# BAKER WINE & GRAPE ANALYSIS

WINE STABILITY

## Baker Wine & Grape Analysis Newsletter — The Stability Issue

**Welcome to Edition 2 of our new series of themed content – Wine Stability, focusing on Protein and Cold Stability!** As you recall, Edition 1 was Baker Wine & Grape Analysis 101, covering the basics of what we offer at BWGA.

## Heat Stability

**How do you know if your wine will stay clear from protein-based haze?**

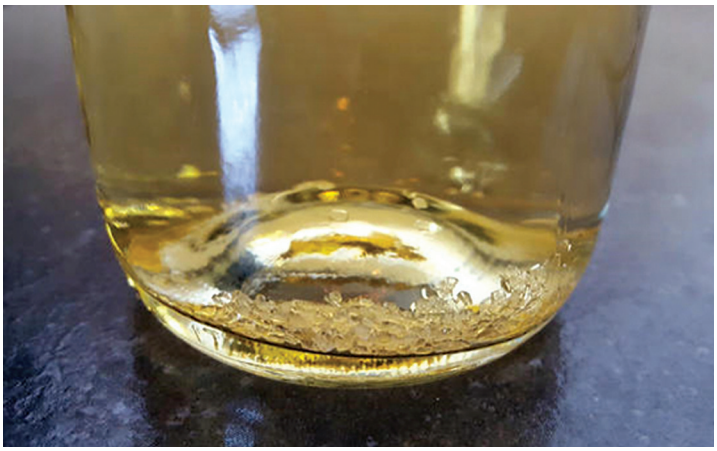
The traditional heat test is a tool that predicts protein stability. Factors such as cultivar, climate, maturity, and interactions with other molecules influence heat stability.

Proteins become unstable then unravel when exposed to high temperatures. Once unraveled, they tend to aggregate to form hazes and clumps.

And it's not just proteins — polysaccharides, polyphenols and metal complexes can clump onto the unraveled proteins.

If your wine is protein unstable, bentonite can be added. Bentonite is negatively charged and will remove positively charged proteins (but it won't remove neutral proteins).

Bentonite has been used for years and can help prevent protein haze. A possible down side — bentonite can strip flavors and color when used in too high of a dose. And weirdly enough — too much bentonite can cause an increase in haze when heated. This phenomenon is still being researched by the industry. BWGA offers a bentonite trial to help find the right dose for your wine.

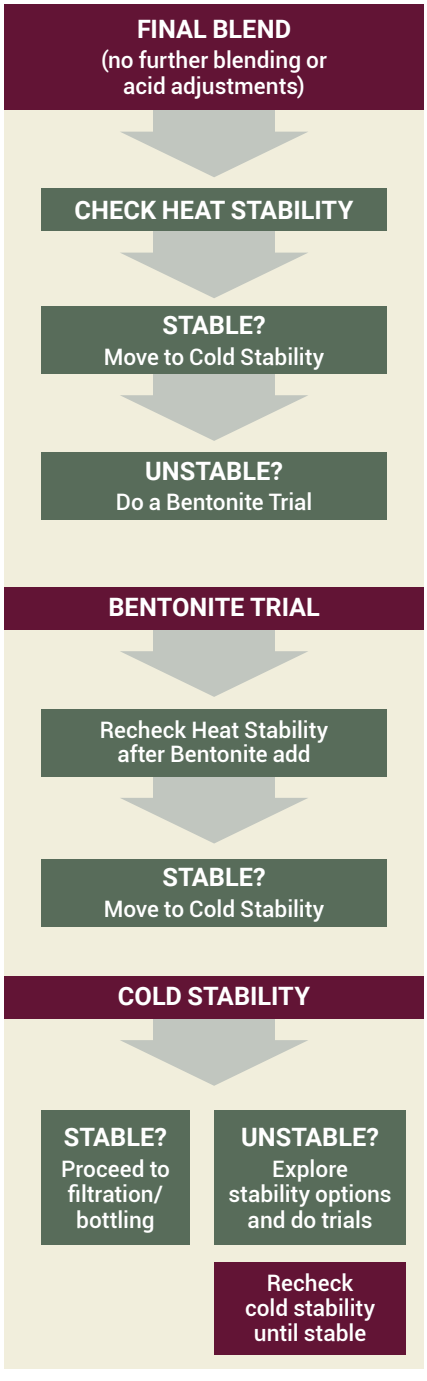


*Tartrates in wine* *(photo credit Brixandcolumns.com)*

*Wine on left has protein haze.*
*Pahoto credit: Marco Esti*

- **Heat Stability Check:** 50 mL of sample is required and runs for two hours at 80° C.
- **Bentonite Trial– 750 mL:** Includes 5 different bentonite dosages and two *free* post-addition rechecks.

Please let us know which bentonite you prefer and which doses you would like us to test when you drop off your sample.





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# Cold Stabilization

**Cold stabilization prevents naturally occurring ionic tartaric salts (K+, Ca2+, bitartrate anions) from forming crystals and precipitating out of wine post bottling.**

Potassium bitartrate (KHT) is harmless and tasteless in wine, but to the uninitiated, the little "wine diamonds" look like unsightly glass shards. Therefore, cold stabilization is performed for aesthetic reasons.

Factors affecting stability include high alcohol (less stable), pH (high pH = less stable) and temperature (colder temperatures = less stable).

White and Rosé wines are stabilized more often than red wines due to the inhibiting molecules present in red wines. In addition, whites and rosés are bottled earlier, allowing less time for KHT to precipitate out, are stored at cooler temperatures, and are more noticeable due to the color and clarity of these wines.

Crystal formation has to do with how salts interact with one another. Under normal conditions salts are surrounded by solvent, and thus never see another salt ion. If salts happen to meet, they aggregate and start to grow into a crystal with ionic bonds, the strongest type of bond.

This is a three-step process, consisting of the following:

**(1) Induction:** high concentration of salt causing increased chances of ions bumping into each other

**(2) Nucleation:** a nucleus is a solid substance the salts can stick to; as more salts stick to this nucleus, they interact and bond at a faster rate

**(3) Crystal Growth:** these tiny crystals create more surface area for more crystallization and the crystal growth expands

Cold Stabilization is the last process the wine sees before pre-bottle filtering. The most used test for cold stabilization involves chill proofing the wine by chilling, seeding, agitation, or temperature filtration.

Another technique used is preventing nucleation by adding Carboxymethyl Cellulose (CMC), which works to eliminate nucleation sites of KHT.

BWGA uses the conductivity test to test for cold stabilization. In this test, filtered wine is chilled to a certain temperature and seeded with fine KHT, which provides nuclei for crystallization. When crystals form and drop out of the wine, conductivity drops, too. Conventionally, less than 3% drop in conductivity indicates a cold stable wine.

## Cold Stability Products

If you use cold stability products on your wines (Celstab, Mannostab, Zenith, Claristar, etc.), PLEASE let us know at the lab when you bring your wine in for testing. We can verify that your wine is cold stable, but we have to test differently if stabilizing products are added or will be used.

For many of these products it is important that the wine is checked for heat stability as well. Some require a color stability test for rosé wines which adds two days to the testing time.

### "Hot N Cold Stability"

*Sung to the tune of " Hot N Cold" by Katy Perry*

Cause you're hot then you're cold
You're stable then no
You're throwing a haze
Is this just a phase?
Should I add bentonite?
pH changed overnight!
We fight, we get labs
We add some Celstab
You don't want to stay stable, no
And you don't want to be bottled oh,
Cause you're hot then you're cold
You're stable then no
Stop throwing that haze
Bottling in two days

# Pectin & Glucan

**What is Pectin and why is it a problem?** Pectin is a sugar-acid-polymer that holds cells together, giving structure and rigidity. Pectin gels together in high sugar, high acid conditions and stabilizes wine haze. Also, lactic acid bacteria are known to thrive on pectin.

**How do you treat Pectin?** Pectinase is an enzyme that breaks down pectin. Pectinases release fruit characteristics for reds/rosé, create smoother mouthfeel, improve color stability, and gently extract phenolics. Adding pectinase increases free-run yield.

**What is Glucan and why is it a problem?** Glucan is a polysaccharide produced by the fungus *Botrytis cinerea*. Glucan inhibits precipitation of tannins/proteins/colloids, contributes to wine haze/viscosity, and plugs filters.

**How do you treat Glucan?** Beta-glucanase is an enzyme that breaks down glucan. Adding this enzyme helps the clarification/filtration process.

**What else should I know about Pectin and Glucan?** The best time to add the enzymes is before pressing, as it allows breakdown of pectin/glucan during fermentation. If the wine is hazy after fermentation, enzymes can be added then as well; just be aware that high alcohol can inhibit effectiveness. Note: Bentonite deactivates enzymes. Wait 24 hours after an enzyme addition before adding bentonite. Turbidity increases at first and takes about 6-8 weeks to settle.

**When should I test for Pectin/Glucan?** Warm climate vineyards have higher grape pectin concentrations as do pulpy cultivars • Botrytis exposure • Added grape concentrate • Clogged pad and membrane filters • Hazy after fining/filtering

**My wine is still hazy but tested negative for pectin/glucan?** Most likely there is excess protein. We can also conduct a microscan to determine if bacteria are an issue.

**What sample size do you need?** 50 mL

## BENCH TRIALS:
## BWGA offers the following bench trial services

| TRIAL | DESCRIPTION | VOLUME NEEDED |
|---|---|---|
| **Celstab Trial** | Heat (protein) stability, cold stability, cold stability with Celstab addition, and color stability (Rosé) | 375 mL |
| **Zenith Trial** | Heat (protein) stability, cold stability, cold stability with Zenith addition, and color stability (Zenith Color) | 375 mL |
| **Mannostab Trial** | Cold stability, cold stability with two dose rates of Mannostab, turbidity, and color stability (Rosé) | 375 mL |
| **Bentonite Trial** | How much bentonite required to heat (protein) stabilize white and rosé wine | 375 mL |
| **Sulfide Detection (Copper) Trial** | Evaluating sulfide issues and the addition of ascorbic acid or copper sulfate | 750 mL |
| **Acid Adjustment Trial** | Balancing the acidity by hitting a pH or TA target | 750 mL |
| **Wine Stylizing** | Enhancing and getting the full potential from your wine | 2 x 750 mL |
| **Troubleshooting** | Identifying wine flaws or undesirable characteristics and how to fix them | 750 mL |
| **Alcohol Bench Trial** | Hitting a target alcohol with dilution or fortification | 500 mL |
| **Pectin/ Glucan Test** | Determine presence of pectin and/or glucan | 50 mL |
| **Filterability** | Determination of wine suitability for filtration | 750 mL |

# Calcium in Your Wine?

Although Calcium Tartrate instability is usually not a problem in white and rosé wines, we've seen cases of calcium tartrate precipitation from grapes that were grown on soils high in calcium concentration. Unlike potassium tartrate, calcium tartrate instability really can't be fixed once it is in the wine. Instead, you have to try preventive measures at the juice stage by adding products to remove the excess calcium.

**Where does this calcium come from?** Mostly from the soil, but post fermentation additives can also have calcium. Uncoated concrete tanks can also release calcium into wine.

**So how much calcium is too much?** Some studies show that wines over 80 mg/L calcium will become calcium unstable.

**Why is it so bad?** Well, calcium tartrates form crystals very slowly — often months after bottling. They are also not temperature sensitive, so normal cold stabilization techniques won't work on calcium tartrate. And there are no products to add to stabilize calcium in finished wine.

**We can help!** We offer a Calcium test for both juice and wine as well as a Calcium Stability test for finished wine. Sample size: 50 mL.

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WINE
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## Hours, Drop Box & Courier!

| Business Hours: | **Monday – Friday 9am to 5pm** |
|---|---|

**DROP BOX**

Leave your samples in the **BWGA drop box** anytime outside of our normal business hours! To access the drop box just open the utility closet at the left of the main doors.

**COURIER**

We are pleased to offer a free courier service for our customers in San Luis Obispo and Santa Barbara Counties. Request a courier pickup by logging into your **Client Portal** and selecting the **Courier** tab on the left. Requests must be made by 4pm the day before pickup and can be requested up to 5 days in advance.

## Client Portal