



Photo by Daniel Pambianchi

should not exceed 12.5% or so alcohol. Anything higher will make the acidity unpalatable and the wine may require more sugar (for balancing taste) than you bargained for. The riddling process can be substituted by placing bottles upside down, a technique called *sur pointes*, and giving bottles a sharp twist every day to dislodge sediment from the side of the glass. And if you are not inclined to disgorge, you can store bottles upright and let the sediment fall and then, either serve the wine directly from undisgorged bottles being careful not to pour sediment, or carefully transfer previously chilled wine into new bottles and then recork.

In a clever variation of the traditional method for home winemakers, fermentation can be carried out by placing the yeast inoculum in dialysis tubing, which is semi-permeable membrane tubing made from regenerated cellulose or cellophane, and inserting it in the bottle containing sweetened wine to initiate bottle fermentation. The tubing has microscopic pores that allow the sweetened wine to interact with the yeast through the pores and ferment, but the larger spent lees particles are restricted inside the tubing. At the end of fermentation and aging, each bottle is uncapped and the tubing with spent lees is retrieved, leaving the wine crystal clear. No riddling, no neck freezing, no disgorging required! Read more about this in the "Techniques" column in the June-July 2004 issue of *WineMaker*.

A Cornelius (beer) keg can be used for making Charmat sparkling wine. The wine is transferred to bottle using a counter-pressure filler. The trick here is to slightly bend the tube that feeds from the bottom of the keg so that the opening will be just over the sediment that will form. A pressure gauge on the keg is also recommended to monitor fermentation progress. Carbonation eliminates the hassle of refermentation and separating the sediment out of the wine. The biggest advantage here is that you know exactly how the wine will taste since it undergoes no microbiological change and very little chemical change (slightly higher acidity due to carbonic acid). Read more about using this method for making sparkling wine at <http://winemakermag.com/story306>.

In all cases, never add more than 25

An aphrometer (above) is used to monitor bottle fermentation progress and the pressure it creates when making traditional-method sparkling wine.

smaller the bubbles, the greater the organoleptic qualities, i.e. more aromatic intensity, more flavors, etc. Data from researchers and anecdotal evidence from consumers are diametrically opposed on this issue. But this can be a moot point now that well-crafted — I emphasize well-crafted — Charmat wines can have some of the smallest bubbles. A steady stream of persistent fine bubbles is what's important. And what's certain is that large bubbles diminish the tactile intensity of flavors on the palate and hence pleasure.

Making Bubbly at Home

Making sparkling wine at home using the traditional method involves a lot of work, though it is not impossible. The biggest challenge is not in the process but rather sourcing low-Brix, high-acidity grapes. Remember that bottle fermentation adds about 1.5% alcohol and the final wine

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The process of removing all the sediment from each bottle of sparkling wine is done, traditionally, by placing the neck of bottles in a brine solution for a few minutes and then disgorging, which reduces the risk of sediment falling back into the wine. In the top photo, the bottles are placed in the brine to freeze the sediment. Next, the disgorging key is used to remove the crown cap on the bottle, which causes the sediment to fly out of the bottle leaving the remaining wine crystal clear. If done properly pressure loss is minimal.

g/L of sugar—more sugar will not necessarily translate into more bubbles, but rather a stuck fermentation. Yeast becomes completely inhibited at 7 bars (105 PSI).

Whichever method you use to make your sparkling wine, be sure to work with safety in mind. You will be handling bottles with as much as 6 bars (90 PSI) of pressure, making these real liquid bombs that will shatter and launch glass particles at dangerous speeds and gush wine to great distances. Here are some tips to make sparkling winemaking fun and safe:

- Wear protective glasses or, better yet, a full-face shield, gloves and overalls.
- Only use glass bottles that are specifically designed with thick glass to withstand the high pressure of bubbly.
- Handle bottles with extreme care as they can easily shatter if knocked against a surface or if hit by a metal tool.
- Do not shake bottles; wine will gush out uncontrollably when disgorging. Other than a mess to clean up, you may also end up losing just about half a bottle.
- Point bottles away from your body and other people around you. Use some kind of safe enclosure to disgorge into. An old oak barrel with a cutout works very well.
- Never add more sugar than recommended for bottle fermentation.
- If you decide to use a freezer to chill bottles down to ease disgorging, use a timer to remind you to take bottles out. There is no worse mess than to have to clean up shattered sparkling wine bottles in a freezer — trust me on this one.
- Do not be tempted to use dry ice for freezing the neck of bottles to ease disgorging — the glass will become very fragile and/or simply break under the extreme cold temperature. Not to mention that dry ice comes with its own set of safety concerns.

Pairing and Serving Bubbly
Sparkling wine makes a great aperitif on its own to get taste buds excited in anticipation of a fine meal or as a refreshing patio sipper. It also pairs best with salty foods, such as crustaceans and other seafood. Russians prefer vodka with caviar, but give champagne or a fine New World sparkler a try for a hedonistic experience in wine-food pairing. For

Bubbles in Bottles



Can you name the various sizes of champagne bottles? The illustration above shows the most common sizes used for bottling sparkling wine. (Many of these sizes are used for still wines as well.) Do you know how many bubbles there are in a standard 750-mL bottle of the finest champagne? Champagne expert Gérard Liger-Belair, Associate Professor of Physical Sciences at the University of Reims Champagne-Ardenne, has made a living from researching bubble physiology and kinetics. Some of his work is published in "Uncorked: The Science of Champagne." He starts from the assumption and estimate that there is approximately 700 mL of gaseous carbon dioxide in a flute of champagne (or 5,250 mL in a bottle). He then calculated that a flute of the bubbly contains about 11 million bubbles or more than 80 million bubbles in a standard bottle. The number of bubbles in champagne would not be serious business unless some "real" research — the type that has serious money to back it up — would be undertaken to measure the size of bubbles. Well, the prestigious Champagne house of Moët & Chandon of Dom Pérignon fame and who has been making champagne since 1743, partnered with beer-making giant Heineken in the late 1980s to do just that and threw \$7 million at it. They used a camera-based, computer-linked 'artificial vision' system to record the release of bubbles and count them. Their result showed that there are on average 250 million bubbles in a bottle.

Illustration by Chris Champagne

something more casual or laid back, like watching football on TV, try some inexpensive dry bubbly with unflavored potato chips. And if you prefer sweeter bubbly, that's best saved for after dinner or by the pool on a hot summer day.

But please, never add OJ to sparkling wine (a cocktail called a Mimosa), at least not fine sparkling wine. Winemakers get offended having gone to great lengths (and expense) to craft fine bubbles, great aromas and sublime flavors.

Serve sparklers chilled in tall flutes — they show the bubbles, aromas and flavors best. Traditional coupes cause excessive loss of precious gas and organoleptic qualities. And the dryer the style, the less chilled the wine.

While sipping, do not be tempted to swirl the glass as with still wines; you would otherwise, again, be releasing excessive bubbles that winemakers worked so hard to get into the wine. There is no need to swirl as the rising

bubbles all on their own bring up and release all those wonderful aromas.

Once done, wash glasses by hand immediately. A dishwasher would coat glasses with a very thin layer of soap that will seal all imperfections in the glass and prevent the next sparkling wine from bubbling. There is nothing less appealing than serving a fine bottle of champagne that looks flat, completely devoid of bubbles. Instead, rinse each glass several times under running hot water and wash the rim by applying a tiny drop of dishwashing soap and rubbing it on the circumference being careful not to get soap down the glass. Then rinse again several times, let drain and towel dry.

As for storing and saving opened bottles of wine — I don't have much experience here — any pressure-resistant closure that grips securely under the lip of bottles are best. Gadgets that re-pressurize bottles do not work; they were not designed with gas and physical chemistry

in mind. And don't store an opened bottle with or without a closure for more than 24 hours; bubbles will quickly fade away. So enjoy your bubbly while it's open — it's not made to last once you pop the cork! **WM**

Related Links:

- Get some sparkling winemaking advice from Richard Geoffroy, Chef de Cave of Dom Pérignon, the prestige cuvée of the Moët et Chandon Champagne house: <http://winemakermag.com/story705>
- Try making sparkling wine with the ease of a wine kit. Make a base wine with one of your favorite kit styles and then add bubbles: <http://winemakermag.com/story480>
- Get some advice from the Wine Wizard for making bubbly wines at home: <http://winemakermag.com/story358>