

## Second Crop Wines

Every year grape vines have small bunches of grapes scattered along the canes. These bunches normally have five to fifteen berries.

The lateral buds on a vine cane can produce lateral shoots that may form flowers and produce fruit.

The berries are generally two weeks behind the primary grape bunches to ripen. They can cause problems for vineyards using mechanical harvesting. These small bunches are called "second crop".

Very few vineyards pick the second crop. The crops are very expensive to pick because of their low yield. Most vineyardists will allow people to pick second crop for free. This gives a good chance to make some wine for home winemakers.

### Making a wine.

Before you start, several things must be arranged.

1. Where will the wine be made? You must make sure you can crush, press, fermenting, age, rack and bottle the wine. Lots of cleaning is needed, so make sure you have water and a way of disposing of grape pomace and waste water. For healthy fermentation, it can't be too cold or warm an area.

2. You'll need equipment. A stemmer-crusher is nice, but you can manually crush and even destem if necessary. A press will be needed. In what containers will you ferment and age? Plastic garbage cans are the most common for fermenting reds. Whites can be fermented in glass or plastic demi-johns. Aging can be done in any inert material or wood. Aging must be done in *FULL* containers. No partials. So get a lot of smaller "breakdown" containers.

A couple collection bins will be needed to put at the press outlet. You should also have one or two plastic funnels for pouring the juice and wine into the containers.

Siphon hoses are needed. A bathroom scale for weighing grapes.

In your "lab" it would be nice to have a scale that can measure grams.

If not, have a local lab weigh for you. Be nice to have containers with graduated markings on the side. You need to measure volumes (liter, milliliters, etc.) Get a wine thief, hydrometer, cylinder, clipboard and pencil.

Taking thief samples can be tough in red fermenters. Seeds plug the thief entry.

Get a kitchen colander with small holes. Fermenting juice enters but seeds do not.

You'll need some lab supplies. 50-ml graduated cylinder, 5 and 1 ml graduated pipettes. These you can get at local home winemaker store. Or online.

3. You'll need to get a source of sulfur dioxide. The easiest to store and use is potassium metabisulfite (KMS). Any local home winemaking supply store will have this. Freeze dried yeast is also nice to have. Not absolutely necessary. If you want to acidulate a wine, try to get a source of tartaric acid. At the most you'll need 5 lb of tartaric for every 1,000 gal of wine you make. That's about 100 grams for 50 gallons.

Get a Clinitest pill kit for checking sugar. Drugstore has them.

4. Picking is slow. Ten people can pick about 800 lb in a day. From this a barrel can be made.

## White Wine

Pick the grapes and deliver to crush area. Weigh all the grapes. The projected juice and wine yield are necessary to calculate additive levels. Crush the grapes and transfer them directly to the press. Home basket presses will yield about 150 gallons per ton of grapes crushed. So, if you pick 650 lb (or 32.5% of a ton) you should yield about 49 gallons of juice. All the juice that drains freely (called free run) and the juice coming from the press should be combined. Now, check the sugar. Remember, that the conversion of sugar to alcohol will be about 59% at low temperature. That is:  
 $^{\circ}\text{Brix} \times 0.59 = \% \text{ alcohol (v/v)}$ . So, what alcohol do you want your wine?

If you want 12%, the starting Brix must be 20.3°. Do the math and calculate how much water to add. With the new volume, on we go. To kill unwanted yeast and bacteria, add 50 ppm KMS.

Mix well. If you can measure the actual juice volume, that's better. If not, assume you'll get (in our example) 49 gallons. Each gallon of juice will require 0.076 g of KMS to get 10 ppm SO<sub>2</sub>. Each gallon of juice will require 0.38 g of KMS to get 50 ppm SO<sub>2</sub>. The 49 gal of juice will need 18.6 g KMS. This can be weighed or approximated with conversion table. Dissolve the KMS in about 100 ml of warm water. Add to juice and mix thoroughly. Let it sit. Clean the crusher, press, equipment, floors, etc. Take the pomace to a vyd or a compost pile. Put the juice settling container in a very cool area.

Take a gallon of juice from the juice container and set aside.

Make a yeast starter. For each gallon of juice, you will need about a gram freeze dried yeast. Each gram will need about 20 ml of warm water for rehydration. So, in our example, we will need 49 g yeast. Say 50.

Get 1,000 ml (1 liter) of water at a bit above body temperature (100° F) and mix the yeast in with the warm water. Let it sit an hour. Should foam before that. After it starts to foam, add to gallon of reserved juice.

Put in warm area and stuff cotton in the neck to keep out the bugs.

The next morning, get a siphon hose and suck the clear juice in the settling tank off the solids at tank bottom. Put this siphoned (racked) juice in your chosen fermenter. Check the sugar and temperature. Add yeast. Mix. Attach fermentation bung or a clean sock to opening. Try to ferment in a fairly cool area. If you have no yeast, the juice should start fermenting in a few days with the wild yeast in your cellar.

Twice a day, check the fermenter for sugar, temp and write your observations on smell and vigor of fermentation. Record each fermenter visit. A graph can be created plotting sugar against date and time. This gives a good idea of fermentation completion. When the wine hits zero Brix, get the Clinitest pills. When the wine reads Blue Negative in Clinitest the fermentation is complete. Now, you must taste the wine. Is it balanced? Is it clean? Does it need acid? Do you want to age *sur lie*? Choices, choices... If no *sur lie*, and you like as is, you need to rack add 35 ppm SO<sub>2</sub> and put in full containers to age. All FULL. No headspace. Not even 1/100th of an inch.

If you think it needs acid, you must do an acid series. Take a 1/2-liter of the wine to your "lab". Make a 4.5% (w/v) aqueous solution of tartaric acid. Weigh 2.25 g of Tartaric acid and put in a glass. Add 50-ml water. Mix. Set out five wine glasses. With a crayon or grease pen write on their bases C-1, 2, 3, 4. Pour 50-ml of sample in each glass. Add to the glass with "1" on its base, 0.1 ml of the tartaric acid solution. And add to the glass with "2" on its base 0.2 ml of the tartaric acid solution. Do the similar additions to the last two glasses. Taste the control, "C", against the other four samples to see what you like. If you think even sample "4" is too flat, try the same test and add 0.5, 0.6, 0.7 and 0.8 ml to ml of new sample. Top up the control and retaste. When you finally pick a winner, the lab work has to be carried over to the cellar. Each of the numbers of ml of tartaric solution represents a cellar ratio. 0.1 ml of 4.5% tartaric soln. added to 50-ml of wine is the same as 1 lb of powdered tartaric acid added to 1,000 gallons of wine. It's written 1 #/m. So in our example above if you liked glass with 3 on the base, that's the same as 3 #/m tartaric. You don't have 1,000 gallons. Do the math. Don't add the tartaric yet.

Do you want to do *sur lie*? If so, then you must weigh out the tartaric acid (if you decided to) and dissolve it in the least amount of warm water as possible. Next, you need to know the volume of your wine because you want to add SO<sub>2</sub> also. Not knowing the pH, we'll be fairly safe and add 35 ppm SO<sub>2</sub>. Remember from above how to figure how much KMS to add. Weigh it out, dissolve it and set it aside. If you want to age *sur lie* all the lees in the fermenter will stay with the wine. So, gently add the tartaric acid soln. to the wine. Next add the KMS soln. Then gently siphon all the wine and lees to full containers. Leave nothing behind. Seal the containers and store in a cool cellar.

If you don't want to age *sur lie*, the activity is different. You don't want the lees. So, you have two choices. 1st. Rack the wine off the fermenter lees to another tank. Remeasure volume. Calculate the amount of tartaric acid (if desired) and KMS to add. Make separate solns. Add the tartaric and then the KMS.

Break down to full containers. 2nd. Rack the wine from the fermenter to full containers. Leave each container down a bit. Now remeasure individual container volume and calculate and weigh out the needed tartaric acid and KMS for each container. Repeat the mixing process. Top up each container after addition of acid and KMS.

Another common method can be used. If you decide you want to do *sur lie* before harvest and you have a container you'd like to both ferment and age in, say a used French oak barrel. You'll need to pick at least 800 lb. You'll want to ferment the wine in the barrel and in a couple of 5-gallon dj's. Then once dry, the wine stays on the yeast lees, gets topped from the dj's and has other additives added. This is a very common method at commercial wineries.

In all cases, the wines should be checked every month. The wines *sur lie* must be gently stirred every two weeks. Try to keep from aerating. All wines, if not clean, should be racked, aerated and SO<sub>2</sub>'d. The main thing to smell for is H<sub>2</sub>S, or rotten egg, odor. If it doesn't clean up, find a local winemaker to befriend.

Come April, gently rack all the wines to new containers. This will be your "filtration" process. Add another 25 ppm SO<sub>2</sub>.

Generally homemade white wines are not filtered nor fined. So, the day before bottling, rack the wines again to new containers. Add 30 ppm SO<sub>2</sub>.

All you need to bottle the wine is a siphon hose and a corker. The corkers can be bought at winemaker supply stores or online. You'll also need bottles and corks. Go ask your befriended winemaker if she has any partial pallets of glass not to be used and any partial bags of corks left over from a recent bottling. If they're nice, they'll give it to you. If not, buy it from them. You can make labels on any home computer system. Get the pressure sensitive Avery labels (or the in-house brands) from Staples, office Depot, etc. If you want capsules, you can buy (or again get from your befriended winemaker) extra caps. If they're free, take them. There are two basic types of capsules. One group is made of plastic material. These caps are put on the bottle (after corking!) and then passed through a heat field. The heat shrinks the capsules to fit tightly on the bottle neck. The second group has metal in them. These caps are placed on the bottle neck and the neck is then placed in the jaws of spinning wheels. The caps are "spun" down tightly. Both the heating and spinning mechanisms can be bought or rented from local home winemaking stores. The spinners can be very expensive, so be careful.

## Red wine

Pick the grapes and deliver to crush area. Weigh all the grapes. The projected juice and wine yield are necessary to calculate additive levels. You'll need fermenters and storage vessels. Most home winemakers want to make a barrel of wine. So, we'll guide them along. If you want to make less you can use the same methods, but must use different storage containers. To make a barrel of red, pick 800 lb. You can crush into several plastic garbage cans or, better yet, find a grape harvesting bin. These are hard plastic bins that are about 47"x47"x28" (high). They'll hold about 42,000 cu in, or 1,370 lb of fermenting red grapes. Fine for 800 lb. So, either crush and destem the grapes into the bin fermenter or several garbage cans. Since you weighed the grapes, you'll be able to calculate the amount of KMS to add. You have two ways of doing this. Normal yield (commercially) of red wine is about 175 gal/ton. So, if you picked 800 lb, you will have, in the fermenter, about 70 gal. of wine. Now the KMS to add is to protect all the wine, not just what your press will yield. So, 70 gallons of wine will need 0.38 g/gal of KMS to give 50 ppm SO<sub>2</sub>, or 26.6 grams. Even though the final yield will not be 70 gallons (only 60), all the wine is protected. Mix it all up. Take the sugar and temp. Second crop, and much first crop, can have raisined and desicated grapes in their company. So, you'll wait until the next morning to see what the sugar in the fermenter is. Meanwhile, make up a yeast starter in the same manner as described in the white wine section above. Change the proportions as necessary.

The next morning, punch down the cap on the grapes. Take the sugar and temp. and record. As with the white wines, what alcohol do you want in your final red wine? Depending on the conditions of your fermenting area, the conversion of sugar to alcohol will be about 55% at moderate temperature. That is:

$^{\circ}\text{Brix} \times 0.55 = \% \text{ alcohol (v/v)}$ .

If you want 13%, the starting Brix must be 23.6°. Do the math and calculate how much water to add. With the new volume, on we go. Add the yeast and mix it well. The fermentation should last about a week. If the temperature is warmer, it will go quicker. Go back to the fermenter three times a day, punch it down to make the cap (skins, pulp and seeds on fermenter surface) wet. Take and record sugar and temperature and observation.

When the sugar is down to zero Brix, get out the Clintest kit.

When the wine reads Blue Negative in Clinitest the fermentation is complete. Time to drain and press. Set up the press and the barrel that will age the wine. The barrel should be in an elevated spot. The wine will be racked later. It can't be moved once full, so think this through in advance.

Red wines undergo malolactic fermentation (MLF). So do some whites, but it's best to prevent them in whites at home. There is lactic acid bacteria in the fermented wine. It will take a few months for the MLF to be completed.  $\text{SO}_2$  will readily kill the bacteria. So, start scooping and carrying buckets of the pomace from the fermenter to the press. Have a collection bin to collect the press wine. Keep this up until all the pomace has been removed from the fermenter.

Once the pomace has been removed, start bucketing the wine at the bottom of the fermenter. Pour it through the pomace in the press. The collection bin will fill up pretty fast now so have the spare bin nearby. By the way, the wine coming out of the press is not perfectly clean. The solids in the wine will later settle in the bottom of the barrel as lees. To minimize these later lees, you can buy a bunch of cheese cloth. Cut it so it will fit your funnel. Rinse with water before using. Pour the wine through the cheese cloth. It will plug fairly often, so you'll need someone just to monitor, repalce and clean the cheese cloth. Better now that later.

Once all the fermenter has been transferred to the press, the pressing can start. Extra blocks will be needed to get the maximum pressure from your press. After you have pressed as much as you think is possible, loosen press and try to break up the pomace cake and press some more. Make sure all the wine is in full containers. Since it will undergo MLF,  $\text{CO}_2$  will be formed. Do not put the seals or bung in tight. Fermentation bungs are good here. Check the wine monthly. Smell to make sure there's no off character. During MLF it will not be completely clean, a bit cloudy and have a touch of  $\text{CO}_2$ . If all goes well, MLF will be over

by February. If off character appears, follow the suggested actions under white wines, above.

MLF completion will be accompanied by elimination of CO<sub>2</sub> production and clearing up of wine. Now's a good time to rack (siphon) the clear wine off the lees.

Rack the wine to another container(s) and add 25 ppm SO<sub>2</sub>. Clean barrel.

Put the wine back in full barrel and other containers. You will want to top up the barrel every month. If you don't have topping wine, use a standard dry table wine from your cellar. Rack the wine and SO<sub>2</sub> again in November. Return to full barrel and containers. The wine can be racked, SO<sub>2</sub>'d (25 ppm) the next summer. See bottling notes above.

## Red Port Wine

If you let your red grapes hang on the vine, they'll surely hit 30° Brix. You can make a nice Portlike wine. Follow all the same procedures in making red wine. To start, you should do an estimate of volume. Let's assume you picked 200 lb of grapes. That's 1/10<sup>th</sup> of a ton and will produce 15 gallons of wine. But you want a wine at 18% alcohol and 8% sugar. Since yeast can't ferment to that alcohol, the wine must be fortified. Any clean spirit with higher proof can be used. For home winemakers, 90 Proof Vodka is the best. Remember, that's 45% alcohol. So, you will ferment the grapes down to 8° Brix, drain and press and fortify with Vodka. Let's assume that °Brix X 0.55 = % alcohol (v/v). If we start with 30° Brix and we want to retain 8% sugar, we'll have 22° Brix to ferment. That will produce 12.1 % alcohol. We need another 5.9% from fortification. To get 18% alcohol, you'll need about 3.2 gallons of Vodka. So, go to a discount chain and buy that much Vodka. So, once the fermentation is down to 9° Brix, drain and press. Check the volume and the sugar. The numbers may not be the same as the projected calculations. Recalculate and add the proper amount of Vodka. Add 35 ppm SO<sub>2</sub>. Put in full containers. Treat like a red wine from here on out.

If you're looking for used barrels, check Wine Country Classified out of St. Helena. Many Napa Valley wineries sell good two and three year old French oak barrels for \$90 to \$150 each. Try to get white barrels that had not had MLF or Brett.

## Conversion Factors

	1/4	1	1
	tsp	tsp	TBSP
<b>Chemical</b>	g	g	g
Ascorbic acid, powder	0.9	3.6	10.8
Bentonite, agglomerated	0.8	3.2	9.6
Calcium carbonate, powder	0.5	2	6
Citric acid, powder	1.1	4.4	13.2
Diammonium phosphate, powder	1.2	4.8	14.4
Fumaric acid, powder	1.3	5.2	15.6
Gelatin, powder	0.8	3.2	9.6
Grape tannin, powder	0.6	2.4	7.2
Malic acid, powder	1.1	4.4	13.2
Potassium bicarbonate, powder	0.7	2.8	8.4
Potassium bitartrate, powder	0.8	3.2	9.6
Potassium caseinate, powder	0.7	2.8	8.4
Potassium metabisulfite, powder	1.4	5.6	16.8
Tartaric acid, powder	1.3	5.2	15.6

*All of above from Winemaking Home Page*