

How is wine produced?

The wine industry has been continuing to grow and Americans are drinking more wine now than ever before. Americans consume three gallons of wine per person, the highest ever. The number of American wineries have doubled in the last decades-to more than 4,000-and, for the first time in American history, all fifty states produce wine (Zraly 40). Although European wine is considered to uphold a better reputation, the American wine industry has been considered quite comparable.

Wine making has been around for thousands of years and has been interpreted and molded into an art. There are five components, or steps to making wine: harvesting, crushing and pressing, fermentation, clarification, and aging and bottling. Undoubtedly, one can find endless deviations and clarifications along the way (“Wine making process”). All of these steps result into personal preference and in the end it’s all about pleasing the palette.

There are many factors that play in the harvesting component. Timing, climate, temperature are three important factors that winemakers must consider. Although, harvesting is an important step that essentially sets the pace for the rest of the process, it is a step that will not be included in my thesis program. This study will focus on the winemaking process from the time the grapes are received.

Once the grapes are received, crushing and pressing comes next. Today, mechanical crushers perform the time-honored tradition of stomping or trodding the grapes into what is commonly referred to as *must*. For thousands of years, it was men and women who performed the harvest dance in barrels and presses that began grape juice’s magical transformation from concentrated sunlight and water held together in clusters of fruit to the most healthful and mystical of all beverages – wine (“Wine making process”). The switch from manually crushing to machine crushing has not changed the taste of wine. The mechanical pressing has improved the longevity of wine and has eliminated some sanitary issues the old tradition brought. Although it seems as if this step is the ultimate beginning of the life of the wine, it is not; sometimes fermentation begins inside uncrushed grapes.

As per the wine month club website, fermentation and clarification steps are typically proceeded in the following way:

Fermentation is indeed the magic at play in the making of wine. If left to its own devices must or juice will begin fermenting naturally within 6-12 hours with the aid of wild yeasts in the air. In very clean, well-established wineries and vineyards this natural fermentation is a welcome phenomena. However, for a variety of reasons, many winemakers prefer to intervene at this stage by inoculating the natural must. This means they will kill the wild and sometimes unpredictable natural yeasts and then introduce a strain of yeast of personal choosing in order to more readily predict the end result. Regardless of the chosen path, once fermentation begins, it normally continues until all of the sugar is converted to alcohol and a dry wine is produced. Fermentation can require anywhere from ten days to a month or more. The resulting level of alcohol in a wine will vary from one locale to the next, due to the total sugar content of the must. An alcohol level of 10% in cool climates versus a high of 15% in warmer areas is considered normal. Sweet wine is produced when the fermentation process stops before all of the sugar has been converted into alcohol. This is usually a conscious, intentional decision on the part of the winemaker.

Once fermentation is completed, the clarification process begins. Winemakers have the option of racking or siphoning their wines from one tank or barrel to the next in the hope of leaving the precipitates and solids called pomace in the bottom of the fermenting tank. Filtering and fining may also be done at this stage. Filtration can be done with everything from a course filter that catches only large solids to a sterile filter pad that strips wine of all life. Fining occurs when substances are added to a wine to clarify them. Often, winemakers will add egg whites, clay, or other compounds to wine that will help precipitate dead yeast cells and other solids out of a wine. These substances adhere to the unwanted solids and force them to the bottom of the tank. The clarified wine is then racked into another vessel, where it is ready for bottling or further aging. (4)

Aging and bottling is the final stage of the process. The winemaker has choice to either bottle the wine immediately or allow the wine to age longer. Much like the whole process of wine making, there are always choices and preferences involved: aging can be handled in a variety of ways. Wine can age within a bottle, barrel, or a tank (stainless or ceramic). Most people would agree that aged wine is better, but that is not always the case. It's a common misconception that all wines improve with age. In fact, more than 90 percent of all the wines made in the world are meant to be consumed within one year, and less than 1 percent of the world's wines are meant to be aged for more than five years. Wines change with age. Some get better, but most do not (Zraly 6).

There are essentially two philosophies for making wine in the commercial sense of wine productivity. Essentially, one method uses pumps and the other does not. There is no right or wrong way of proceeding, but some winemakers prefer a certain way. The type of wine being produced has better suited processes as well.

An old philosophy known as the *gravity flow* process is making a comeback into the wine industry. This simple process has been validated by over 500 years of wine making in France's Burgundy region. The inherent sophistication of the design and higher construction costs make this approach best suited for low volume production of high quality wines ("Willakenzie gravity flow"). This process is more favorable for the making of red wines in particular (pinot noir). Why is it more favorable? Nurturing and gentle handling of Pinot Noir wine at every stage of its development are requirements for achieving greatness ("Willakenzie gravity flow"). During the gravity flow process grapes start at a height and work their way downward through the wine making process rather than suffering the stress of pumping or pushing. This method has been accepted as the gentlest way of treating precious raw materials. Gravity flow has been said to create more complex dynamic wines and often times produces a smoother wine. A well-known Oregon winemaker, Eric Hamacher (Hamacher Wines, Carlton, OR) has been quoted from time to time, "...pumping process degrades the quality of the final product."

An ideal gravity flow facility would have as many as seven levels: 1) grape receiving, sorting and loading, fermentors and presses, 2) fermentor unloading and pomace removal, 3) settling, 4) barrel storage, 5) blending, 6) bottling, and 7) the dock for truck loading (Ferar 3). Although the seven stories would be considered ideal it is

considered a lavish thought. (See Fig.1) Wineries that use this method tend to compromise and use gravity in the most cost-effective way. A common question arises when compromising, which can steer what direction the winery will take: how are grapes best sorted, destemmed, and loaded into fermentors (movable or stationary fermentors). In the article *Lemelson Winery: Building a Gravity-Flow Pinot Noir Facility*, written by Laurence Ferar, these questions were investigated. Eric Lemelson and Eric Hamacher, two winemakers came to some conclusions:

We observed two basic methods: an array of movable equipment, servicing rows of fixed fermentors and movable fermentors filled on a fixed crush pad. The first method typically involves a hopper or bin dumper, a sorting table, and a destemmer, which all must be moved and properly aligned at each fermentor. Power drops have to be coordinated to be within close range of each piece of equipment. Many wineries utilize a mezzanine level just above the top of the fermentors. These require removable guard rail sections and splash guards for open-top fermentors. Facilities with single-level fermentation rooms often employ an inclined conveyor in addition to (or in conjunction with) a sorting table, adding to the challenge of creating an efficient set-up. The fixed crush pad has the advantage of not requiring alignment of various equipment each time a fermentor is filled. But moving large fermentors requires special self-propelled pallet jacks and flat floors, which obviate good drainage. As a result, clean up becomes more tedious. (4)

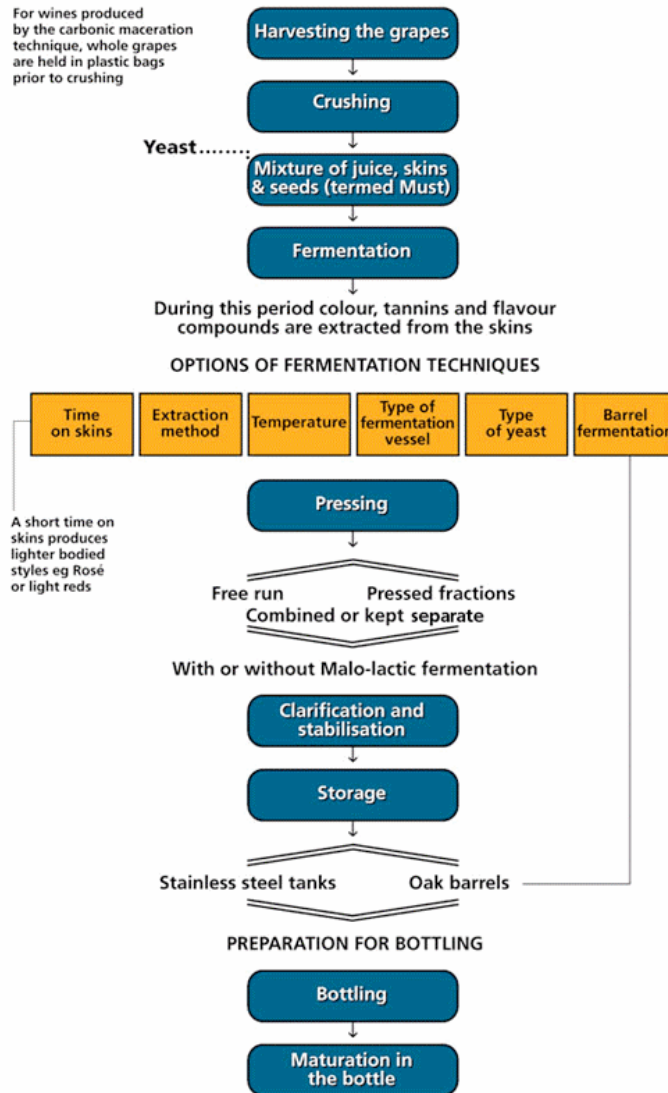


Fig. 1. Diagram, Willakenzie Estate Gravity Flow 2006. 9 Sept 2006.

The Willakenzie Estate (Yamhill, OR) uses the gravity flow philosophy (see Fig. 2). It is a multi-level facility that prides in producing high quality wines with minimal handling. Grapes are brought from their onsite vineyard to the upper level for processing. The upper level houses the press, vibrating table, sorting table and destemmer. Processing equipment for red grapes is moved from tank to tank so that the destemmed berries fall directly by gravity into one of the stainless steel fermenters. Below this is the fermenting area where the grapes sit in a controlled room. Finally the wine is drained from the tanks by gravity into French oak barrels located at the next level below. The “must” is removed manually from the tanks, loaded into large bins, which are driven back to the top level

with a forklift. Then it is gently pressed to extract the remaining wine, which is gravity fed into the barrels (“Willakenzie gravity flow”).

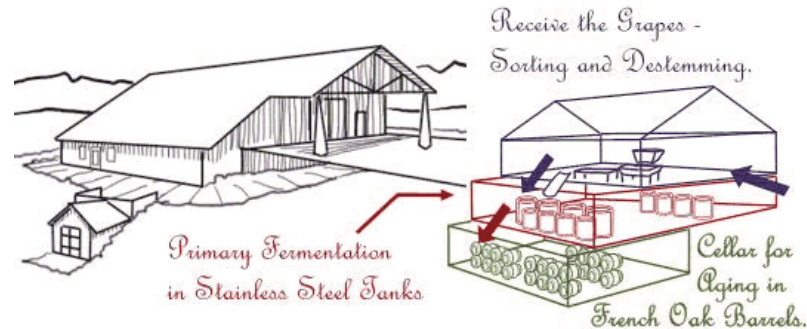


Fig. 2. Diagram, Willakenzie Estate Gravity Flow. 2006. 9 Sept 2006.

The gravity flow technique worked well architecturally speaking for the Willakenzie Estate because it was on a site that allowed for the level changes. The winery is located on a slope, which allowed for the multi-level A-frame design to cater to the philosophy as well as blend into the landscape. On the contrary, not all wineries are located in the hills (out in the country sides), and not all wineries have a vineyard. This particular philosophy can be designed with as little as three and as many as seven levels. The Willakenzie Estate used three because they wanted a gradual slope that integrated into the landscape.

There are certain principles in winemaking that essentially remain the same throughout any winemaking process, but the different values, philosophies, and innovations each winemaker uses creates a different taste. Although the internationalization of winemaking techniques is a topic that is always much discussed, methods of production can still vary greatly not just from country to country, but from region to region, and quite commonly even from grower to grower within the same village (Stevenson 32).

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