into the selection of each yeast strain, typically taking five years to commercialize. First, the laboratories must choose the vineyards and/or cellars that bear desired fermentation characteristics of individual varieties, observed during fermentations in previous vintages. Depending on how widespread the cultivation of a certain cépage (grape varieties), scientists may gather as many as 1,000-2,000 organisms. The *Institute Rhodanien* based in Orange, France, recently selected yeast for the fermentation of Marsanne in the Northern Rhône. Since Marsanne is not as widespread as Syrah, for example, only 200 samples were taken from various sites. Once isolated from must, each strain began to colonize on a small bed of nutritious jelly. Scientists performed 97 fermentation tests on each strain, seeking resistance to oxidation and high alcohol. Narrowed down to 75 strains, the tests were performed a second time to confirm the first trial's results. This round yielded 42 yeasts.

Scientists performed micro-vinifications with each, checking the nitrogen levels and turbidity of each cuvée. Sensory analyses were performed on the final wines. Scientists continued to test yeast strains in micro-cuvées for three years, both in their labs and in several volunteer wineries, and finally selected L4600 for the marketplace.

Above all, producers and consumers should understand these are not genetically modified yeast. GMO yeast do exist in the laboratory. They are helpful in examining, for example, how yeast metabolizes glucose independent of alcoholic fermentation. However, all the characteristics of GMO yeast are available through naturally isolated strains. Winemakers can achieve a wide variety of specific characteristics from different yeast by simply fermenting separate batches of must or juice with different yeast and then blending after alcoholic fermentation.

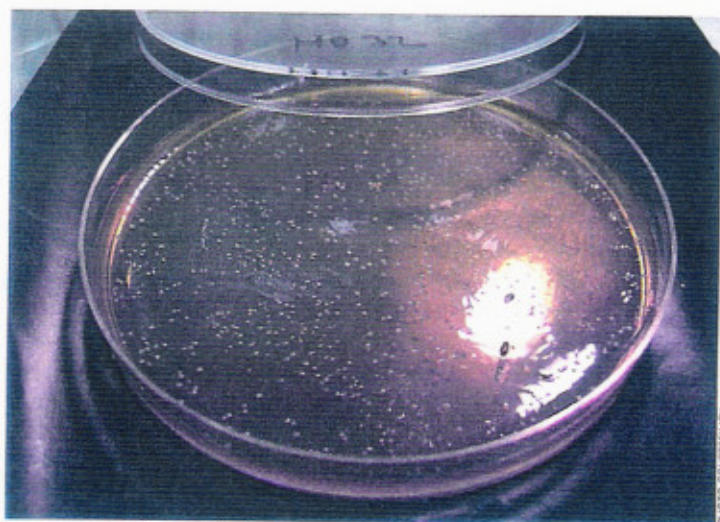
Potential Problems with Inoculation

Not without its drawbacks, inoculation can be a source of headaches. Luckily, it is typically the standardizing strains that produce the vinegary whiff of

excess acetic acid, the sherry-esque qualities of acetaldehyde or the exceedingly tutti-frutti flavors of mass market wines. Chances are, producers focused on quality won't be using the standardizing strains.

When asked what was most frustrating about clients who use his products, Delteil was quick to respond. "Some expect miracles. They want aroma yeast that smells like fresh-cut papaya. I can give them that, but they have to realize that just because a yeast can produce certain aromas doesn't mean those aromas will ultimately be expressed in every wine; especially in the long-term. The others lack creativity in what they seek. Someone wants yeast that will help Sauvignon maintain its shelf life for three years under fluorescent light. Fine! I can give them that. I'm not afraid of a good challenge." *wbm*

Christy Canterbury, a New York-based freelance wine writer and educator, is a Candidate for Master of Wine and holds the Diploma of the Wine and Spirits Education Trust (WSET).



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