



“Small-scale fining trials: Effect of method of addition on efficiency of bentonite fining”

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Wineries often carry out fining trials to determine whether a wine will benefit from fining, and if so, what concentration of fining agent to use. It has already been emphasized how important it is that the lab procedures mimic those eventually to be used in the cellar. In this paper the authors warn us about two additional sources of variation that we should be paying attention to.

- There are three main components to a fining trial: 1) the fining agent preparation, 2) the method of addition, and 3) the method of assessing the efficacy of the process, that is, the stability of the resulting wine. Bentonite is a common fining agent that, when hydrated, absorbs many times its dry mass in water, thus providing a very large surface for the proteins that cause hazes in wine to adsorb to. Bentonite preparation should take place in water rather than wine, as swelling is limited in solutions containing alcohol. Some agglomerated bentonites can be prepared in cold water, while hot water is required for other types. As for the method of addition, the authors expressed their frustration at how little attention the phrase “mix thoroughly” gets in scientific papers.
- Regarding the methods for assessing wine stability, which vary wildly, they are normally based in one of two methodologies: *nephelometric determination* of turbidity (which measures the amount of light scattered by suspended particles), or *visual inspection* of clarity. The relationship between the two is that **turbidity values of 10 or less NTU (turbidity units) will usually appear clear to the eye.** A common method used by wineries that the authors discuss is the “penlight flashlight in a darkened room”. **If the beam of light passes through the treated wine unimpeded, then the equivalent turbidity values would lie between 0.5 and 3.5 NTU,** and the wine would pass the test. Thus, the “flashlight” method is actually more stringent than the 10 NTU standard method.
- Wines are often heated or chilled during a stability test to subject them to extreme conditions. To illustrate the variation in stability tests, in a 1984 survey in which 16 participating wineries were asked about their method of conducting heat stability tests, the authors found that 14 different methods were being used. Another source of frustration!
- The goal of this study was to examine several variables influencing bentonite dispersal, including 1) mixing speed, 2) method of addition to wine sample, 3) age of bentonite, and 4) variation among laboratory personnel.
- The authors added varying amounts of a 5% sodium bentonite slurry (KWK Volclay, stirred overnight) to 50 ml of a 1993 Sauvignon blanc. After half hour of incubation at room temperature, the samples were centrifuged and the supernatants were subjected to a heat/chill test (6 hrs at 80°C followed by 12 hrs at 4°C). After that, the researchers evaluated the results by measuring the residual protein left after fining.

- **Effect of age of bentonite and method of addition.** There was no significant difference in turbidity between new and older bentonite. Likewise, the method used to introduce the bentonite into the wine had no impact on turbidity.

- **Effect of mixing speed.** Turbidities of samples mixed at the highest speed were a third of those mixed at the slowest speed. In other words, **the faster the mixing speed, the more effective the protein removal.** This finding has important practical consequences in the cellar. While a “fast” rate of mixing would lead to the conclusion that the wine will be stabilized at a given bentonite rate, a “slower” rate of mixing would suggest that more bentonite is needed to precipitate the same amount of protein. The obvious implication is that “speed of mixing” used in the lab is yet another factor that should match as close as possible the actual cellar procedure .

- **Effect of experimenter (Reproducibility).** The authors found a good reproducibility in the turbidity determinations when the assays were run by two different lab technicians. They also found relatively good reproducibility in the protein determinations. But there was a significant difference between samples whose bentonite additions were done by different experimenters. Furthermore, **there was a considerable variation in the turbidity between sample replicates prepared by the same experimenter.** The authors concluded that there is something intrinsically difficult about the mixing of bentonite into a wine. They advise several replicate fining trials be performed to determine the appropriate final concentration to be used in the cellar.

In conclusion, the most important sources of variation in bentonite fining trials are *mixing speed* and *experimenter technique*. These variations were minimized by conducting all fining trials in duplicate, and by noting the appearance of the sample immediately after mixing. Well-dispersed bentonite samples generally produced reproducible results, whereas those with a more “clumpy” appearance (inadequate mixing?) were more troublesome and produced a less efficient fining.

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