

Protein Instability and Bentonite Fining*

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Turbidity or cloudiness in wine is one of the important problems known to occur in commercial table wines. Often the cloudiness in wine results from microbial activity. However, sometimes it is caused by proteins which are heat sensitive and unstable.

Proteins are nitrogenous compounds with large molecular weights. They are polymers of some twenty natural alpha-L-amino acids. Of the total wine proteins, only a certain portion is unstable. The amount of unstable proteins depends on several factors such as, grape variety, growing conditions, and must pH.

The unstable and heat sensitive proteins can be removed from a wine with a bentonite treatment. Bentonite particles have a negative surface charge, thus, they attract and hold positively charged proteins. The two colloids neutralize each other and form a precipitate which settles or can be filtered.

Bentonite is classified as a montmorillonite clay. It is principally mined in Wyoming, and therefore, is also called a Wyoming clay. Volclay is a trade name for Wyoming bentonite.

The effectiveness of bentonite in removing proteins, and thus, clarifying the wine, depends on the method of preparation, the amount used, and the mixing of bentonite with wine to be treated.

To determine the amount of bentonite needed to clarify and stabilize a wine, conduct a small-scale trial in the laboratory in the following way:

1. Prepare a 5% slurry by mixing 5 grams of bentonite in hot water to make 100 ml total. Stir this mixture until smooth and free of clots. Let set overnight.
2. Pipette portions of the base mix or stock slurry into 100 ml graduated cylinders containing 100 ml of wine. Stir the solution well and let it stand for several hours or overnight.
3. Examine the samples for the degree of clarity.
4. The sample showing the greatest amount of clarity with a minimum amount of bentonite has the desired level of bentonite to be used.

The following chart can be used to translate laboratory results into plant calculations.

5% bentonite slurry per 100 ml	grams dry bentonite/gal	lbs bentonite per 100 gal
.5	1.0	2.2
1.0	2.0	4.4
1.5	3.0	6.6
2.0	4.0	8.8

Plant Application

To treat wine with bentonite, follow these simple steps:

1. Determine the desired amount of bentonite by conducting a laboratory trial.
2. Add the bentonite gently to enough hot water to make a creamy smooth slurry.
3. Allow the bentonite to swell by holding the mixture overnight.
4. The following day, stir the bentonite slurry again until it is creamy smooth.
5. Pour the slurry gently into the wine to be treated while the wine is being agitated. Proper dispersion and thorough mixing is essential to obtain good results.
6. Once the bentonite is mixed, the agitation is stopped and the dispersed material is allowed to settle. The time required to settle the sediment depends upon the height through which the particles fall. It may vary from several hours to several days.
7. The volume of the sediment or lees formed is usually around 3% to 5% of the total volume. The sediment can be removed by racking, filtration, or centrifuging.

*Previously published in *Vineyard & Vintage View*, Mountain Grove, MO.