

STARTING SMALL RED FERMENTATIONS

by
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Warm grapes often result in fast, hot fermentations, and fast fermentations usually produce poor quality wines. Oxidation and biological changes start when the grapes are picked, and just a few hours can degrade the quality of the fruit in hot weather. On picking day, contentious winemakers get to the vineyard early, and they pick, transport and process the fruit quickly.

Grape Quantities Needed

Sometimes beginning winemakers have trouble estimating how many grapes are needed. When making red wines, home winemakers often get about 150 gallons per ton a small vertical basket press is used. The data shown in the Table 1 provides a reasonable basis for making fruit estimates. The values shown in the Table were calculated based on a yield of 150 gallons, but these values are only estimates.

Wine storage containers must be kept full, and some liquid is always lost during the winemaking process. So, experienced winemakers always produce 10 or 15 percent of extra wine to be used to top up their storage containers.

Gallons of Wine	# Red Grapes	# White Grapes
5	70	80
10	130	150
15	195	225
20	260	300
25	325	375
30	390	450
40	520	600
50	650	750
100	1300	1500
200	2600	3000

Table 1. Pounds of grapes needed.

Crushing/Destemming

Crushing breaks the skins of the berries and allows the juice to flow. Crushing should be done with a minimum of grinding and tearing of the grape tissues, and the seeds should never be broken. Small quantities of grapes can be crushed by hand, and several hundred pounds of grapes can be easily crushed by foot. Most home winemakers crush their grapes with a hand crank crusher. Both single and double roller crushers work well.

Stems contain much phenolic material. These phenolic compounds can contribute bitterness and astringency to wine, so most winemakers de-stem red grape varieties before starting fermentation. Stems can be removed quickly by scrubbing crushed grapes through the bottom of a **clean** plastic milk crate with your hands.

Sulfur dioxide (SO₂) helps winemakers control wild yeast and bacterial growth, and sulfur dioxide also helps reduce oxidation. Small wineries and home winemakers use potassium metabisulfite (sulfite) crystals to produce sulfur dioxide gas, and 25 to 50 milligrams per liter of sulfur dioxide are usually added to the crushed grapes before fermentation is started. A half-teaspoon of crystals per 100 pounds of grapes is the correct amount. The sulfite powder should be dissolved in a small amount of water and stirred into the grapes.

Must adjustments

Testing should be done when juice is available. Attempting to make a big red wine from immature fruit is hopeless, so winemakers prefer red grapes with a sugar content of at least 23 Brix. Consequently, sugar content is usually the first measurement made. Sugar can be measured with either a hydrometer or with a refractometer. Home winemakers are often advised to add sugar to immature fruit, but adding sugar will not increase the flavor or improve the weak

varietal characteristics of immature grapes. Adding sugar to under ripe grapes raises the alcohol level but does little else, so adding sugar is seldom advisable. Normally, under ripe red grapes are best used for making blush wines.

The titratable acid is also measured at crush time, and most winemakers prefer to ferment red musts when the titratable acidity (TA) falls between 0.6 and 0.75 percent. The TA can be measured using an acid test kit or with a pipette, calibrated sodium hydroxide and phenolphthalein solution. Grapes grown in Southern California are often low in acid, and additions of tartaric acid are common. Four grams of acid crystals will raise the TA of one gallon of juice about 0.1 percent. However, estimating acid additions is difficult, and several small acid additions are much safer than one large dose. Any significant acid adjustments are best made before fermentation is started.

Yeast must have access to nitrogen, oxygen, vitamins, minerals, etc. to reproduce the large number of cells needed to complete fermentation, and grapes from under fertilized vineyards can be difficult to ferment to dryness unless extra nutrients are added. The manufacturer's directions should always be followed carefully when yeast nutrients are added because excessive quantities can produce off-odors.

Wine Yeast

Large differences exist in wine yeasts. The differences relate to speed of fermentation, color extraction, alcohol production, tendencies to stick, the quantity of foam generated, hydrogen sulfide production, etc. The type of yeast used for primary fermentation contributes little to the flavors of aged red wine.

Prise de Mousse is an excellent, general-purpose yeast for both red and white wines. It produces little hydrogen sulfide, tolerates sulfur dioxide, tolerates high alcohol levels, and it seldom sticks.

Pasteur Champagne yeast is also tolerant of high alcohol levels and sulfur dioxide, and this yeast is often used to restart stuck fermentations. It can be counted on to produce clean, neutral fermentations. Pasteur Champagne yeast can produce large quantities of foam in warm weather.

Pasteur Red yeast is becoming the yeast of choice for producing full-bodied Bordeaux style red wines. It produces clean fermentations, and it has good color extraction characteristics. Pasteur Red is a vigorous fermenting yeast, and cooling is often needed in warm weather.

Some home winemakers pour dry yeast into the juice. However, weak fermentations often result, and better results are obtained when dry yeast is rehydrated. Use about a cup of warm water for 10 grams of dry yeast. The water temperature should be 100 F, so use a thermometer. Stir the water rapidly while the yeast is slowly added. Stir again after all the dry yeast has been added, and let the mixture stand for 20 or 30 minutes before adding the rehydrated yeast to the must.

Extraction

Red grapes have colorless juice. The red color is in the skins. Red wines are made by fermenting the juice and the pulp, skins and seeds together. Astringency is a typical characteristic of red wine, and astringency comes from seeds, stems and skins. Most of the color is extracted in six to eight days of skin contact time, but astringency and bitterness continue to be extracted from the seeds for weeks.

Small bubbles of carbon dioxide gas form during active fermentation. In red fermentations, the carbon dioxide bubbles adhere to the grape skins, and the bubbles make the skins more buoyant. As the bubbles collect, the skins float to the surface of the fermenting liquid,

and after a few hours a thick layer of skins accumulates. Liquid slowly drains away as the layer of skins increases in thickness. This cap of skins becomes dry, and dry caps in open fermenters cause problems. Extraction becomes poor because most of the skins are out of the liquid, and vinegar bacteria can propagate rapidly in the cap. Fortunately, cap problems can be prevented easily by breaking up the cap periodically.

Caps on small fermentations are not very thick, and small caps can be managed by stirring the must with a large, wooden spoon two or three times each day. In larger fermentations, the cap becomes several inches thick, and a special tool is needed to push the cap back down into the juice. Most winemakers punch down the cap at least twice a day. Generally, more color and flavors can be extracted during the first few days of fermentation if the cap is gently punched down several times a day.

Red wines are normally fermented at temperatures ranging from 70 to 90 degrees, and within this temperature range, fermentations lasting from four to ten days are typical. Yeast cannot survive for long when fermentation temperatures exceed 90 degrees or so. Consequently, fermentations must be watched carefully, and cold water, ice or other means should be used to cool fermentation tanks when temperatures become excessive.

In general, the temperature of the must determines fermentation speed. However, the type of yeast, the amount of initial sulfur dioxide added, nutrient levels, etc. also affect fermentation rates, so predicting when a fermentation will finish is difficult. Surprises can be avoided by measuring the temperature and the Brix at least once each day and plotting the data on a graph. In addition, the fermentation should also be smelled and tasted at least once a day.

Skin contact time is a standard method used to control the astringency of red wines. Tannin content is low when short skin contact times are used, and soft, fruity red wines are produced. Fruity style red wines are often produced by pressing the fermentation when the sugar has dropped to eight or ten Brix. Full-bodied red wines are produced by five to ten days of skin contact (they are usually pressed when the hydrometer reads zero). Some big red wines are kept on the skins for three or four weeks, but very high quality grapes are needed for such extended maceration. Deciding when to press a red fermentation is part of the winemaking art.

Summary

Try to obtain cool fruit, then crush, test, adjust and start fermentation promptly. Never crack the seeds when crushing. Remove and discard most of the stems. Add a half-teaspoon of sulfite powder, mixed in an ounce or two of water, for each 100 pounds of grapes. Test the juice, and adjust the acid level of the must before adding the yeast. Use active, dry Prise de Mousse, Pasteur Champagne or Pasteur Red yeast. Rehydrate the dry yeast in 100 F water before adding it to the must. Punch down the cap two or more times each day. Measure, smell and taste the fermentation at least once each day. Press in seven or eight days.