

Taint Mitigation: Tricks of the Trade and Tasting #6

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Employing thermal mass and a high performance cladding system, the building does not have a traditional heating and air conditioning system and is completely heated and cooled by passive strategies including night time ventilation and an underground thermal rock bed.

Lighting and plug load requirements are met by photovoltaic panels on the roof and the building is pursuing net-zero energy certification from the Living Building Challenge. The building also captures and stores rain water from the roof. The Jess S. Jackson Sustainable

Winery building will serve as a test bed facility for faculty currently collaborating with industry partners to develop innovative new systems to demonstrate net-zero water and net-zero energy in the commercial production of wine.



This is a brief re-cap, in my words and interpretation, of Chik Brenneman's (Manager/Winemaker of UC Davis Student Winery) "**Wine Flavor 101**" presentation, January 15th, 2015, on **sulfur taints, their avoidance and/or treatment**.

WINEMAKER'S RESPONSIBILITIES

➤ **Avoid Formation in the First place:**

- ✓ Temperature Control – warmer = more sulfides.
- ✓ Use of Nutrients – Right Kind, Right Amount, Right Addition Timing.
- ✓ Pre-taint Additives – May work, if added at the right time.

- **Address Each Situation Promptly and Effectively:**
 - ✓ Identify the Correct Taint.
 - ✓ Get the Wine to a Stage at Which You Can Treat It.
 - ✓ Understand That the Treatments have Limitations/Risks.

THE WINEMAKER'S SULFIDE AVOIDANCE/CORRECTION TOOL BELT

➤ **During Fermentation:**

- ✓ Add Proper Nutrients, if Brix is Higher than 10° B.
- ✓ Add these Nutrients at the Proper Times. [“Chart for Harvest Nutrient Additions / Timing of Nutrient Additions”](#).
- ✓ Aeration helps blow off Light Sulfide Volatiles, increasing Yeast Health. Also drives (oxidizes) Sulfides to Mercaptans and then to Disulfides.

➤ **After Fermentation:**

- ✓ **Sulfide (H₂S) Treatment** – Use Copper Sulfate, once wine has settled.
 - Copper Sulfate only removes Sulfides and Mercaptans, not Disulfides.
 - Almost always, you'll also have Mercaptans by then)
- ✓ **Mercaptan/Thiol Treatment** – Copper Sulfate. Always measure and add carefully to avoid residual copper.
 - “If you have Mercaptans, you almost always have Higher Sulfides”
- ✓ **Higher Sulfide Treatment** (fairly slow at cellar temps. Days to weeks)
 - Stabilize SO₂ (31ppm Free / 114 ppm Total). SO₂ cleaves the Disulfide bonds, becoming Thiols.
 - Then add Ascorbate (>50ppm). Ascorbate/Vit.C traps Oxygen, preventing the re-oxidation of the Thiols back to Disulfides.
 - Then add Copper Sulfate to rapidly bind Thiols and H₂S as Copper Sulfate, which precipitates out of solution. Recommend filtration.
- **Blending** to possibly cover light taints.

WINEMAKER RULES ON COPPER USE

- **Use the Lowest Effective Amount.**
- **But, use enough to remove the offending aromas, or they will reform, guaranteed.**
- **Risk of copper-protein haze formation.**
- **Can act as an oxidation catalyst.**
- **Can mute the desirable characters of some thiols.**
- **“Just Throw Some Copper At It”, prophylactic additions are Highly NOT Recommended.**

TTB RULES ON COPPER USE (21CFR 184.1261 [GRAS])

- **The quantity *added* (calculated as copper) must not exceed 6ppm (6mg/L).**
- **The *residual* must not exceed 0.5 ppm.**

TIMING OF NUTRIENT PACKAGE ADDITIONS

- ❖ **Pre-Stage 1 - Rehydration of Cultured Yeast in “Start Up™”.**
Growing yeast need nitrogen and a wealth of nutrients, minerals, vitamins, and survival factors to build up enough healthy bio-mass that is needed to start and to complete ferment. Since there is no DAP [inorganic nitrogen/ammonia] in “Start Up™”, the yeast will get their nitrogen by “eating their amino acids” instead of “spoiling their dinner” by gorging on ammonia/DAP first. Now, your yeast are fully ready to grow when added to the must.
- ❖ **Stage 1 - Add 1/3 of the Total Nutrient Addition** when your fermentation is fully active and the Brix have dropped 3 to 4 degrees. (about 48 hrs. after inoculation) At this point, the yeast have taken up most of the nitrogen in the juice, and need more of everything.
 - ✓ **This is also the time to add your *M-L starter*.** (On the other hand, *if adding M-L after pressing/at dryness*, only add "Leucofood™" and add it 24 hours *before* adding your M-L starter)
- ❖ **Stage 2 - Add another 1/3 of the Total Nutrient Addition** when your fermentation Brix have dropped another 3 to 4 degrees.
- ❖ **Stage 3 - Add the last 1/3 of the Total Nutrient Addition** when your fermentation Brix have dropped another 3 to 4 degrees, at or just about mid-fermentation (8°B – 12°B). The yeast have stopped growing, but the alcohol is low enough that they can still take up extra nitrogen, replenishing the amount needed to survive to complete ferment.
 - ✓ **If, doing “spontaneous/native” fermentation**, add Stage 1, only when *saccharomyces* yeasts, instead of *Kloeckera* and other apiculate vineyard yeast, start growing. Do not feed *non-saccharomyces* vineyard yeast.