

Harvest Preparation*

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The harvest season is around the corner. This is the busiest and the most critical period of the year. Organizing the crush and careful planning of this work is essential for a successful and trouble-free vintage. Let's consider several topics to help you with the upcoming vintage.

Winery Inspection and Cleanup: Cleaning and sanitizing during processing is very important. Keep an adequate supply of cleaning materials such as industrial strength detergents, sanitizers, and hot water. Brushes, brooms, squeegee, etc., may seem like minor items, but they are essential to do a good cleaning job.

Inside the winery check the floor for cracks and low spots (where water or juice may accumulate) and repair them. Postponing any repair will make the problem worse. Check the walls and ceilings for mold growth and other foreign material and clean them well. Make sure the cellar has good ventilation. You may consider having a fan on hand to create an air curtain to keep fruit flies away. This is important not only for producing quality wine, but also for creating a positive impression of your operation if it is open to visitors.

Equipment used during crush such as the crusher, press, pumps and others should be checked to make sure they are in working order. They should be tested and repaired, if needed. Breakdown of key equipment, such as crusher, press, pumps, chillers, etc., can be disastrous. It is therefore crucial to see that the equipment is in sound working condition.

The equipment that is used only in the season and stored during the rest of the year needs special cleaning. These items (crusher, press, etc.) should be taken apart as much as possible and cleaned and sanitized thoroughly. If you don't have a steam cleaner, you may consider renting one and using it to do an effective job of cleaning before the harvest season.

Wine Inventory: Inventory your bulk wines on hand. Review your past year's sales by type (brand) and style of wines. You may notice that about 80% of your sales are generated from 20% of your brands. If your sales pattern is close to the scenario mentioned above, consider eliminating those brands that don't contribute significantly to your sales, but take up a good portion of your time and money. If your goal is to make a new style of wine, make sure you have the right grapes, the time, and facility to do it. The decision to make a certain wine should be based on consumer demand and your resources.

Scheduling the Harvest: If you grow all the grapes that you need, you should start sampling them to check maturity and decide the sequence in which you plan to harvest. You may decide on harvest dates, but be flexible; it may rain or your help may not show up when expected. If you are going to sell juice or grapes to home winemakers be sure you are prepared and organized.

If you are planning to purchase grapes, contact growers well before harvest and give them harvest parameters. It is a good idea to visit their vineyard a couple of times to be sure that you will get quality fruit. Hand harvested grapes should preferably be picked during a cool time of the day. Machine harvested grapes should be sulfited promptly to minimize oxidation and initiation of fermentation by wild yeast. If grapes are to be transported over a long distance, consider a refrigerated truck for shipping. When buying bulk grape juice, you may look for someone in the milk hauling business to help you transport the juice at a cooler temperature.

To schedule the picking, one needs to know the relative order in which the various grape varieties are likely to ripen. The time of ripening for a given variety can vary from one region to another. This can be an important consideration if you are buying a variety from different vineyard locations.

Estimating Fermentation Capacity: After scheduling the harvest, the next step is to make sure you have adequate fermentation capacity. As a rule of thumb, one ton of white grapes will require 220 gallons of fermenter space and a ton of black (red) grapes will use 250 gallons of space. It is assumed that a ton of grapes will yield about 160 gallons of juice (must), and this volume will need between 220 to 250 gallons of fermenter space.

Another point to consider is the duration of fermentation. As a guideline, one can assume that a white must will require about 21 days fermenting and the red must will be fermented in about 7 days. This means a tank holding white must will be occupied for about 3 weeks whereas a container. Another point to consider is the duration of fermentation.

Must Adjustment: If the must composition is not in the ideal range, it may need to be adjusted. Such adjustment should preferably be made before fermentation. To increase must sugar level, first calculate the amount of sugar needed and then add to the must. Adjusting pH and acidity require more work. To increase acidity, use tartaric acid. To raise the acid level by 0.1 percent, add tartaric acid at the rate of 1 g/L or 0.14 oz per gal of must. Remember that some of the acid added will precipitate during cold stabilization. Do not add citric acid to the must before fermentation, as it can lead to high VA levels in wines. To reduce acidity, the simplest approach is to ameliorate the must with water or a water and sugar mixture. The extent of amelioration should be carefully determined since addition of water will also dilute flavor and color.

Another means of reducing acidity is the addition of chemicals such as calcium carbonate, potassium bicarbonate and Acidex. As a rule of thumb, to reduce acidity by 0.1 percent, add 3.4 g per gal of KHC_3O_3 or add 2.5 g per gal of CaCO_3 . Before adding chemicals to the must, a lab trial should be conducted to determine the amount required.

In a high acid must, in which the malic acid concentration is at least equal to that of tartaric acid, treatment with CaCO_3 in a double salt manner to remove both tartrate and malate is recommended.

A thorough understanding of these deacidification procedures is advisable before choosing one.

Must Treatment:

a) Treatment with Pectic Enzyme: Grapes, especially certain varieties, are rich in both pectin and pectic acid. These compounds contribute to the juice cloudiness or haze formation and also make juice separation difficult. To facilitate both juice separation and clarification, must treatment with pectolytic enzyme is recommended.

b) Bentonite Treatment: Many winemakers prefer to treat juice with bentonite to remove heat unstable proteins prior to fermentation.

c) Polyvinyl Polypyrrolidone (PVPP): Polyclar AT stabilizer, a proprietary compound, is used to remove compounds that cause browning and pinking in wines. It is useful for white wine varieties that are susceptible to browning. Typical use levels for Polyclar AT in wine are 2-4 lb per 1000 gal. It can be added to juice or wine and should be given 24 hours of contact time. It forms compact lees and is best removed by filtration.

d) Must Clarification: Juice clarification is an important practice in producing quality white wines. Removing suspended solids from juice before fermentation results in wine with cleaner and fruitier aroma. It also reduces the danger of H_2S formation. During juice clarification the suspended solid level is reduced to .5 to 2.5 percent. Juice can be clarified by settling, centrifugation, or filtration.

Yeast Rehydration: When dry wine yeast is used to initiate fermentation, the first and most important step is the rehydration. During this stage the yeast cell absorbs water. Improper rehydration affects cell dispersion and can cause loss of cell constituents, resulting in a stuck fermentation. Points to remember for rehydrating the yeast are:

A. The amount of water used should be about 5 to 10 times the weight of the yeast. For example, one pound of dry yeast may be dispersed in one gallon (approximately 8.4 lb) of water.

B. Use warm water. The desirable temperature range is 104° to 115°F. Water temperature below 68°F can cause a cold shock and reduce yeast viability.

C. Slowly add yeast to water while gently agitating. Dumping all the yeast at once will cause clumping.

D. Do not add water to yeast. Always add yeast to water.

E. Rehydrate the yeast for approximately 15 minutes. Do not allow the yeast to stay in water longer than 30 minutes; since this will adversely affect yeast activity.

F. Preferably use water and not must to rehydrate. The must may contain high SO_2 that could be lethal to the yeast.

Yeast Propagation: After rehydration the yeast slurry is added to the must. At this stage it is necessary to provide yeast with the most ideal conditions to multiply or propagate. Some of the important factors to consider are:

A. Must temperature of 77 to 86°F.

B. Nutrient supply such as availability of sugar, nitrogen, phosphorous, trace minerals and vitamins.

If the must is deficient in nutrients, then a yeast nutrient should be added to the must along with the yeast.

C. Oxygen supply. Under semi-aerobic state, the yeast growth slows down and the sterol level drops, which

makes yeast cells sensitive to alcohol poisoning.

At a rate of 1 lb per 1000 gal, about 2 million yeast cells per ml of must are present. Under normal conditions, the yeast population will increase to 100 million cells per ml, before alcoholic fermentation dominates. It is, therefore, important to encourage yeast growth so that fermentation can proceed in a desired manner.

Equipment: New equipment should be ordered ahead of time so that it arrives before the vintage. Make sure it is in working condition and your employees know how to run it. All equipment should be thoroughly cleaned and sanitized.

Check list of common equipment:

*Equipment such as fork lift, shovels, pitchforks, paddles, plastic 5 gallon buckets, and other items used for unloading should be washed and sanitized with chlorine compounds and hot water.

*Crusher/stemmer: Check to see if electrical and mechanical parts are in working condition. If it needs repair, fix it before the crush begins. If metal parts are exposed, apply a coat of paint for food processing equipment.

*Press: Regardless of what kind or type of press you have, your first job is to clean and sanitize it. Be sure it is in working order. Have some spare parts in stock that are not too expensive which you think you may need. It is best to have a factory representative check it for you. This may cost you some, but will save you money in the long run because you cannot afford a press breakdown during crush. Anticipating problems and planning ahead is the key here.

*Must pump, must chiller, transfer pumps, etc: All pumps should be cleaned and repaired if necessary- especially check seals. Any part of the pump that comes in contact with must should be made of stainless steel. If it is made of any metal, be sure to paint it. Must lines and hose should be thoroughly cleaned and sanitized. Check for leaks or damage and have some extra hose and clamps on hand. If you are using a must chiller, make sure it is working properly. It is best to have it checked by someone who knows refrigeration.

*Cooperage and containers: Receiving and crushing bins, hold tanks, steel tanks, wooden barrels, and other storage containers must be cleaned and sanitized. Check valves and tank fittings and make all necessary repairs.

*Cleaning equipment: Power washers should be in working order. Have some high pressure hose and a spare nozzle on hand. Replace worn-out brushes and brooms. Plenty of hot and cold water is a must.

*Miscellaneous: There are other items that you may need and should have on hand. Such items are tools, food grade grease and grease gun, electrical tape, machine oil or lubricant, hydraulic oil, fuses, flashlight and bulbs, first aid kits (particularly to help with bee stings), safety glasses, masks, gloves, boots, a couple of 5 gallon sprayers, drain cleaners, etc. You may add other items to this list based on your past experience.

*Have a technical person check out your refrigeration system and equipment if you have jacketed tanks for cold fermentations and/or a room for cold stabilization.

This list of equipment is by no means complete. You should use it as a guideline and add other items to the list that you may need. This will make your next crush easier.

Winery Chemicals and Supplies: There are numerous chemicals and supplies used in the winery all year round, but some of them are crucial at crush. The following list should help you with your needs at crush. You may not need all the items listed or you may need some additional items not listed here.

*Fermentation material:

- Sugar
- Yeast
- Yeast nutrient
- Malolactic culture
- Antifoam
- Pectic enzyme

*Other material:

- Potassium
- Sulfex metabisulfite
- Cufex
- Ladders
- CO2 gas cylinder
- Bentonite
- N2 gas cylinder

- Calcium Carbonate
- Carbon (deodorizing)
- Acidex
- Carbon (deodorizing)
- Citric Acid
- Cleaning compounds
- Malic Acid
- Sanitizing compounds
- Tartaric Acid
- Soda ash
- PVPP (polyclar AT)
- Bungs and air locks
- Gelatin/Kieselsol
- Longstem thermometer
- Sparkoloid
- Wine thief
- Caseinate (1 %)
- Plastic buckets
- Egg white (various sizes)
- Oak chips

Laboratory Supplies: Regardless of the size of the operation, you should have the equipment, glassware, and chemicals to do at least the following 7 tests:

1. Brix - hydrometers (various calibration)

hand refractometer

dextrocheck kit

2. Titratable acidity

3. pH

4. Ethanol (ebulliometer)

5. Detection kit for Malo-lactic fermentation

6. Free and total sulfur dioxide (Ripper)

7. Volatile acidity

Laboratory chemicals should be stocked fresh every year and quality control personnel should be prepared for the crush.

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