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ADDITION OF SULFUR DIOXIDE

USING A SOLUTION OF SULFUR DIOXIDE IN WATER

Some winemakers choose to use solutions of sulfur dioxide in water for additions. The solutions are created by bubbling gaseous SO_2 into a measured volume of chilled water or by the direct addition of liquid SO_2, creating a saturated solution of SO_2-H_2O. **This is not the same as creating a solution by dissolving potassium metabisulfite in water.** At 20°C (68°F) the solubility of SO2 in water is 11.28% by weight.

(a) Prepare a solution of SO_2-H_2O in a well-ventilated area using appropriate safety measures. In cold water, solutions of 6-8% are readily produced.

(b) Using the data in the following table[1] you can plot concentration of SO_2 vs. specific gravity at various temperatures. Please note that this chart is not accurate for aqueous solutions of potassium metabisulfite because of the density contribution of the cations.

SO_2 Concentration	Specific Gravity at		
(% wt/vol)	15°C (59°F)	20°C (68°F)	30°C (86°F)
1.0	1.004	1.003	1.000
2.0	1.009	1.008	1.005
3.0	1.014	1.013	1.010
4.0	1.020	1.018	1.014
5.0	1.025	1.023	1.019
6.0	1.030	1.028	1.024
7.0	1.035	1.032	1.028
8.0	1.040	1.037	---

(c) Using the chart or plot from (b) above and a specific gravity hydrometer, determine the SO2 concentration of the solution. For example, a reading of 1.028 at 20°C corresponds to a concentration of 6.0% (60 g/L or 60,000 mg/L).

(d) Additions can then be calculated using the following formula:

$$\frac{\text{desired addition in ppm} \times \text{volume in gallons} \times 3.785\ \text{L/gal}}{SO_2\ \text{solution concentration in g/L}} = \text{addition in milliliters}$$

For example, the volume of 6% solution needed for a 10 ppm (mg/L) addition to 1,000 gallons (or 37.85 hL) of wine is 630 mL.

[1] *Source of data:* Willson et al. (1943). "Liquid sulfur dioxide in the fruit industries." *Fruit Prod. J.* 23:72-82.

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