

# H2S/MERCAPTAN/HIGHER-SULFIDE TREATMENT

(Always do small trials first, before treating the rest of your wine!)

**STEP #1-** Test for and raise your SO<sub>2</sub> level to the recommended amount, relative to your pH. (Wait for MLF completion)

**STEP #2-** Ascorbic Acid Treatment for Higher Sulfides:  
(3.75 mls of 1% Ascorbic Acid/gallon = 10 ppm)

	<i>Slightly Stinky</i> try 30 ppm. 1% Ascorbic	<i>Mildly Stinky</i> try 60 ppm. 1% Ascorbic	<i>Very Stinky</i> try 90 ppm. or more 1% Ascorbic
1 gallon	11.25 ml.	22.50 ml.	33.75 ml.
5 gallon	56.25 ml.	112.50 ml.	168.75 ml.
15.5 gallon	174.37 ml.	348.74 ml.	523.11 ml.
60 gallon	675.00 ml.	1,350.00 ml.	2,025.00 ml.

- Ascorbic Acid/SO<sub>2</sub> makes higher sulfides become mercaptans/thiols.
- Wait 7 days and then do **Step #3**, the mercaptans/thiols treatment.
- **Un-removed** higher sulfides **will** create more mercaptans/thiols, and visa-versa.
  - So, treat aggressively and completely.
- Note: Ascorbate additions will confuse SO<sub>2</sub> tests by the same number of ppms.  
This effect dissipates with time.

**STEP #3-** Copper Sulfate Treatment for Mercaptans/Thiols:  
(.15 mls of 1% Copper Sulfate solution/gallon = .1 ppm copper)

	<i>Slightly Stinky</i> try .30 ppm. 1% Copper	<i>Mildly Stinky</i> Try .60 ppm. 1% Copper	<i>Very Stinky</i> Try .90 ppm. or more 1% Copper
1 gallon	.45 ml.	.90 ml.	1.35 ml.
5 gallon	2.25 ml.	4.50 ml.	6.75 ml.
15.5 gallon	6.97 ml.	13.94 ml.	20.91 ml.
60 gallon	27.00 ml.	54.00 ml.	81.00 ml.

- The copper will combine with equal amounts of thiols/mercaptans.
- **6 ppm total addition and .5 ppm un-bound residual copper are the legal limits.** Too much can be toxic and can cause a metallic taste and a distinct haze. So, do not over-treat, but do treat enough to **completely** remove the offending odors/flavors.
- **Un-removed** mercaptans/thiols **will** create more higher sulfides, and visa-versa.

**STEP #4-** Add De-odorizing Carbon (Norit D-10):  
(.02 oz to .08 oz. per 5 gallons) (That's ¼ tsp. to 1 tsp. per 5 gallons)

	<i>Slightly Stinky</i> De-odor Carbon	<i>Mildly Stinky</i> De-odor Carbon	<i>Very Stinky</i> De-odor Carbon
5 gallon	.02 oz.	.04 oz.	.08 oz.
15.5 gallon	.06 oz.	.12 oz.	.24 oz.
60 gallon	.24 oz.	.48 oz.	.96 oz.

- Simply dissolve in water and mix, gently, throughout the wine. The carbon will settle out in a few days to weeks, often clinging to the sides of the container.
- If, after the above treatments, **any** sulfides/mercaptans/thiols/higher sulfides (**any** odors other than pure fruit of the grape) persist, you will have to repeat the treatments. So, treat for the stinkies aggressively and completely.

The Different Forms are in an Ever-Changing Equilibrium.



Treat to Remove All Forms, or they will Reform

Link to [“Sulfur Taints During Fermentation”](#) & [“Sulfide Taint Mitigation”](#) for more info!

Rarely, a grower may dust his grapes with elemental sulfur to retard mildew conditions. If so, you can easily develop H<sub>2</sub>S/ Hydrogen Sulfide (a rotten egg, sulfury, burnt matches, off odor smelled at the start of fermentation) in your wines.

What is more usual is that **stressed, late season grapes are nutrient deficient**, leading to H<sub>2</sub>S formation (smelled at mid - late fermentation).

### To avoid the formation of H<sub>2</sub>S/Mercaptans/Thiols/Higher Mercaptans

- ❖ **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.

**Do not aerate, after the end of fermentation**, or you will just create more mercaptans/thiols and higher sulfides!

**If H<sub>2</sub>S is smelled, just at the end of sugar fermentation**, gently rack, and treat for mercaptans/thiols/H<sub>2</sub>S, *using copper sulfate only*.

**If off-odors persist** *after doing this copper only treatment*, rack and treat for higher sulfides, using ascorbic, copper, and carbon. (Consult the chart)

**You probably would have been better off, at the first smell of off-odors, to have done the complete higher mercaptan treatment. Ascorbic, copper, carbon.**

**If your wine doesn't smell/taste like 100% pure fruit of the grape, then you still have “The Stinkies”.**

**Any odor other than pure rotten eggs (H<sub>2</sub>S)** can be assumed to be Mercaptans/Thiols which will only progress to Higher Mercaptans when aerated.

**If you smell mercaptans/thiols, assume and treat for higher mercaptans**, using ascorbic, copper, and carbon.

**Inadequate removal of ALL THE STINKIES will result in the regeneration of more stinkies somewhere down the line.** These off-odors are in a state of flux.

Not treating for one will result in the evolvment of the others, **GUARANTEED**.

**“Just throwing copper at the stinkies is the worst mistake a winemaker can make”**  
said The Wine Lab, Napa Valley.