

Rare Old Wine or Overpriced Vinegar? New Test May Be Able to Tell

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By Daniel Sogg

Wine lovers need to have a little bit of the gambler in them. After all, it can seem like a roll of the dice every time you pull a cork on a prized old bottle. Sometimes you roll a seven, sometimes it's snake eyes.

But a chemist at the University of California, Davis, believes he has developed a method that will improve the odds of getting a good bottle. Using the same nuclear magnetic resonance technology employed in medical MRI scans, associate professor Matthew Augustine, 34, can scan unopened wines for the presence of acetic acid, a primary component of vinegar.

As wines age, their corks usually deteriorate, permitting oxygen to seep into the bottle in varying amounts. In the presence of a specific type of bacteria, and in the absence of the preservative sulfur dioxide, vinegar can form. Wines are commonly considered spoiled if they contain 1.4 grams per liter of acetic acid. Augustine's technique detects as little as 0.1 gram per liter.

Unfortunately, this specific test can only "diagnose" a small portion of ruined wines. Most older bottles simply oxidize without forming vinegar. But Augustine, who has submitted papers chronicling the research to the *Journal of Magnetic Resonance* and the *American Journal of Enology and Viticulture*, hopes that the technique might be further refined so that it can isolate a variety of other chemical compounds.

In the course of the research, graduate student April Weekley and Augustine examined six bottles of Cabernet Sauvignon from the collection of UC Davis' department of viticulture and enology: one bottle each from the 1950, 1956, 1960, 1968, 1970 and 1977 vintages. The nuclear magnetic resonance test determined that three bottles had elevated acetic acid levels, indicating spoilage.

The NMR technology could be of great value to anyone who buys older, expensive bottles at auction. Auction wines are generally sold "as is," meaning the buyer assumes the risk associated with spoilage or inferior storage.

"In a perfect world, if there was a handheld device you can aim at a bottle and get an instant reading, that would be great," said Fritz Hatton, principal auctioneer for Zachy's wine auctions in New York. "Of course, you'd have to be able to run bottles through quickly and inexpensively."

In its current form, the NMR technique is neither very quick nor inexpensive. Augustine needs up to 30 minutes per bottle to interpret the scan results. And while Augustine constructed a device to scan bottles using equipment scavenged from the UC Davis lab, a manufactured scanner could cost from \$750,000 to more than \$1 million, estimated Paul Newton, account manager at Varian NMR, which manufactures NMR equipment.

Nonetheless, any technique able to evaluate unopened bottles is sure to interest collectors and auctioneers. "Right now, we're just scratching the tip of the iceberg about what we can do with NMR and wine," said Augustine.