

SUCCESSFUL BOTTLING

by
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Light-bodied, white table wines and most blush wines are bottled a few months after harvest. Heavier-bodied white table wines, such as Chardonnay and Sauvignon Blanc, are usually nine months or so old when bottled. Most red wines are about twelve months old when bottled, and high quality red wines are often two or more years old.

Bottling may seem like a simple procedure to the novice winemaker, but several important issues need to be considered before the bottles are filled.

Clarity and Stability

Most sound red wines become clear and bright when several months old so clarity is seldom a problem for these wines. On the other hand, practically all white and blush wines require fining or filtration to achieve good clarity. In any case, all wines must be brilliantly clear before they are bottled. Besides being clear, wines must also be stable before they are ready to bottle. The major stability issues encountered by home winemakers are residual sugar, “hot” instability and “cold” instability.

Residual Sugar

Wines containing more than 0.2 percent residual sugars (RS) are not biologically stable. These wines can start fermenting again in the bottles and become “spritzy.” An ugly sediment forms, and the corks may be pushed out of the bottles unless special steps are taken. Hydrometers are not accurate enough to reliably measure residual sugar, so *Clinitest* tables should be used to determine how much sugar remains after fermentation.

Commercial winemakers use “sterile filtration” to deal with the residual problem, but most home winemakers add potassium sorbate when they leave residual sugar in a wine. The potassium sorbate does not stop yeast from fermenting sugar, but it does prevent the yeast cells in the wine from reproducing. Sometimes potassium sorbate does not prevent fermentation from restarting because the wine contains too many viable yeast cells. The potassium sorbate prevents the yeast from reproducing, but enough yeast cells may already be present to ferment the residual sugar.

A different situation exists when potassium sorbate is added to a well-clarified wine. Clear wine contains very few yeast cells, and the potassium sorbate prevents the viable yeast cells from reproducing. Now, the yeast population remains small, and the sugar is unaffected. The usual dose is about one gram of sorbate per gallon of wine. One gram per gallon is equivalent to about 2 teaspoons of potassium sorbate for 5 gallons of wine. But, how much sorbate is needed depends upon several wine properties. Wines with a high alcohol content, low pH and 30 to 50 milligrams per liter of free sulfur dioxide present require less potassium sorbate. Sulfur dioxide should always be used with sorbate or a strange geranium-like odor may develop in the wine.

Hot and Cold Stability

Practically all white and blush wines require both hot and cold stabilization treatments before they become stable. Wine is made hot stable by removing excess protein from the wine with Bentonite, and wine is made cold stable by chilling the wine to about 28 F for several days.

Wines can be checked for cold stability by placing a small sample in the refrigerator. After

48 hours, the wine sample is removed from the refrigerator and set aside for several hours. When the sample reaches room temperature, the wine is carefully examined for cloudiness or tartrate deposits.

Wines can be checked for hot stability by holding a small wine sample at 120 degrees. After 48 hours at 120 degrees, the wine is allowed to stand at room temperature for several hours. The wine is then inspected for protein haze or sediment.

Most commercial wineries test their red wines to be sure they are cold stable. But, the tartrate crystals are harder to see in red wines, so most home winemakers do not bother with cold stabilizing their red wines.

Free Sulfur Dioxide

The free sulfur dioxide (SO_2) in the wine and the pH should be measured a few days before bottling. The sulfur dioxide content should then be raised to 0.8 milligrams of **molecular** sulfur dioxide per liter of wine. Molecular SO_2 depends on wine pH as shown in Figure 1. Note that large amounts of free SO_2 are needed when the pH exceeds 3.8, so many winemakers use 0.5 mg/l of molecular SO_2 in their high pH red wines.

The proper level of SO_2 is important, and bottling any wine with less than 0.5 milligrams of molecular sulfur dioxide per liter often results in a short-lived product.

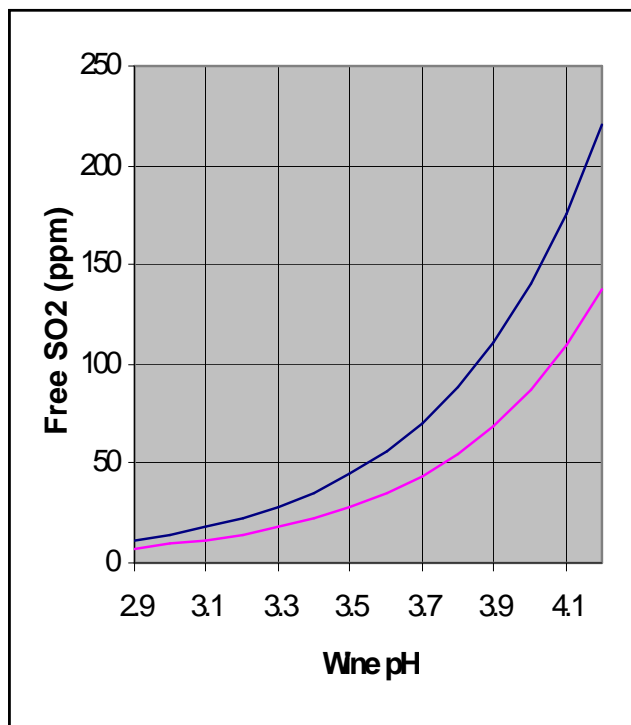


Figure 1. The free SO_2 required to produce 0.8 (upper curve) and 0.5 mg/l (lower curve) as a function of wine pH.

Filling the Bottles

Bottles stored for extended times should be rinsed before filling. Some home winemakers turn up the hot water heater a couple of hours before starting to bottle wine. Then previously washed, clean, used bottles can be rinsed with very hot water (180 F) just before they are filled as shown in Figure 2.

Other home winemakers prefer to rinse previously cleaned bottles with a sulfur dioxide solution. The solution is made by mixing 1/4 tsp. of sulfite powder and 1/2 tsp. of citric acid in 750 ml of clean, cold water. This sulfite solution is very strong so the bottles must be drained **completely** before they are filled.

Wine is always exposed to air when the bottles are filled, so some type of bottle filler should be used to minimize wine oxidation. Most home winemakers use a hose fitted with a plastic, wand-type bottle filler to fill their bottles. These fillers consist of a small valve on the end of a rigid plastic tube. The plastic tube is placed in the empty bottle and the valve opens when it contacts the bottom of the bottle. Wine begins to flow when the valve opens, and the bottle is filled from the bottom. Little splashing occurs when filling is done slowly, and wine oxidation is held to a minimum.

Small, two and three-spout gravity type bottle fillers can be purchased for about one hundred dollars, and these fillers are very convenient when several cases of wine are bottled at once. Gravity fillers consist of a small tank, a float valve assembly to keep the wine in the tank at a constant level

and the filler spouts. The filler tank is kept full by siphoning or with a small pump.

Operation of gravity type bottle fillers is quite simple. The operator places an empty bottle on an empty spout, and the machine starts filling the new bottle. Filling continues unattended while the operator removes other full bottles and places empty bottles on those spouts. When new bottles become full, the machine automatically stops filling. Once the filler is adjusted properly, all of the bottles will be filled to the same uniform level. Little spillage occurs, and if the operator is careful, the outside surfaces of the bottles remain clean and dry. Most gravity bottle fillers can fill two bottles per minute for each spout and one person is kept busy changing the bottles. See Figure 3.



Figure 2. A bottle being washed with hot water prior to filling.

Most wand-type bottle fillers and some gravity fillers leave too much air space in the bottles. Bottles should be filled so there is less than 1/4-inch space between the top of the wine and the bottom of the cork.

Some winemakers prefer to fill and then cork one bottle at a time. Others prefer to fill several bottles and then cork the lot. Either method works well, but leaving bottles full of wine open for long periods is not good practice.

Corking

Standard wine corks are sold in sealed polyethylene bags containing one thousand corks. The corks are sterilized with sulfur dioxide gas and the water content of the corks is carefully adjusted just before packaging. Corks taken from a sealed bag are sterile, soft and resilient, and dry corks can be driven easily with a floor” type corker.

Most small hand type corking machines cannot adequately compress hard, dry corks. Here, the normal procedure is to soak the hard corks in cold water until they become soft enough to drive with the corker available. A pinch of sulfite can be added to the water to help sterilize the corks as they are soaking. Wet corks may leave “cork water” when the corks are driven into the bottle. Excessive cork water is undesirable. It can be easily avoided by soaking the corks for a few hours and then draining them overnight.



Figure 3. 1.5 liter bottles being filled on a small, two-spout gravity bottle filler..

Corks can be quickly softened (and probably sterilized as well) in a microwave oven. But, corks burn easily, so practice on a few old corks. First the corks are rinsed in clean, cold water. Then the wet corks are sealed in a plastic zip-lock storage bag, and the sealed bag is then placed in a microwave oven. Some experimentation with the time and power settings of the microwave oven will probably be needed.

Corking machines should be adjusted so the top of the cork is set just below the lip of the bottle. Spilled wine should be removed from the outside surface of the bottles when the corking operation is completed. Wine left on the bottles makes labels difficult to apply, and mold often grows on the spilled wine.

Labels

Producing custom wine labels with a home computer is easy, and professional looking labels can be produced if a color printer is available. Layout 4, 6 or 8 labels on standard 8.5 X 11-inch paper. If the layout is done carefully, the labels will be easy to cut out with a paper cutter. Some types of glue have a tendency to wrinkle light weight papers, so labels are best printed on medium or heavy weight paper.

Labels can be applied when the bottles are clean and dry, and a “glue stick” is convenient for labeling few bottles. Some home winemakers use an inexpensive, 1-inch brush to apply “*Elmers*” glue to labels. The following procedure works well for labeling a few dozen bottles by hand. Cut a piece of cardboard a little smaller than the label. Place the label face down on the cardboard and apply the glue with the brush. Apply the glued label to the bottle and quickly smooth out any wrinkles. Try to place the label in the proper position the first time to avoid smearing the bottle with wet glue.

When labeling “short runs,” commercial wineries use a label paster to apply glue to the back surface of plain paper labels. Home winemakers that produce large amounts of wine each year also rely on these machines to apply just the right amount of glue. These little machines are easy to use, and they save a great deal of time when labeling large numbers of bottles. But unfortunately, even small label pasting machines are rather expensive. New machines cost \$600 or \$700, and second hand machines are almost impossible to find. Figure 4 shows an old, but functional label paster in operation.



Figure 4. Label pasters, like the one on the left, apply glue to plain paper labels quickly and easily.

A few extra labels should be made when the labels are printed. The extra labels are pasted on the ends of the cartons to identify the contents, and the labels give the “case goods” a nice, professional look.

Capsules

Plastic capsules are inexpensive, and they provide an attractive, finished look to bottled wine. “Push-on” type capsules are made of heavy weight, plastic material, and many home winemakers prefer this type of capsule because they are easy to apply. The capsule is simply pushed onto the neck of the bottle by hand.

Unlike push-on capsules, “heat-shrink” type capsules are made from thin plastic materials. They are available in a greater range of colors and finishes, and they are slightly less expensive. Heat-shrink capsules are placed over the neck of the bottle, and then heat is applied to shrink the plastic material tightly to the bottle. Large wineries pass the bottles through a heat tunnel to shrink the capsules in place. Home winemakers use electric heat guns or hair driers or they dip the necks of the bottles in boiling water.

Summary

All wines must be both clear and stable before they are bottled. Any blending should be done many weeks before bottling time. Early blending allows the winemaker to observe the wine for several weeks to make sure the new blend is stable before it is bottled. Wines containing more than 0.2 percent residual sugars can restart fermenting anytime and these wines must be treated in some way to insure stability after they are bottled. Sterile filtration or adding potassium sorbate are the common ways of stabilizing wines containing residual sugar.

Much wine oxidation occurs when bottles are filled. Since oxidation is the most common defect in homemade wines, home winemakers should give considerable attention to how the bottles are filled. Some type of bottle filler should be used, and the bottles can be filled slowly from the bottom with a minimum of splashing and bubbling.

Corkers should be carefully adjusted so that the corks are set flush or slightly below the lip of the bottle.

All bottled wine should have a label to identify the contents. Custom wine labels are easy to make using a home computer and they can be applied with a glue stick or with Elmer’s white glue.