Chapter 9

WHITE WINE PRODUCTION

No longer drink only water, but use a little wine for your stomach's sake and your frequent infirmities.

1 Timothy 5.23

The production of white wines is relatively simple compared with the production of red wines because the must is separated from the skins before fermentation and thus there is no complication with floating solids. All the effort in making a good white wine goes into the preservation of the aromas by cool fermentation, and by the prevention of oxidation. In those instances where skin contact is practised (see p.104), the juice is usually separated from the skins before fermentation begins. Although the techniques are similar to those used for red wine production, the order of operations is different:

- de-stemming
- crushing
- sulphiting
- skin contact
- draining
- pressing
- clarification
- adjustments to acid and sugar
- fermentation

Some of these processes have certain conditions that are of particular importance in the production of white wines.

Cool fermentation

The ready availability of refrigeration equipment for cooling and temperature control has encouraged winemakers to ferment white musts at lower and lower temperatures, but unfortunately, excessively low temperatures do not produce attractive wine. The results of such techniques are wines that are clinically clean, with aromas reminiscent of pineapple and banana, yet lack true varietal character and taste very similar, whatever their provenance.

It has been realised that there is an optimum temperature, which depends upon the grape variety and the style of the wine being produced, but will probably lie between 15 and 20ºC. The tendency now is to keep towards the higher end. At too low a temperature, too many of the volatile esters are retained, with the predominance of the estery pineapple aroma. As the temperature rises, so the true character of the grape is allowed to show itself. At high temperatures the volatile components are lost, and the wine becomes dull and lifeless.

Skin contact (macération pelliculaire)

Red wine, of course, gets its colour from the skins of black grapes, usually during the fermentation. For the sake of clarity of definition, this is usually referred to as maceration or skin fermentation. The expression skin contact, or *macération pelliculaire,* is reserved for the production of white wines and should not be confused with *macération carbonique*, which is used in the production of red wines (see p.97).

In the making of white wine it was (and still is in many instances) normal practice to separate the juice from the skins as quickly as possible, because it is recognised that the flavour could be spoiled by extraction of the harsh and bitter polyphenols in the skins. As the study of winemaking advanced, it was realised that many of the flavouring components of aromatic grapes are contained in the layer of cells under the skin, immediately adjacent to the pulp. After the grape has been picked, provided the skin is still in contact with the juice cells, these flavour compounds gradually leach into the juice. It is therefore necessary to allow a certain amount of time for this to happen, which is contrary to the accepted technique of rapid processing.

The usual method of skin contact, or *macération pelliculaire,* as this part of the process is known, is to crush the grapes carefully and then leave the crushed mass to stand for several hours with the skins in contact with the free run juice. Reducing the temperature minimises the risk of extracting unwanted flavours because these compounds are less soluble at lower temperatures. Keeping the mixture of skins and juice for as long as two days at zero degrees celsius (32°F) is sometimes done to bring out the maximum flavour, the low temperature preventing bitterness from developing.

This method is particularly useful for aromatic varieties such as sauvignon blanc, but it does not work for all grapes as there is a danger of extraction of polyphenols at the same time.

An alternative technique, requiring carefully gathered and undamaged bunches of grapes, involves simply leaving the grapes in a cool place overnight before crushing and pressing the next day. This somewhat subtle process results in a diffusion of the aroma compounds from the cells on the inside of the skins, while avoiding any contact with the exterior surface and minimising the release of polyphenols. It is essential that the grapes should be in as perfect a condition as possible to minimise damage due to oxidation.

Sometimes the berries are not crushed but whole bunches are loaded directly into the press. This method is imperative with high quality sparkling wine production, as used in Champagne. Whole-bunch pressing leads to a juice with fine, delicate flavours, low phenolics and low solids. Some hot-climate Chardonnays and Rieslings are made in this way.

Tank vs. barrel

Many modern white wines are fermented entirely in stainless steel tanks because this produces a clean, fresh wine as appreciated by the modern palate, and the tanks are easy to clean and sterilise. White wines can be finished in oak barrels if more complexity is wanted, but this is not the ultimate method. The greatest complexity is achieved by fermenting in barrel, as opposed to merely maturing in barrel. This is the result of multiple reactions between the polyphenols in the wine, in the wood of the barrel and in the yeasts themselves. (See ch.11 for greater detail.)

Tumultuous fermentation in a traditional barrel fermented white Burgundy

Sur lie

This is a French term meaning "on the lees", the lees being the deposit in the bottom of a tank or barrel at the end of fermentation. It consists of yeast cells, both dead and viable, and particles of grape skin and cells. The purpose of this technique, which is used mostly for white wines, is to induce more flavour and greater complexity, and usually a slight 'toasty' quality. The wine usually associated with this technique is Muscadet, where the wine is left on the lees for several months. By law, it must not be racked and must not be bottled before the end of the March following the vintage.

Bâtonnage

An extension of lees contact, as above. When a wine is left in contact with a thick deposit of lees for several months, the dead yeast cells start to decompose under the action of their own enzymes. This creates what is known as a reductive condition, which means the opposite of oxidation. Under these conditions, some of the sulphur dioxide is reduced to hydrogen sulphide, a foul smelling compound (dirty drains, bad eggs). Stirring introduces oxygen to the lees, which prevents the reductive condition occurring, and thus prevents the creation of a foul smell.

Traditional 'batonnage' equipment

Modern barrel rollers

Stirring the lees also increases the contact of the wine with the dead yeast cells, thus enhancing the flavours produced by these cells.

Bâtonnage is normally carried out by inserting a stirring rod with a chain attached to the end through the bung-hole and stirring in a circular motion to agitate the deposit and mix it into the wine. A neat alternative, which is quicker, easier and more effective, is to stack the barrels on a set of rollers, so that the barrels can be agitated by rotating rather than stirring.

Prevention of oxidation

One of the modern principles of the making of white wine is the prevention of oxidation, for oxygen is the great destroyer of fruit. Red wines contain high levels of polyphenols which act as natural antioxidants so they are less susceptible to oxidation, while white wines do not have this protection. The old style white wines from Spain, France, Italy and eastern Europe were dreadfully dull, brownish in colour, with a nose of wet cardboard and a palate tasting of anything but fruit, all rounded off with a whiff of sulphur dioxide. This was mostly the result of poor oxygen control.

One of the revolutions in modern winemaking has been the production of pale coloured, delicately fruity white wines, refreshing and eminently drinkable. Much of this style is the result of the elimination of oxygen at every stage in the winemaking process:

- Pressing the grapes in a tank press, pre-flushed with nitrogen
- Moving the juice through pipework and into vats where all the air has been removed by flushing with carbon dioxide or nitrogen
- Checking all joints for integrity of seals, especially pump seals
- Never keeping wine in a part-filled tank unless blanketed with nitrogen
- The correct use of antioxidants, especially sulphur dioxide and ascorbic acid
- Attention paid at all times to keeping dissolved oxygen at low levels

Sweet wines

The sweet wines of the world are made by various methods according to local traditions - and cost. They can be classified as follows:

- The addition of concentrated grape must to a fully fermented dry wine (cheap carafe wine)
- The addition of preserved grape juice to a fully fermented dry wine (German QbA wines)
- Using grapes that have become over-ripe and naturally concentrated by the sun (the so-called *cuvee* wines and some German QmP wines)
- Using grapes that have been picked when ripe and dried by keeping the bunches in a dry atmosphere (Amarone and Vin Santo)
- Using grapes that have been affected by *Botrytis cinerea* (Tokaji Aszu, Sauternes and German *Trockenbeerenauslesen* wines)
- Using grapes that have been frozen (German *Eiswein* and Canadian Icewine).

Grapes drying for Vin Santo at Villa di Vetrice in Pontassieve

• *Carafe wines*

The simplest and cheapest way is to add some grape sugars to dry wine that has finished its fermentation and has been clarified and stabilised.

It should be noted that the sweetening has to be done using grape must in some form; it is not permitted to use sucrose (except in the case of Champagne). This is the method used in the production of low cost carafe wines, such as would be called a “Medium Dry White Wine” or a “Sweet White Wine” as served in many pubs. Actually, some low cost red wines contain a low level of added sugar to produce a style that is preferred by the everyday palate.

- ***German wines***

Dry wines have been made in the southern parts of the German wine region for centuries. These have sufficient body to make well-balanced wines, suitable for drinking with food. In the more northerly sectors such as Rheingau, Rheinhessen and Mosel, the wines are of a lighter weight and have traditionally been made in a sweeter style by the addition of *Süssreserve*, which is unfermented grape juice that has been preserved by various methods such as microfiltration, cold storage or the addition of sulphur dioxide.

This addition of sweetening is allowed only for the production of *Qualitätswein bestimmte Anbaugebiete (QbA)* which is the classification used for the lower end of the quality scale. It is not allowed for the higher quality *Qualitätswein mit Prädikat (QmP)*, where all of the residual sugar is natural to the original grapes. These

Riesling vines in the Piesporter Goldtröpfchen vineyard

wines can be classified into different categories according to the sugar levels in the grape juice from which they are made. The following figures are for Riesling wines produced in the Rheingau:

Kabinett	73°Oe
Spätlese	85°Oe
Auslese	95°Oe
Beerenauslese, Eiswein	125°Oe
Trockenbeerenauslese	150°Oe

(See p.231 for explanation of °Oe)

With the modern fashion for dry wines, many producers have been experimenting with fermenting some of these wines to dryness, but the result is not always successful - and it makes it very confusing to discover that a wine labelled *Auslese* is dry! The fact that the German wine producers use several of the various sweet wine methods has resulted in their incredible range of tastes, which are some of the finest sweet wines in the world, with wonderful delicate and complex aromas and fruits balanced by a fine acidity.

(Note that *süssreserve* is not used for the process of enrichment before fermentation to increase the alcoholic content of the finished wine.)

• *Sauternes*

Sauternes is the epitome of wine produced from grapes that have been attacked by *Botrytis cinerea* or *pourriture noble*, otherwise known by the less attractive name of Noble Rot. The development of this condition depends entirely on the right weather conditions. It is necessary to have misty, moist mornings that encourage the growth of the fungus, followed by sunny dry afternoons to halt its growth.

It follows, therefore, that the production of the finest wines only occurs in those years when the conditions for the development of the fungus is right. In a good year, when the berries have shrivelled, each one has to be picked by hand, leaving the healthy berries to succumb to the noble rot in due time. This means that the pickers have to pass through the vineyard several times in order to pick the berries that are in the correct condition. It is not unusual in a vineyard such as Chateau d'Yquem for the harvesters to go through the vines eight or nine times, hence the high cost of wines such as these!

- ***Tokaji Aszú***

The *aszú* wines of Tokaj are made by a unique method that is not used in other wine region, so it is worth looking at them in detail.

As with botrytised wines produced in any region, the weather plays a very important part in their quality, depending on damp, misty mornings and dry, sunny afternoons. The shrivelled berries are picked individually by hand, a very tedious and exacting task, usually done by the deft fingers of women. At this point the process is totally different.

First quality aszu berries selected by Royal Tokaji for the production of Tokaji Aszu

The botrytised berries are collected in bins at the winery and are stored after being dusted with potassium metabisulphite as a preservative. The healthy berries are then harvested and used for making a normal dry white wine.

The next step is to give the *aszú* berries a gentle crushing and add them in measured quantities to the dry base wine. After macerating with careful mixing for a few hours, the wine is drained off the skins and is transferred to barrels in the deep, cool cellars where it stays for a minimum of two years, but often much longer.

During this period the wine gradually matures, sometimes with a very slight fermentation, producing an incredibly complex, rich and sweet wine, with a characteristically clean and sharp finish. This acidity

which balances the lush sweetness is due to the particular grape varieties used, especially the Furmint. The other varieties, the Hárslevelu and the Sárgamuskatály add to the complexity.

The deep, cold cellars of Royal Tokaji

The classification of Tokaji wines is not easy to understand, partly because of the unique character of the Magyar language. It is actually quite simple and is linked to the sugar content of the finished wine, unlike German wines, where the categories are determined by the sweetness of the unfermented must. The name originates from the word for the hod in which the grapes used to be collected: *puttony* or *puttonyos* (plural).

3 puttonyos = 60 - 90 g sugar per litre
4 puttonyos = 90 - 120 g sugar per litre
5 puttonyos = 120 - 150 g sugar per litre
6 puttonyos = 150 - 180 g sugar per litre

The juice that drips from the *aszú* berries during storage is the famed *Eszencia* and is more akin to fruit juice than wine, as it contains anything up to 600 g/l of sugar and only 3% alcohol.