

Effect	SO2 level needed	Ref(s)
<i>Antimicrobial (fungicide, bactericide)</i>	Generally: 0.6 ppm molecular for reds, 0.8 ppm molecular for whites	5
Against yeast	Varies: up to 100 ppm free (Saccharomyces, Klöckera, Candida); 0.8 - 1.5 ppm molecular	8
Against ML bacteria	10 ppm total slows, 50-80 total ppm prevents ML (0.6 ppm molecular); 50 gh/L inhibits ML, even if bound	5,8
Against Acetic Acid Bacteria	0.9 ppm molecular, >50 ppm free	8
Against Brett	0.3 ppm molecular to inhibit activity	3
	0.825 ppm molecular to eliminate viability (10,000 fold decrease in viable Brett)	8
<i>Antioxidant</i>	Target 20-40 ppm free during aging	3
Against enzymes at crush	20-80 ppm depending on fruit (50 ppm to healthy juice reduces PPO by 90%); 35 ppm will inhibit tyrosinases at crush	2,8
Red Wine oxidation	Risks below 10 ppm free	6
White Wine oxidation	Risks below 20 ppm free	6
Wine made from rotten grapes	Risks below 30 ppm free due to laccase	6
Guidelines		
SO2 level	Activity/Operation	
150-200 ppm	General total sulfur limits for fine wine (sensory)	5,7
350 ppm	Legal limit of total sulfur	8
Aging (Free SO2)		
20-30 ppm	Red wine aging; 0.6 molecular if done with ML, tannins allow antioxidant, 0.5 may be target if pH so high its hard to achieve	6
30-40 ppm	White wine aging, 0.8 molecular to prevent ML, oxidation	6
40-80 ppm	Sweet wine aging	6
Bottling (Free SO2)	Generally 0.4-0.8 ppm molecular	3
Targets		
10-30 ppm (0.3-0.6 ppm molecular)	Red wine	6,7,8
20-30 ppm (0.4-0.8 ppm molecular)	White wine	6,7,8
30-50 ppm (0.8-1.2 ppm molecular)	Sweet wine	6

Additions		
50-70%	Proportion of SO ₂ added to juice that binds to sugar, rest binds aldehydes and ketones	8
50-67%	additions	6,7
Operations		
8-10 ppm	Extra addition during bottling to offset oxygen intake due to filtration, racking	7
5-6 ppm free	Needed to offset O ₂ in headspace of bottle (or, sparge bottles)	8
Other numbers		
>100 ppm	Amount of SO ₂ addition needed to slow fermentation at crush, less if lower pH	1
10-30 ppm	Amount of SO ₂ produced by yeast during fermentation	6
5ppm	Loss per month during normal barrel aging	7
8-10 ppm	Free SO ₂ lost in bottle in the first year	7
Timing		
3-4 days	Time needed for bisulfite binding, lag time for SO ₂ re-testing	7
5 days	Time needed for degradation of acetaldehyde post fermentation	5

References

1. Bokulich, Nicholas A., Michael Swadener, Koichi Sakamoto, David A. Mills, and Linda F. Bisson. "Sulfur Dioxide Treatment Alters Wine Microbial Diversity and Fermentation Progression in a Dose-Dependent Fashion." *American Journal of Enology and Viticulture* 66, no. 1 (February 1, 2015): 73–79. <https://doi.org/10.5344/ajev.2014.14096>.
2. Boulton, Roger, Vernon L. Singleton, Linda F Bisson, and R.E. Kunkee. *Principles and Practices in Winemaking*. New York: Chapman and Hall, Inc, 1996.
3. Cojocar, George, and Oana Antoce. "Chemical and Biochemical Mechanisms of Preservatives Used in Wine: A Review." *Sci. Pap. Ser. B: Hort.* 56 (November 24, 2015): 457–66.
- 4 Jackowetz, Nick, Erhu Li, and Ramón Mira de Orduña. "Sulphur Dioxide Content of Wines: The Role of Winemaking and Carbonyl Compounds." *Appellation Cornell* 3 (2011): 1–7.
5. Margalit, Yair. *Concepts in Wine Chemistry*. 3rd ed. San Francisco, California: The Wine Appreciation Guild LTD, 2012.
6. Ribereau-Gayon, Pascal, Denis Dubourdieu, Bernard Doneche, and Aline Lonvaud. *Handbook of Enology Volume 1: The*
7. Stamp, Chris. "How Much SO₂ to Add and When." *Wines and Vines*, May 2011.
8. Zoecklein, Dr Bruce. "Sulfur Dioxide (SO₂)." *Enology Notes* Downloads (n.d.): 16.