

Port Production*

By Tim Spencer, St. Amant Winery

Introduction

When I was invited to speak before this group I accepted with pleasure, although with hesitation, since I am not practiced in the art of authorship or public speaking. Port is; however, a subject that I dearly love and a drink that I cherish. What does the word port mean? Usually people will think of a glass of sweet red wine. Most will know that it has been fortified. Very simply, that is exactly what port is; usually a red wine that tastes sweet, that has had brandy added to it. However, port is much more than this simplistic definition. It is my desire to instill enthusiasm for the drink and educate as to its production.

History

Viticulture has existed in Northern Portugal for thousands of years, but it was at the end of the 17th century that an event took place that would give universal fame to the wines of the Douro River Valley. The event was the British discovery. In the 1660s, when problems arose between France and England, Bordeaux wines, the British drink of choice, became almost impossible to secure. At this time, trade between England and Portugal existed, but the wine, a crisp red Vinho Verde, was not popular. However, a gradual discovery of the richer red table wines of the Upper Douro allowed exportation of wines more agreeable to the British palate; in fact, this led to the establishment of the first English Porto firm-Warres in 1670. It would be erroneous to think that as soon as the English discovered the wines of the Douro that they were transformed into the rich, fortified dessert wines we know today.

The transformation was gradual. The evolution started with adding a small amount of brandy to the wine as a preservative for barrel shipment. Like many discoveries, the transformation was quite accidental. In 1820, a vintage occurred with very high sugars that were not totally fermented to alcohol. The British enthusiastically received the semi-sweet wine. It was like liquid sunshine to foggy Londoners.

Although the practice was most controversial, some producers began to add alcohol prior to cessation of fermentation to emulate the wine of 1820. The practice was so controversial; that it wasn't until about 1900 that the sweet fortified style wine we know today was the universal port production practice.

Production

Perhaps at this time we should discuss in more detail the actual process of fortification. Fortification is simply the addition of a high proof alcohol at a given time to stop the fermentation, leaving the desired residual sugar. In practice, at St. Amant, we desire grapes at a °Brix of 22.5 to 24.5. Our approach is to fortify with clean, high-proof spirits, to arrest fermentation (17% alcohol). Over the next several years, we will make incremental (alcohol) additions bringing the wine to the desired level of alcohol. Depending on the style of wine, we may use lower proof, more complex brandies, as in the case of "vintage" Port. We do not distill brandy ourselves, but we will evaluate a number of spirits from several producers. Since a significant percentage of the Port is with added alcohol, I consider it logical that special care be taken to obtain F.M. low in aldehydes, ethyl/acetate, and higher alcohols. In order to achieve a residual sugar of approximately 8%, the alcohol addition is made when the wine has fermented to between 12 to 13 °Brix. To calculate the amount of alcohol (x) the following formula is employed:

$$x = V \frac{(C - A)}{B - C}$$

V = the # of wine gallons to be fortified

C = the desired % of alcohol by volume in the wine after fortification

A = the % of alcohol in wine to be fortified (i.e., that is produced by fermentation)

B = the % of alcohol in the fortifying material

To demonstrate, assume 1000 gal (V) of wine is to be fortified to a desired 20%(C). The alcohol in the wine is 6.0% (A) and the percentage of the fortifying material is 84% (B). Therefore,

$$x = \frac{1,000 (20 - 6)}{84 - 20} \quad x = \frac{14,000}{64} \quad x = 218.75 \text{ gal F.M.}$$

From experience I would like to share these points:

Following inoculation of the must you will have 2 to 4 days prior to fortification. It is essential that

"punching down" or "pumping over" be performed diligently to obtain the maximum extraction in a short period of time.

The fortifying alcohol and the wine must be thoroughly mixed. Otherwise, the spirits, which are of a lower specific gravity, will float on top and the must will continue to ferment.

Monitor the fermentation progress frequently. It can progress quite rapidly and the resulting wine will be too dry. Inevitably fortification occurs at 3 am.

Secure your fortifying alcohol well in advance so that it is available when needed.

At St. Amant, we prefer an alcohol of about 168 to 178 proof. However, I believe that the poorer the quality of distilling material, the higher the proof fortifying brandy is desired in order to avoid objectionable volatile acids, higher alcohol, and aldehydes.

The Grapes

Obviously, a very important factor in premium port production is the choice of grapes. Because of ignorance I'm not qualified to address the suitability of varieties available in this area of the United States. However, I would like to comment on the philosophy at St. Amant and the selection used in Portugal.

In the mid-1970s, when we began to develop an interest in port, the practice in California was to utilize what was available. Consequently, most ports were produced from Zinfandel, Cabernet, or Petit Sirah.

The resultant wines exhibited varietal character, simplicity, and were one dimensional on the palate. With table wines, varietal character is desired, but in port, the complexity is achieved by blending. During this time frame, the famous wine writer and vigneron Alexis Lichine, when asked about California Port, responded, "Whatever it is, it isn't Port!" Portuguese port is always a blend. Over thirty varieties are grown in the Douro region, but from a practical standpoint, four to six are utilized, each adding their own characteristics and building to the final complexity and ageability. Typical varieties vinified in Portugal and at St. Amant are:

Tinta Cao - Low yielding grape of the Douro area in Portugal. Clusters are small, berries have thick skin. When grown in cooler areas, the wine has a delicate floral aroma. In hot regions, it can be spicy. The wine quality is complex and fine.

Touriga Nacional- One of the finest grapes for making red port. The vine is vigorous but yields are low. Berries are small, with dark color. It produces wine with light tannin and good extract. The aroma can be suggestive of mulberries, raspberry and cassis with floral overtones.

Alvarelhao - Lighter than Touriga, but well-balanced. Good acid level and delicious flavors. Makes fine wine.

Souzao - Productive, red-fleshed teinturier grape with good acidity and flavor suggestive of chocolate.

Bastardo - Good producer with fruit achieving high sugar levels, but the color is light. Ripens early and wine quality is moderate.

Tinta Barroca - Vigorous variety with large cluster and high yield. Ripens early, the berries have thin skin, low acid, and high sugar. The wine has a delicate aroma with hints of cherry, raspberry, and mulberry. It is one of the top five port varieties of Portugal.

Tinta Roriz - It is also known as Tempranillo in Spain where it is considered a noble variety for producing top quality Rioja red wine. The berries have thick skin and deep color and are borne on large clusters. The wine can be woody or stemmy, but in good years, can be fruity with a long finish.

Cellaring Treatment

Following fortification, assuming the alcohol is between 18 to 21 %, you now have port. Initially we place the wine into a vertical tank allowing settling to occur prior to transfer to barrels. The alcohol addition facilitates a rapid settling of solids, and the first racking is preferable prior to barreling.

At St. Amant we do not consider oak flavor desirable; therefore, neutral barrels from 60 to 130 gallons are utilized for a period of time, depending upon the style of port wine being produced. Initially all of our ports are handled the same for about 1 1/2 years. At this age we make the determination as to the style of wine to

be produced. A discussion of the wine types produced at St. Amant as well as in Portugal will clarify this subject.

Vintage Port. As in Portugal, St. Amant only produces a vintage port in exceptional years. Vintage port is from a single harvest of superb quality with exceptional organoleptic characteristics. The wine is bottled between the 2nd and 3rd year from harvest, and will require many years of bottle maturation. In its youth it will display intense color, fruit and tannins, with complexity and balance. It will require many years in the bottle to achieve its full potential. Bottling while young, with little or no filtration, a heavy sediment will form, requiring decanting.

Unlike most of our wine experiences, no single varietal association characterizes vintage port. On the contrary, there are so many components that it can be overwhelming to describe: berries, plums, cherries, chocolate, mint, violets, camphor, and especially dried tea. This latter smell is attributable to the Touriga grape. In a vintage port's youth the alcohol smells can predominate. This will fade as the wine "marries," and resurface as the wine becomes very old and is falling apart. A puzzling phenomenon I have frequently observed in young ports is that they can go through a "dumb" stage, virtually losing all aroma, only to blossom as the ageing progresses.

Late Bottled Vintage (LBV) Port. This is a wine from a single harvest of good quality. LBV's are usually of less concentration, but will still exhibit good organoleptic characteristics. LBV's are wood ports. In other words, the maturation is allowed to occur in the barrel (wood), being bottled four to six years after harvest. This wine is essentially ready to drink upon release, and will throw little sediment. This is a very popular wine, especially with restaurants.

Tawny Port. Americans have a strong preference for vintage ports, but most of the world recognizes the pleasure derived from a good glass of Tawny. There are various types of tawny port. The simplest is a blend of white and red bearing no indication of age. The finest are a blend of vintages with an indication of average age. These are exceptional wines with an average age of ten to forty years. A tawny shows the art of the blender. Vintage port is an expression of the vintage and the quality of the grapes.

A fine tawny can have a vague aroma. Most common will be a nutty, smoky scent with a touch of licorice. Being mature it should be mellow.

White Port. Premium white port is a category with little American acceptance, but is superb as an aperitif. Made like red port, but with white grapes, they can range from dry to very sweet. The drier styles are quite good with a slice of lemon or a little soda. With the grape varieties available to you, white port might be a consideration, especially if you enjoy a good tasting room/retail trade.

Conclusion

American ports have always had a poor market image, fostered by the "wino," who is more concerned with price and alcohol content. However, I believe that America has the viticultural areas, the enology expertise, and the entrepreneurial spirit to produce world class port. It will not be easy, but if one is willing to experiment, and committed to quality, success can be achieved.

Port through the centuries has been known as the conversation wine. Sitting by the fire, after enjoying a fine dinner, with a glass of mature port stimulates conversation and provokes questions. I would like to pour a taste of our current release and solicit your questions. After 30 minutes of talking with my glass empty, I am reminded of a quote attributed to Percy Croft, who is reputed to have drunk six bottles per day, "Any time not drinking port is a waste of time."

- What is a common mistake made in port winemaking?

Not realizing how fast the fermentation can go. It is important to monitor the progress of fermentation.

- Do you add alcohol to must before pressing or after?

We add alcohol to must before we press. To do this you need to estimate the volume.

- What type of barrel is used?

We use about five-year-old barrels that are neutral in woody flavors.

- How much SO₂ is added?

We maintain around 30 ppm SO₂.

Fortification Chart (Percent of Alcohol in Wine Spirits)

Number of gallons of wine spirit to be added to 100 gallons of wine containing various percentages of alcohol to produce a fortified wine containing 18% alcohol

Alcohol in Initial Wine (Volumn %)	82	84	86	88	90	91	92	93	94	95
0	28.13	27.27	26.47	25.71	25.00	24.66	24.32	24.00	23.68	23.38
1	25.56	25.76	25.00	24.29	23.61	23.29	22.97	22.67	22.37	22.08
2	25.00	24.24	23.53	22.86	22.22	21.92	21.62	21.33	21.06	20.78
3	23.44	22.73	22.06	21.43	20.83	20.55	20.27	20.00	19.74	19.48
4	21.88	21.21	20.59	20.00	19.44	19.18	18.92	18.67	18.42	18.18
5	20.31	19.70	19.12	18.57	18.06	17.81	17.57	17.33	17.11	16.88
6	18.75	18.18	17.65	17.14	16.67	16.44	16.22	16.00	15.79	15.58
7	17.19	16.67	16.68	15.71	15.28	15.07	14.68	14.67	14.47	14.29
8	15.63	15.15	14.71	14.29	13.89	13.70	13.51	13.33	13.18	12.99
9	14.06	13.64	13.24	12.86	12.50	12.33	12.16	12.00	11.84	11.69
10	12.50	12.12	11.76	11.43	11.11	10.96	10.81	10.67	10.53	10.39
11	10.94	10.61	10.29	10.00	9.72	9.59	9.46	9.33	9.21	9.09
12	9.38	9.09	8.82	8.87	8.33	8.22	8.11	8.00	7.89	7.79
13	7.81	7.58	7.35	7.14	6.94	6.85	6.76	6.67	6.58	6.49
14	6.25	6.06	5.88	5.71	5.56	5.48	5.41	5.33	5.26	5.19
15	4.69	4.55	4.41	4.29	4.17	4.11	4.05	4.00	3.95	3.90

Source: U.S. Internal Revenue Service (1962)

Fermentation Record

St. Amant Winery, Tim Spencer, Owner & Winemaker

Touriga	Date	Time	Temperature °F	°Brix	Residual Sugar
Inoculated	28 Oct	1700 hours	68°F	23.2	
	29 Oct	1000 hours	68°F	23.0	
	30 Oct	0945 hours	74°F	19.5	
	30 Oct	1430 hours	79°F	16.8	
	30 Oct	1620 hours	81°F	14.7	
	30 Oct	1745 hours	82°F	13.7	
	30 Oct	1900 hours	82°F	12.4	
					7.2
Tinto	Date	Time	Temperature °F	°Brix	Residual Sugar
Inoculated	28 Oct	1700 hours	60°F	23.6	
	29 Oct	0945 hours	66°F	21.8	
	29 Oct	1420 hours	74°F	19.6	

	29 Oct	1620 hours	76°F	18.4	
	29 Oct	1830 hours	78°F	17.5	
	29 Oct	2130 hours	81°F	16.5	
	30 Oct	0045 hours	84°F	13.8	
	30 Oct	0130 hours	85°F	12.4	
					7.8

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