Sulphur in Winemaking

Sulphur has been used in winemaking for many centuries. In fact, from the Middle Ages until well into this century, barrels for storing wine were disinfected by burning a sulphur stick inside them.

Today more controllable methods are used, but the end result is the same; and despite recent concerns about the use of “sulphite” (which is actually a partial term for one of the more convenient sulphur-containing chemicals in wide use), it is unlikely that we will see the elimination of sulphur from winemaking anytime soon. The reason is that no other method offers the range of desirable effects that sulphur provides, with its convenience of use, measurability, and low cost.

What we actually use is not sulphur itself, nor even (though we think of it in those forms), sodium or potassium metabisulphite, but rather the gas Sulphur Dioxide (SO2), which is obtained variously by burning pure sulphur, or by dissolving Sodium or Potassium Metabisulphite in water, preferably a slightly acidic solution. SO2 is a gas with a pungent odour, although not to be confused with Hydrogen Sulphide (H2S), which is the odour of rotten eggs. By contrast, the odour of SO2 is the typical one you smell when you take the lid off a jar of metabisulphite.

As mentioned earlier, SO2 is particularly useful in winemaking. It is an antioxidant, preserving the fresh flavour of the wine and preventing browning. It is a sterilant; and what is more interesting about this is that its effects are far more pronounced with wild yeasts and bacteria than it is with cultured wine yeasts, which have a fair tolerance for it. In other words, it’s selective in its actions and favours the organisms that we wish to favour. It can also be used to stop a malolactic fermentation where this type of activity is undesirable. By inhibiting new budding of the yeast it enhances clearing of the wine. Finally, in small concentrations it results in the final products of fermentation showing above average levels of glycerol, which makes wines smoother and more fully bodied in the taste.

Sulphur Dioxide can be added to wines in a number of ways; by burning elemental sulphur (a practice which probably has died out most everywhere….), by either adding a measured dose of sulphuric acid or bubbling pure SO2 gas through the wine (techniques used in some wineries), or by adding a chemical which produces the gas in known quantities. For simplicity, home winemakers usually employ the latter technique.

The products we use are Potassium Metabisulphite, Sodium Metabisulphite and Campden Tablets (a pelletized form). Taking them in order, Potassium Metabisulphite in crystal form is the cheapest and – for people making a reasonable quantity of wine – probably also the most convenient. Sodium Metabisulphite has fallen into disfavour, in part because it leaves Sodium in the wine, a concern for people with high blood pressure, but also because Potassium Metabisulphite assists in the deposition of Potassium Tartrate crystals, while the Sodium salt does not. Finally, Campden tablets, pre-measured doses of Potassium Metabisulphite, have the convenience of being precise doses, but with the drawbacks of higher cost and the bother of crushing them up before using them.

Whichever your choice, when the raw material is dissolved in water, much the same things happen. The material disassociates, by which we mean that it breaks up into particles that could not exist on their own, and are looking for other particles to team up with — sort of a singles’ bar for molecules. The action is swift and constant, and all possible combinations come to exist (wow, this is getting to be pretty steamy stuff!), with the interesting effect that the combinations all stabilize. One of those,

for our purposes, is sulphur dioxide. What that means is that if you add sulphur, in whatever form, or remove it, the amount of free SO2 is constant as a percentage of the total sulphur available.

How Much to use?

For preserving a wine, a level of 50 parts per million (ppm) is normally recommended.
This is achieved by using 1 Campden tablet per gallon, or 1/2 teaspoon of Potassium Metabisulphite crystals in 4 gallons (1 teaspoon of Potassium Metabisulphite, or K2S as you may see it in some bills, being equal to 8 Campden tablets).
At 50 ppm you should not normally detect an objectionable sulphite content. Many people can at 100 ppm, and most people do at 150.

It is instructive to determine your level of sensitivity to SO2, specifically 50, 100, and 150 ppm.
It is useful therefore to set up a “smell test” of sulphite to determine your threshold. Remember that 50 parts per million (ppm) is equal to 1 ml per 20 litres. Look for it primarily in the nose, and only secondarily in the taste. Following that, you might want to try increasing the concentration to determine where you find the sulphite smell. This is how we train judges!