Dunne on wine

Sacramento Bee/Lezlie Sterling

UC Davis associate professor Matthew Augustine shows off his machine that uses magnets to determine if wine is healthy.

MRI science can tell if old wine still good

By Mike Dunne
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The patient had lost some weight and was looking wan, but the doctor pronounced him fit, predicted that if he was handled gently he'd thrive for at least 10 more years, and sent him home.

In this instance, the patient was a bottle of wine, and the doctor was Matthew Augustine, an associate professor of chemistry at the University of California, Davis.

Augustine's specialty is nuclear magnetic resonance spectroscopy, the use of powerful magnets to record the internal structure of things, including humans, for whom the technology most commonly is seen as magnetic resonance imaging (MRI).

With two colleagues, graduate student April Weekley and senior development engineer Paul Bruins, Augustine built a squat, round magnetic chamber into which he can slip a sealed bottle of wine to determine whether it's healthy or has turned to vinegar.

The practical application is clear: With such a chamber in the cellar, a wine collector no longer would have to worry about embarrassment at a dinner party by opening a rare old bottle

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that turns out better suited for making salad dressing than pouring into crystal goblets.

Auction houses are another possible market for Augustine's time machine, which could help assure that rare old wines on the block are fit. But auctioneers don't seem much interested, Augustine says. "Auction houses are not so thrilled with the idea, which has the potential to lose them money and jobs. They're sellers. But buyers are interested, and they'll have to push the sellers to do it," Augustine says.

Though Augustine's team has applied for a patent for the device, and though a venture capitalist is teaming with Augustine to develop a commercial model, don't expect to see the chamber in a Sharper Image catalog any time soon.

For one, his experimental chamber cost about $10,000 to construct, and he estimates that commercial models will run between $50,000 and $100,000. At that price, a buyer likely would install a unit where wine enthusiasts could bring or ship bottles to be checked for a fee.

Secondly, the technology needs refinement. As now set up, Augustine's unit can measure water, ethanol (alcohol) and acetic acid in a bottle of unopened wine. But it can't see whether a wine is contaminated by the chemical

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Graduate student April Weekley, associate professor Matthew Augustine, at the keyboard, and senior development engineer Paul Bruins study results of a test on a bottle of wine.

compound 2,4,6-trichloroanisole, which deadens a wine's fruity aroma, leaving it smelling musty and moldy, a problem often attributed to poor corks.

Augustine is confident the technology can be enhanced to address successfully that problem, as well as other issues. For example, by tracking deterium, an isotope of hydrogen in rainfall, nuclear magnetic resonance spectroscopy can determine where a wine originated, authenticating its pedigree.

For now, the technology works like this: A bottle is locked into the chamber and the scan gets under way as Augustine and his crew push buttons, flip switches and turn dials. Soon, red lines start scrolling across a computer monitor, creating a graph with two prominent peaks, one for water, another for ethanol.

If a third significant peak materializes, the wine has a problem, namely acetic acid, the sour-tasting component that gives vinegar its puckery bite. When a wine is exposed to oxygen, such as through a faulty cork, acetobacter bacteria convert alcohol into acetic acid.

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Wine is considered spoiled if its acetic acid hits 1.4 grams per liter, though some people are apt to be able to pick up vinegary smells at around 0.7 grams per liter. Augustine's machine can measure acetic acid to a tenth of a gram. A bottle of vinegar he stuck into the chamber to demonstrate how it works spit out an acetic-acid reading of 12.56 grams per liter. A bottle of a 1996 cabernet sauvignon he tested earlier registered 4.7 grams of acetic acid per liter.

The wine I brought to Augustine's campus lab was a Shenandoah Vineyards 1978 Amador County Zinfandel, which, frankly, had been moved often and not always stored sensitively. Some of the wine obviously had leaked out, and what remained came up only to the shoulder of the bottle. Even through the dark glass of the bottle, the wine looked thin and hazy. The outlook wasn't encouraging.

But when Augustine read the chart after the wine was put through his chamber, he pronounced it still vibrant. "The acetic acid is way under the threshold of detection. It's got a few more years, and under perfect conditions should be fine for the next 10," Augustine said.

That was my plan, but after getting it home and seeing again how low the wine was in the bottle, I let skepticism and curiosity get the better of me, and pulled the cork, which was so saturated with wine it fell apart during extraction.

In the glass, the wine had lost some of its luster, but otherwise it was spectacular, its rich and spirited flavor running to nuts, plums and the ripe pruneyness typical of foothill zinfandels of that era. I was surprised by how much jammy fruit was still there and by the firmness of its spine. There wasn't a hint of acetic acid. It was just what the doctor ordered.

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