Standard Operating Procedures

For Micro-Winery Winemaking

RJS craft winemaking

Stage One:

Re-Hydration of Bulk Wine Kits

Procedure

1. From the 2 tables below, you can determine your tank size and type of wine kit. Please note that table one is for drum kit formats and table two is for multiple wine kits format.

2. Select the appropriate amount of water to add back into your bulk program as per tables.

3. Ensure that your tank capacity is 10% larger than the total volume you intend to ferment.

4. As you combine the water and wine kit contents, ensure the temperature range is 72° - 77° F. Mix adequately to ensure a uniform must. Using a hydrometer, please take a specific gravity reading (SG) Refer to the table for SG limits.

5. If your kit contains optional additives such as oak chips, elderflowers, elderberries, grape skins etc, you should add it to the must now. These loose additives can be placed in a muslin bag big enough to allow the contents to steep in the wine.

6. Record all information (i.e. SG, temperature) on a form to track progress

Table 1. Bulk Drums

Wine Type	Total Batch Size (L)	Min Tank Capacity (L)	Equivalent # of Kits	Rehydration Water Amt (L)	Starting S.G Range	Finished Base S.G	Finished Bottling S.G	Stage 2 Yeast (g)	Stage 4 Bentonite (g)	Stage 4 Sulfite (g)	Stage 4 Sorbate (g)	Stage 5 Kieselsol (mL)	Stage 5 Chitosan (mL)	OPTIONAL SUBSTITUTE FOR KIESELSOL & CHITOSAN - Stage 5 Isinglass (mL)
Orchard Breezin	920	1000	40	700	1.050-1.060	<0.998	1.018-1.025	**140**	750	144	250	500	2,000	1200

Table 1. (Continued) Bulk Drums

Wine Type	Total Batch size (L)	Min Tank Capacity (L)	Equivalent # of Kits	Rehydration Water Amt (L)	Starting S.G. Range	Finished Base S.G.	Finished Bottling S.G.	Stage 2 Yeast (g)	*Stage 4 Bentonite (g)	Stage 4 Sodium matabisulfite (g)	Stage 4 Potassium Sorbate (g)	Stage 5 Kieselsol (mL)	Stage 5 Chitosan (mL)
Cru International	460	500	20	300	1.080 - 1.106	<0.998	<0.998	100	375	72	65	250	1,000
*** Lab analysis may be required to confirm Bentonite addition rate and stability.**													

Table 2 - Kits Only

Wine Type	Total Batch Size (L)	Suggested Min Tank Capacity (L)	Equivalent # of Kits	Rehydration Water Amt (L)	Starting S.G Range	Finished Base S.G	Finished Bottling S.G
Orchard Breezin	275	300	12	220	1.050-1.060	<0.994	1.018-1.025
Orchard Breezin	160	200	7	96	1.050-1.060	<0.994	1.018-1.025
Cru Select	275	300	12	83	1.080-1.110	<0.994	<0.994
Cru Select	160	200	7	49	1.080-1.110	<0.994	<0.994

Suggestions for A Successful Re-Hydration Process

- Suggested methods of mixing include:
- Recirculation of water and must in tank in combination with an inert gas bubbling.
- Using an intermediate vessel with a mixer, you can combine the water and must and simultaneously pump out to receiving tank- Intermediate vessel can consist of a 50 – 100L open top tank or drum with a bottom valve and a mixer attached to the side. As juice must and water is racked into the top of the vessel, a mixer/agitator will need to be switched on. The bottom valve is connected via a hose and pump to the receiving tank. Pump speed should match the speed of water and must addition to avoid overflow. Water quantity should be measured carefully during this stage. This is an effective set up meant for large tanks of 1000 L or more. This intermediate vessel setup will be useful during stage 4 & 5 when adding ingredients to wine in larger tanks as well.
- If your tank is less than 500 L, an intermediate vessel may not be required and direct mixing via recirculation of contents is sufficient.
- There are inline mixing devices that can be obtained. You can simultaneous pump in must and water through this device and achieve universal mixing.
- Accurately measure water to ensure proper starting SG range.

Stage Two:

Inoculation of Yeast

Procedure

Inoculation of yeast into a large vessel is not the same as a 5 gallon carboy. In this case, the yeast will need to be re-hydrated in a separate vessel prior to adding to the must.

1. In a small 5 gallon bucket, combine 2.5 L (0.66 Gal) of must and 5 L (1.3 gal) of warm water 25°C – 30°C (77°F – 82°F).
2. Slowly combine yeast into the bucket ensuring no clumping.
3. Let stand for 30 – 45 minutes to allow yeast to propagate.
4. After the standing time, verify the yeast is active (i.e. bubbling, foaming).
5. Pour the yeast mixture onto the top of the must.
6. Set the heating/cooling range on the tank to 22°C – 25°C (72°F – 77°F). Fermentation on tank should start in 24 – 48 hours.

Suggestions for a Successful Inoculation

- The standing time is necessary to ensure a healthy start to the fermentation process. This standing time will avoid any stuck fermentations issues.
- Do not seal the tank or vessel, as pressure will be generated during the fermentation process.
- Ensure adequate ventilation; there will be a lot of CO_2 generated. Avoid fermenting in confined spaces

Stage Three:

Fermentation Stage

Procedure

During this stage, the yeast will do its job and convert the sugar to alcohol and CO_2.
The important thing to note during this stage is to maintain a constant temperature during the fermentation process. If temperature control is an issue, the fermentation kinetics will be less predictable and the quality of the wine will be affected.
If the fermentation process should get out of control, here are some typical situations may occur:

- Sluggish Stuck fermentations
- Reductive fermentations – smell of rotten eggs
- Loss of wine quality
- Extended winemaking time
- Clearing problems

Suggestions for a Successful Fermentation

- Maintain a good log of the fermentation process. The information collected will provide valuable information when it comes to trouble-shooting.
- At the end of fermentation the wine should be dry, the SG is less than 0.994. You will need to verify dryness with a Residual sugar Test. A residual sugar reading of 6 gm/L or less is acceptable.

Stage Four:

Stabilization

Procedure

When the wine has finished fermentation and verified with a residual sugar test, only then should you proceed to the stabilization stage. Any attempts to stabilize a wine while it is still active will be futile and counter productive.

1. Rehydrate bentonite in hot water at a ratio of 4:1 (water:bentonite). Be careful to avoid producing any lumps during the rehydration process. Allow the liquid bentonite to stand for 12 hrs.
2. After 12 hrs, stir up the bentonite again.
3. Dissolve the sorbate in hot water at a ratio of 4:1 (water: sorbate).
4. Dissolve the sulphite in a drawn off sample of wine at a ratio of 2:1 (wine:sulphur).
5. Rack wine from the primary tank to a secondary holding tank. During the racking process, you will be adding the bentonite in stages. The racking process will help in the dispersion of bentonite and settling.
Note: When you add the liquid bentonite to the wine, you must add it slowly to the wine while it is re-circulating. Otherwise the bentonite will just sink to the bottle of the wine! It is very important to get an even dispersion of bentonite through out the wine.
6. During the first 25% of the racking, add 25% of the bentonite portion to the wine into the secondary tank. During the first 25% of the wine being racked, you can add all the liquified sorbate and sulphur to the secondary tank as well.
7. Continue this proportionate addition of bentonite at 50%, 75% and 100 % of volume of racking. Each time, add the bentonite via the top of the tank.
8. Once all the wine has been racked and all bentonite been added, secure the tank of wine by blanketing any head space with inert gas and seal the tank. May want to explain how to do this.
9. Allow 3 - 5 days time for wine to clear.

Stage Five:

Fining

Procedure

This stage proceeds after the wine has had time to stabilize for 5 days.
You will need to add kieselsol and chitosan to the wine. **IT IS VERY IMPORTANT TO ADD THE FINING AGENTS IN THE RIGHT ORDER!**

1. Rack the wine off the bentonite and lees to a clean empty tank. It is important that we take the wine off the bentonite before adding finings.
2. Recirculate (mix) the tank of wine and start adding your —Sweetening additive if your batch came with it.
3. Continue to recirculate the tank of wine and slowly add kieselsol into the wine. Once all the kieselsol portion has been added, continue recirculation for another 5 minutes before proceeding to the next step.
4. Next add the chitosan to the wine in the same manner as step 3.
5. Blanket any head space in the tank with inert gas and seal the tank and allow the wine to sit undisturbed for the next 2 – 3 weeks for clearing.
6. If your wine is Cru Select, it is recommended that you set your cooling on the tank of wine down to 0°C (32°F) during this 2 – 3 week clearing process. This will aid the drop out of potassium bi-tartrates (if any) in the wine to reduce the likelihood of wine diamonds in the bottled product.

Stage Six:

Filtration and Bottling

Background Information

This stage involves the use of a pad filtration unit and an optional use of a membrane filter during bottling.

- Pad Filters come in nominal ratings and are in units of microns (µm). Microns define the particulate size you are trying to filter.
- Pad filters are rated nominal pore sizes (average pore sizes) because they are not perfect. Depending on suppliers, a pad with a nominal rating of 1 µm will remove particulates in the 1 – 1.5 µm range. Nominal micron rating of filter pads only provides a range and do not guarantee accuracy.
- Filter pads come in 5 µm, 1 µm, 0.7 µm and 0.45 µm nominal ratings. Check with your supplier for details.
- Depending on the ―dirtiness‖ or turbidity of your wine, you may require different micron rating of pads to clean up wines.
- Membrane filters are different from pad filter in shape, size and configuration. They will typically come in a specialized housing in which will fit onto existing hoses to filter the wine through.
- Membrane Filters are absolute filters – meaning they will filter particulates down to a size they are rated for. Most membrane filters come in 0.45 µm and 0.20 µm absolute. Yeast and bacteria have sizes ranging from 0.7 to 0.5 µm. Therefore the 0.45 µm membrane filter will remove all yeast and bacteria rendering your wine commercially sterile.
- Filtering liquids down to 0.2 µm is usually reserved for water filtration to remove viruses.

Filtration and Bottling, Continued

Procedure

Do not attempt to membrane filter hazy wines through a membrane filter as it will only clog up filters and become costly.

1. Rack clarified wine off lees to a holding tank. The purpose of this racking stage is to take the wine off the lees so that the lees do not interfere with the filters. If you are finding that the CO_2 level in the wine is still too much, now is the time to sparge the wine with nitrogen. The general rule is 5 – 10 psi for 30 seconds per 100 L of wine from the bottom of your vessel. A maximum of 10 minutes is all that is required regardless of the wine size. Very large vessels will require higher psi to overcome static head pressures.

2. Test the wine for FSO_2 levels. Adjust the FSO_2 level to 30 – 35 ppm prior to filtering.

3. Using 0.45µm filter pads in your filter, filter the racked wine through you pad filter to a clean and empty holding tank. The wine is clear but it is not sterile.

From this point, you can decide whether or not you want to carry out another level of filtration prior to bottling. You can proceed to bottle wines after pad filtration but it is highly recommended that you consider membrane filtration as a final filtration prior to bottling. Membrane filtration is the only filtration that can render your wine sterile. Do not attempt to perform membrane filtration without performing pad filtration at 0.45 µm rating first!

Follow supplier's recommendations and instruction on proper setup and use of membrane filters. Immediately bottle the wines after the wine has been membrane filtered.