

Dealing with Hydrogen Sulphide (H₂S)

by Dan Sullivan

(This information is posted as it was written – an e-mail exchange on the WINETALK forum.)

Hi Kathryn: Your experience is quite common. In fact this year, I have had two “stinky ferment” problems (so far).

First, let me say that I am not a trained chemist or enologist, but here goes:

Your response has been generally correct. I believe what is happening in your ferment is that sulphur in the must is being reduced. This occurs when sulphur in a non-elemental form has oxygen removed (scavenged) by yeast during the fermentation process from the compound that it was contained in.

In a sense it is “set free”. Subsequently, the sulphur combines with hydrogen which is available in abundance in an acidic solution such as grape must. This forms a product called hydrogen sulphide (H₂S). Hydrogen sulphide is the mother of all stink!

Your application of the copper pipe is a crude but effective way of removing the sulphur from your must. The copper which dissolves into the must combines with the H₂S and binds together as an insoluble compound called copper sulphide (CuS). The danger in this method of treatment is that it is possible to permit too much copper to dissolve into your wine. Current regulations for commercial production of wine in Canada permit 1ppm of copper, I believe.

While it's unlikely that consumption of the wine will result in poisoning, excess copper can bring on its own set of problems. One which was common in days of yore, was the incidence of Cupric or Ferric Casse. This is a condition in which wines become permanently cloudy or hazy, due to metallic contamination. Back in pre-stainless and plastic days this was common. Don't worry, you don't have excess copper in your wine, as the smell has returned which means any copper in the wine is now CuS, hence will settle out.

The generation of H₂S is not necessarily a problem which can be laid solely on the doorstep of the grower. In fact, most good growers are acutely aware of the dangers of spraying late with Bordeaux mix or other sulphurous compounds and usually refrain from doing so for at least a month to six weeks prior to harvest, I think. That being said, yes, elemental sulphur from spraying can be a source. Perhaps an experienced grower can comment further.

More commonly, H₂S is generated during the fermentation process due to a lack of utilizable nitrogen in the must or juice. I don't know what specific mechanism in the fermentation process causes this, but I can definitely tell you that specific grape varieties and yeasts seem to require higher levels of nutrient and attention, in my experience. The addition of proprietary and generic fermentation nutrients such as Fermaid and Diammonium Phosphate (DAP), can provide supplementary sources of nitrogen. These additives work on SOME stinky ferment problems.

In my experience, grape varieties with tendencies to H₂S are: Gamay, Pinot Noir, most red hybrids and Merlot. In whites, Riesling, Gewurz. and Chardonnay (for a different reason-autolysis) seem more prone.

Yeast which I have had H₂S episodes with are: VL1 and less so VL3 (aromatic whites), BM45 (big reds), Wadenswill (WSK 27)-(slow fermentor, fruity wines) and 71B (malic acid reduction). A look at

Scottlabs website will give you a fermentation chart listing nutrient demands among other “all things yeast”.

There is a growing belief that the addition of utilizable nitrogen may NOT correct some stinky ferments and may in some cases, exacerbate the problem. A study by some researchers suggest that certain yeast species may be the main source H₂S generation during fermentations.

In any case my long-winded reply is about to close. What you want to do is rack the wine off the lees quickly and with a lot of aeration into an open bucket. This will help remove a source of growth for the H₂S, which is the yeast (alive and dead) and change the sulphur from a reduced to oxidized state where it can be volatilized off.

Further, quick action helps reduce the likelihood of disulphides or mercaptans (evolved and harder to treat products of H₂S) from being produced. Splash it until the smell starts to dissipate. Be warned that you are introducing a lot of oxygen to your wine.

Rack it back in to a carboy or demi-john with minimal headspace. Put it through malolactic fermentation quickly with a culture and add your sulphite for protection. Check for oxidation and H₂S recurrence frequently.

Based on your 19 Brix reading and knowing a little about hybrids, I think that that you'll probably want to cold-stabilize to help attenuate the tooth-rattling acidity that your wine probably has. Managing and reducing acid is another story best left for later.

Thanks for bearing with me, hope this helps.
Cheers, Dan Sullivan.

P.S.- Checking red wine with the sulphite titrettes is a waste of time and money. The pigment and phenols in the wine interfere with the end point and give false high readings. Further, that kit is designed for measuring free sulphite (the stuff that protects your wine from oxidation) not total or elemental sulphur concentration.