

White Wine Production*

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Introduction

A significant number of wineries in Missouri and other states are engaged in small-scale wine production. Some of the wineries are recent commercial ventures while many others have chosen to stay small due to the limitations of time and other resources.

Regardless of the scale of production, the wineries must make high quality wines consistently in order to succeed in the business.

In the last couple of decades, wine production technology has made great strides. Many large wineries use modern technology to make excellent wines. Small-scale wine producers can also adapt this technical know-how to make high quality wines.

For the purposes of this publication, small-scale winemaking, or microvinification, refers to those winemakers producing five to several thousand gallons of wine annually. There are three categories of winemakers that practice microvinification. These are:

- Smaller commercial operations.
- Researchers making smaller lots of experimental wines. This group would include enologists working in the Research and Development Department in a larger commercial winery.
- Serious hobby winemakers who enjoy making various kinds of wine in smaller lots, five gallons or more.

The discussion in this publication will focus on how to apply modern winemaking technology to small scale wine production. Large-scale wine producers can also easily adapt this information because the principals for quality wine production remain the same, and are equally applicable to quality winemaking regardless of size.

White Wine Production

A schematic diagram showing important steps in white wine production is presented in Fig. 1. The illustration points to the basic steps, along with some variations, to be followed in order to produce various styles of white wines. Commercially, white wines are produced in several styles, and stylistic considerations are often guided by market forces. However, wineries making smaller lots should experiment with making both traditional as well as newer styles of wine.

White wine styles

White wines are made in various styles. The two main categories are:

- Dry white wines.
- Sweet white wines with varying degrees of sweetness.

The dry white wine category includes three main styles:

Standard whites - This style includes generic, easy to drink, everyday table wine. It is vinous, somewhat fruity, crisp and clean. Examples include jug wines.

Varietal whites - These include quality varietal wines. The wines are well balanced and display prominent varietal characters. These wines are often consumed with a meal. Chardonnay, Sauvignon blanc, Seyval, Vidal, and some dry Riesling can be grouped in this category.

Premium whites with complex flavor-

These wines have good body plus complex and well-integrated aromas. These include premium varietal or blended, high-priced wines. Wines in this category include white Burgundies, and barrel fermented and 'surlie' aged Chardonnay.

Among sweet white wines, there are many styles based on the degree of sweetness and the techniques of production. The main styles are:

Fresh, fruity and sweet - This style of wine includes white wines with varying level of sweetness. They are fruity and good general purpose wines. Examples are generic sweet wines and varietal whites such as white Riesling.

Late harvest - These wines are usually sweeter, have more ripe fruit aromas, and a fuller mouthfeel. They are made from grapes harvested later than the usual harvest time. Examples would be late harvest style

Riesling, Seyval and Vidal.

Late harvest with noble rot – The wines are made from grapes infected with noble rot. They are sweet and have complex and unique flavors. An example is the Sauternes of France. Many Rieslings of Germany and other varietal wines made from Botrytis infected grapes.

Ice wines - These wines are made from overripe frozen grapes. The wines are generally very sweet and delicious. Examples include the ice wines of Germany and Canada made from white Riesling grapes.

The soil, climate, and viticultural practices all influence the composition and quality of fruit, and particularly, the varietal expression. The fruit composition, to a large extent, dictates wine style. Therefore, a winemaker's job is to determine the style of wine that can best be made from a given fruit or to obtain the fruit with the most suitable composition to make a certain style of wine.

Raw Materials (Grapes)

Varieties

A top quality premium varietal wine grape is the most desirable raw material for making good wine. Grape variety plays a key role in determining wine quality. Many varieties are used in white winemaking, but some varieties are better suited than others for making high quality wines. Vinifera grape varieties are commonly used for making wines, however, in regions where Vinifera grapes are not commercially grown, French hybrids and Native American grape varieties are used for white wine production.

In the Vinifera grape variety group, Chardonnay, Sauvignon blanc, Semillon, Riesling, Gewürztraminer, and Muscat canelli are considered distinctive and premium white wine varieties. Chenin Chenin blanc, and French Columbard make less distinctive wines and are generally used to make good quality everyday drinking wines. Chardonnay, Semillon and Sauvignon blanc are commonly used to make various styles of dry white wine; whereas, Riesling, Gewürztraminer, and Muscat canelli are Sauvignon blanc are commonly used to make various styles of dry white wine; whereas, Riesling, Gewürztraminer, and Muscat canelli are generally used for fruity and sweeter styles of wine.

Among the non-Vinifera group, French hybrid varieties such as Seyval, Vidal and Vignoles make fine white wines. Other varieties such as Aurora and Villard blanc seem to make less distinctive wines. In recent years, some new varieties have been released that make high quality white wines. Varieties in this category include Cayuga White, Chardonal and Traminette. Generally, varieties such as Vignoles, Cayuga White and Traminette are fruitier and made into sweeter styles while others with delicate varietal characters are vinified into dry white wines.

Native American varieties such as Catawba, Niagara and Delawave have been used for making white wines. These varieties have strong fruity aromas and are commonly made into sweeter styles of white wines. Varieties other than the ones discussed above can also be made into wine depending on availability and quality. Winemakers should feel free to experiment with them.

Composition and quality

In addition to the premium grape variety, composition and quality of the grapes is important to making superior wine. The grape contains many constituents. The important ones are briefly described here.

Physical composition

The estimated physical composition of a grape cluster in terms of percent by weight is:

- stems - 2 to 6%
- seeds - 0 to 5%
- skins - 5 to 12%
- pulp - 70 to 80%.

Stems are rich in tannins and minerals. Seeds contain high levels of tannin. Skin mostly contains pigment, aroma compounds and phenolic substances. The juice consists of sugars, acids, phenolic compounds, aromatic substances and many more chemical constituents.

Chemical composition

Grapes are rich in sugars. The main sugars include glucose and fructose. Their concentration in ripe fruit generally varies between 150 to 250 grams per liter. Sugars are obviously responsible for the sweet taste.

Next to sugars, organic acids are the most abundant solids present in the grape juice. Principal organic acids include tartaric, malic and a small amount of citric. Their concentration usually ranges from four to twelve grams per liter of must. They contribute to the tart taste. The amount and kinds of organic acids have an important bearing on juice/wine pH, which in turn affects the color, flavor and stability.

Grapes also contain significant amount of phenolic compounds. They contribute to the wine's color and flavor. They are also involved in juice/wine oxidation and wine maturation and aging. The concentration of phenolic substances generally ranges from 100 to 250 milligrams per liter in white wines. In addition to substances mentioned above, there are many other compounds present in grapes. These compounds occur in small concentrations but are very important constituents. These include aroma bearing compounds, nitrogenous compounds, pectic substances and inorganic constituents. To make good table wine, the various constituents should be present in proper balance. When they are not in balance, must adjustments become necessary in order to produce good wines. Table 1. lists the desirable sugar, acid and pH levels to make table wines.

In addition to the parameters mentioned, the grapes should also have well developed color and varietal aromas. The sugar and acid values given above are suited for making dry table wines. For making other types or styles of wine, the desired composition in terms of sugar, acid and pH would be different.

Table 1. Desirable sugar, acid and pH levels in must to produce quality table wine

| | Sugar (°B) | Acid (g/L tartaric) | pH |
|-------|---------------|------------------------|-----------|
| White | 21 - 22 | 7 – 9 | 3.2 - 3.4 |
| Red | 22 – 24 | 6 - 8 | 3.3 - 3.5 |

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