

HYDROGEN SULFIDE/MERCAPTAN SENSORY SCREEN

The following procedure is adapted from Zoecklein et al. (1999).

Brenner et al. (1954) suggested a technique for the separation of the two groups of sulfur-like off odor compounds based on sensory examination before and after treatment with copper- and cadmium-containing salts.

In the case of copper [as copper (II) sulfate] addition, reaction with both sulfides and mercaptans yields nonvolatile and relatively odorless products. Cadmium salts, by comparison, are chemically reactive toward hydrogen sulfide, but have little effect on mercaptans.

The following technique provides a quick, relatively simple and inexpensive diagnostic examination of wines suspected of having hydrogen sulfide and/or mercaptan problems.

NOTE!!! Wines evaluated using this technique should *not be tasted!* This procedure is designed for evaluation by smell only.

I. Reagents

Copper (II)sulfate (1% wt/vol): In approximately 90 mL of deionized water, dissolve 1 g $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$. Bring the solution to a final volume of 100 mL, using deionized or distilled water.

Cadmium sulfate (1% wt/vol): In approximately 90 mL deionized water, dissolve 1 g $\text{CdSO}_4 \cdot 8\text{H}_2\text{O}$. Bring the solution to a final volume of 100 mL using deionized or distilled water.

Ascorbic acid (10% wt/vol): In approximately 90 mL deionized water, dissolve 10 g ascorbic acid. Bring the solution to a final volume of 100 mL using deionized or distilled water.

II. Procedure

1. Fill three *clean* glasses with 50 mL of wine to be evaluated.
2. Mark glass 1 as "Control" and set aside.
3. Mark glass 2 as "Copper." To the 50 mL of wine, add 1 mL of the copper sulfate solution and set aside.
4. Mark glass 3 as "Cadmium." Add 1 mL of 1 % cadmium sulfate to the 50 mL of wine.
5. Mix each glass thoroughly.

Table 1 . Interpretation of results from sensory evaluation of cadmium and copper-treated wines

<u>Glass 1</u>	<u>Glass 2</u>	<u>Glass 3</u>	<u>Interpretation</u>
Off Odor	Odor is gone	No change	Mercaptans
	Odor is gone	Odor is less but not gone	Both H ₂ S and mercaptans
	No change	No change	a

^aThe objectionable odor does not stem from either mercaptan or H₂S sources, or methyl mercaptan has been oxidized to dimethyl disulfide.

6. Smell the Control sample, noting the presence and relative intensity of offensive odors. In like manner, evaluate glasses 2 and 3. Attention should be directed toward decrease or absence of a reduced odor.

7. Interpret results of the test as follows with reference to Table 1.

8. If odor evaluation results indicate that neither H₂S nor mercaptans are responsible for the offensive odor (last selection in Table1), further evaluation for the presence of dimethyl disulfide should be carried out (see steps 9-12 below).

9. Transfer 50 mL of untreated wine sample to a fresh, clean glass.

10. Add 0.5 mL of the 10% ascorbic acid solution. Mix, and let stand for several minutes.

11. Add 1 mL of copper solution. Mix, and evaluate for changes in the "nose."

12. If the offensive odor is less apparent than in Glass 2, the presence of dimethyl disulfide is suspected. Dimethyl disulfide does not react with copper. It must be reduced back to reactive species, methyl mercaptan.

III. Supplemental Notes

1. The Control sample should not change appreciably over the short course of this test. However, if the objectionable character is diminished as a result of oxidative changes, this would suggest a possible cellaring technique for correction.