THE BEVERAGE PEOPLE
2010 Summer News and Wine Catalog

WINE CHEM 101 Part C

The Final Frontier

By Bob Peak

Last year in Part B of this ongoing chemistry lesson, I wrote about wine acids. As usual, I found it impossible to discuss acids without also mentioning pH—they are closely related. However, they do not measure exactly the same thing and must be determined separately if you want a full picture of your wine. While the titratable acid number—TA—is all about taste, the pH number is all about stability. **In particular, wine pH strongly influences the effectiveness of sulfite in preserving wine's freshness and quality. So a sulfite discussion follows this information on pH and wraps up the Wine Chem series.**

The range for pH is from 0 to 14. Water, representing neutral, is pH 7.0. Lower numbers (0-6.9) are acidic and higher numbers (7.1 to 14) are basic. The normal range for wine is about 3.0 to 4.0, occasionally going a little higher. pH is named that for good reasons—not just to drive non-chemists crazy! The lower-case "p" means "the negative logarithm of". The capital H represents the hydrogen ion activity (concentration, more or less) of the acid solution. All of this is expressed in molar values—a mole of a substance is the gram equivalent of its molecular weight—but don't worry about that. It just puts all chemicals on an equal footing for reaction purposes.

Strong acids, like hydrochloric (muriatic) swimming pool acid, are essentially completely dissociated in water. That is, for every molecule of HCl that comes in contact with water, the H separates as a proton, H^+, and the Cl separates as a chloride ion, Cl^-. The gram equivalent weight of HCl is 36.5 grams. So, if we mix 3.65 grams (one tenth of a mole) in one liter of distilled water, the molar concentration is 0.1. Since all of the molecules dissociate for this strong acid, the hydrogen ion activity is also 0.1 molar. In scientific notation, we can express one-tenth as 10^{-1}. Since the base-ten exponent of that number is –1, the logarithm of that number is also –1. That said, we look at the negative logarithm (p) by reversing the sign: 1. A one-tenth molar solution of hydrochloric acid has a theoretical pH of 1. In reality, we would get a measured value very close to that, because this strong acid is so fully dissociated in water.

Not so, however, for the weak acids of wine. Several factors influence pH. First, we have different carboxylic acids participating in the combined pH—primarily tartaric, malic, and lactic, but also possibly citric and succinic. In addition, the potassium salts of the weak acids participate, serving as reservoirs for acid ions as needed in the solution. The wine is "buffered"—it resists changing its pH—by all of these combinations. **So, settled in somewhere between pH 3 and pH 4, it is unlikely to change very much even if the acid level goes up or down significantly. That is why you cannot determine TA by measuring pH, nor the other way around.**

To measure pH in the home wine laboratory, the easiest technique is to use pH indicator "dip sticks". Unfortunately, although easy, they are not usually accurate enough to make good winemaking decisions. Instead, winemakers seriously interested in measuring pH will use a pH meter as seen elsewhere in this catalog. Either a portable, hand-held meter or a bench meter is good enough for wine PH, but the portable meters may respond too slowly to be useful for TA measurement if you want to get double-duty out of your meter.

CHEM. 101 CONT. PG 2

5 Big Problems...

It seems like everyone has them, luckily not all at once.

By: Gabe Jackson

Winemakers can often be heard exclaiming that grapes want to be wine! Our job, then, is to simply get out of the way and let it happen. Yet home winemakers know that those same grapes may want to become a wine we don't want to drink, or worse yet vinegar, without some guidance. We often confront wines that won't finish fermenting, wines with sharp or flat flavors, wines with strange fermentation aromas, or other problems on the path to great wine. In these situations we need to be prepared to act as wine doctors, ensuring that our patients make it to bottle fully fermented, balanced, clean, clear and with ripe flavors intact.

Some problems can be set into motion on harvest day. Grapes picked too early or late are unlikely to become a great wine by themselves. If they are picked too early, an acidic and herbaceous wine may be the result; too late and it may be flat tasting, high in alcohol and prone to spoilage. Timing the harvest is crucial. The grapes should have a sugar content of 22 – 26° Brix, and a total acidity content of 0.6 – 0.7%. When the numbers reach outside these margins, doctoring or blending is generally required. The harvest manager should be able to tell you these numbers, but remember that this is only the quantitative part of the harvest decision. Qualitatively, the grapes should be assessed for maturity and flavor---a far more esoteric art. Have a look at the vineyard and the fruit. Do the vines look healthy? The leaves should not be completely brown yet. Are the grapes all of uniform maturity? Is it over-cropped? Variance in the maturity of the fruit and excessive fruit production make it very difficult to create a wine with fully ripe flavors. Finally, are the fruits physiologically mature? Eat a few and look at the seeds. If the seeds have some browning and feel hard, they are mature.

Other problems are set into motion with the onset of fermentation. Lack of nutrients can make a fermentation that starts out normal end up with funky aromas such as the rotten egg smell of hydrogen sulfide. The most common cause of this problem is a deficiency of amino nitrogen, or certain

5 Big Problems Continued Pg 3

WINE CHEM CONTINUED

Many years ago, a very skilled Austrian chemist named ***Martha Steinmetz*** told me, ***"everything is pH dependent."*** She said it often, and it is usually true. As noted above, our next chemistry topic is sulfur dioxide, and its behavior in wine is very pH dependent, indeed.

Sulfur dioxide, SO_2, is a gas. When dissolved in water, it has a very vigorous reaction, producing dissolved sulfurous acid:
SO_2 <== ==> (K1) $H^+ + HSO_3^-$ <== ==>(K2) $H^+ + SO_3^=$

As it proceeds through the reaction, two protons are involved, just as with the dicarboxylic acids discussed in last year's article (although this is a simple mineral acid, it just happens to have two active protons). The pKa's (acid dissociation constants) are 1.77 and 7.22, shown as the (K1) and (K2) reactions above. These indicate that half of the "first" protons are dissociated at pH 1.77 and half of the "second" protons at pH 7.22. Since our wine has a pH between 3 and 4, only (K1) plays a significant role, and the dominant form of sulfur dioxide at wine pH is the bisulfite ion, HSO_3^-. However, it is sulfur dioxide in its molecular form, **SO_2, that is strongly antiseptic and antioxidant—protecting your wine from spoilage.**

Reactive, available sulfur dioxide measured in wine is called "free SO_2" or "free sulfite". (Note, by the way, that "-ite" ending on sulfite. Sulfate, with an "-ate" ending is a completely different ion and plays no role in protecting your wine.) As we have seen from the pH discussion, most of the free sulfite is actually in the form of the bisulfite ion. Bi- in this case means "one hydrogen atom and one something else" rather than the more common meaning of "two". Potassium bisulfite, for instance, would be $KHSO_3$.

So, how free is it? The amount of molecular SO_2 available to protect your wine depends on both the concentration of free sulfite and the pH of the wine. Red wines are generally considered to need 0.5 ppm of molecular SO_2 for protection from oxidation and spoilage, with white wines needing more, about 0.8 ppm. [On page 11 of this newsletter you will find a table that displays the needed free sulfite level to achieve effective molecular levels at various wine pH's.] And now you know one of the main reasons why low pH wines are more stable than high pH wines!

So far, this discussion has presented sulfite addition as though it came directly from added sulfur dioxide gas. Wineries do that, but sulfur dioxide is a dangerous and reactive chemical not appropriate for home winemaking. Instead, we usually add potassium metabisulfite, a potassium salt of sulfur dioxide. In this application, "meta" is a chemical term meaning "about to become." As above, the "bi" denotes that there is the one proton we have already discussed, plus one potassium ion. Consequently, when potassium metabisulfite is dissolved in water, our old friend the bisulfite ion is produced:

$K_2S_2O_5 + H_2O$ ==> $2\ HSO_3^- + 2\ K^+$

But, even though this presentation looks as though everything goes to bisulfite, we are still pH dependent. Once the bisulfite ion is in the wine, it can begin going back and forth to the other forms, incuding molecular sulfur dioxide. **So, how do all these "sulfite" terms add up?**

Potassium metabisulfite weighs 222.32 grams per mole. Sulfur dioxide gas weighs 64.1 grams per mole. For every mole of the salt you dissolve in water (or wine), the yield as sulfur dioxide is as if you added two moles of the gas. As a result, 222.32 grams of potassium metabisulfite introduces the same amount of activity as would 128.2 grams of sulfur dioxide gas (potassium, harmless to the wine, makes up the missing mass). That means that for every 100 ppm of potassium metabisulfite we use in our wine, we have added the equivalent of 57.7 ppm of sulfur dioxide. So, view 100 ppm as "total potassium metabisulfite added." **Does that mean "total SO_2" is 57.7 ppm? No. The term "total SO_2" is operationally determined in wine testing laboratories.** That is, instead of "total", it means something like "total sulfur dioxide that is recoverable by the recognized analytical method." In that method, a chemist adds strong acid to a wine sample to force the sulfite back over into molecular sulfur dioxide. As that reaction proceeds in a heated flask, air is swept through the sample, removing the sulfur dioxide gas as it forms. At the other end of some glass apparatus, the gas is caught in a basic trapping solution. The chemist measures the amount caught, and that is called "total sulfite." Not surprisingly, in our case, the number would be somewhat less than the theoretical number of 57.7 ppm. From whatever that lower amount is, a still lower amount will be "free"—available to react. And only "free" produces molecular (which protects wine) as noted above. **See Page 10 in this catalog for more information on testing for free SO_2.**

So, home winemakers always ask, "where did it go?" We have the tiny amount of molecular sulfur dioxide in the wine. We also hope to have a substantial amount of "free" sulfite—maybe up around 30 ppm. Most of that is in the form of the bisulfite ion. In the "total" measured by the appropriate test, we have all of the "free" included, plus some unstable reaction products that loosely link sulfite with other molecules such as sugars and some trace acids. Some of these may return to the "free" side of the ledger as other free sulfite is used up, serving as a sort of reservoir of free sulfite. Other links are not going to come apart, leaving that part of the "total" sulfite bound and unavailable. Those stable sulfite-containing compounds are mostly sulfited aldehydes—oxidation products in the wine that have been safely taken care of by the sulfite, but took the sulfite away with them. So although this sulfite is not coming back, neither are the aldehydes, and that is a good thing. But, as noted earlier, some "added" sulfite is not even in the "total." Those sulfites are gone forever, mostly oxidized to sulfate (it's that –ite and –ate thing again). Sulfate is very common in wine and in the environment, is non-reactive, and is non-toxic. It is what becomes of sulfur dioxide as the wine is exposed to air:

$2(SO_3^=) + O_2$ ==> $2(SO_4^=)$

Since that sulfite is gone forever, it helps explain why you keep that barrel topped up and oxygen out!

But what about "safe" SO_2 levels? The legal maximum for total SO_2 in wine is around 350 ppm (and remember, the amount added can be higher still, without hitting the "total" limit, because some of it disappears). Dried fruit is allowed to contain up to 2,000 ppm. When people are adversely affected by sulfites, it is usually reflected as respiratory problems in sensitive individuals, often asthmatics. As I looked for a good illustration for this article, I came across an interesting case study. It seems that an alert emergency room physician noticed that he had six patients who had all consumed the same brand of salsa. Two of the patients had asthma flare-ups, two experienced coughing and tightness of the throat, and two required mechanical ventilation. It was discovered that the offending salsa had a sulfite content of 1,800 ppm—well above the level of 700 ppm found in other brands of salsa. One of the patients, fully aware of her sulfite sensitivity, thought it was safe to eat the salsa because it was improperly labeled as "fresh." (Nagy, S. M., S. S. Teuber, S. M. Loscutoff and P.J. Murphy, J. Food Prot. (58) pp. 95-97. 1995).

So what does it all mean? Well, don't add 700, 1,000, or 1,800 ppm of sulfite to your wine. Just don't go there. Keep it to 30 ppm or so, added frequently and measured often. If problems do develop from sulfite in wine, they will likely be respiratory, particularly in sensitive individuals. If one of your friends says they cannot drink your wine because it gives them a headache, it isn't the sulfites. They're drinking too much wine!

This article concludes our three-year series of Wine Chem 101. We have covered sugar, alcohol, acids, pH and sulfites. **If you keep all of it in mind as you make this year's wine, you can envision your ideal wine chemistry: enough sugar to yield a desirable alcohol level; acids in the right range to be pleasant, refreshing, and balanced; pH where it can safely protect the wine from spoilage, and enough sulfur dioxide to get it safely into the bottle.** Chemistry is where science meets art in making fine wine!

5 Big Problems Continued

vitamins, in the grapes. Also, high potential alcohol content (i.e. high sugar content), low fermentation temperatures, and nutrient deficiency can lead to a stuck fermentation. At the shop, we routinely coach winemakers when they face these problems. Eliminating hydrogen sulfide is fairly easy; reviving a stuck fermentation is less so.

Hydrogen sulfide is a member of a family of compounds called volatile reduced sulfur (VRS). Some other VRS compounds found in wine smell like smoke, burnt rubber, and rotten cabbage.

Burnt rubber... drag strip yes, wine cellar... NO

None of these enhance the wine. The sooner you treat the wine to remove them, the better. They can develop into compounds that are more difficult to remove. The treatment generally depends on when the problem is identified. If discovered during fermentation, a yeast nutrient such as Diammonium Phosphate or Fermaid K can be added to the must. If done soon enough the yeast will stop production of sulfide but will continue to off-gas carbon dioxide, taking the sulfide aromas away with the CO_2. If it is not discovered until the end of fermentation, two other solutions remain. Hydrogen sulfide is volatile and can be effectively knocked out of the wine by splash racking. This technique, however, will introduce oxygen to the wine. Ensure that free SO_2 levels are above 30 ppm in the wine before trying it. A less risky solution is to use a copper sulfate treatment to reduce the VRS. The copper treatment is very effective and inexpensive. Add copper sulfate solution 1% at a rate of 0.75 mL per gallon of wine. The result will be a copper level of 0.5 ppm which is the maximum allowed in commercial wine. (Adding yeast hulls can help absorb the copper for removal, and the wine should be racked off of the sediment after a couple of days.)

Reviving a stuck fermentation can be tricky. Preventative measures should be taken to avoid it in the first place. Adding nutrients during fermentation will help prevent the yeast from becoming stressed. Fermentation temperature can be another factor leading to a stuck fermentation, especially in garage wineries. Be aware of the temperature range for your chosen yeast strain and ensure that the temperature of the fermenting must stays in the range, day and night. Should the fermentation stall despite your best efforts, you may be in for a challenge. Many strategies might be employed, the simplest of which would be simply pitching a strain of yeast that has higher alcohol tolerance, lower nutritional need, or broader temperature range than the stalled yeast. The simple strategy, however, is not a silver bullet. Sometimes a more elaborate restart plan is required. The following method is a multi-faceted attack on the remaining sugar, and the most thorough method we use for advising winemakers at the shop. Remember that the environment of a stuck fermentation is very stressful to yeasts, so they will need help by addition of nutrients (Go-Ferm and Fermaid K) and slow adaptation.

See Restart Quide to the Right

RESTART PROGRAM

1. Select an alcohol tolerant, vigorous, low nutrient need yeast such as Uvaferm 43 or Prise de Mousse.

2. Using at a rate of 2 grams per gallon of must, rehydrate the yeast using Go Ferm yeast starter nutrient. Follow the rehydration directions on the package, but do not add it to the stuck wine yet.

3. Prepare a sweetened mixture for the starter:

2.5% of volume of stuck wine
2.5% of volume as water
NOTE: 2.5% is 1 quart out of 10 gallons of wine
1 gram Fermaid K for every gallon of mixture
Add juice, concentrate, or sugar until mixture is 5° Brix (measure with a hydrometer)

4. Add the yeast to the starter and ferment at 70 – 75° F until the sugar content drops to 2.5° Brix.

5. Prepare the stuck wine by adding yeast hulls (1 gram per gallon) to absorb medium chain fatty acids. They are potentially toxic to the yeast.

6. The stuck wine may now be added to the starter slowly. Add 20% of the total volume at a time to the starter and wait until the sugar has decreased by half. Repeat until all the stuck wine has been added.

Fully fermented wine with lovely aromas may yet be hiding another problem. One sip will reveal the obvious presence or absence of adequate acidity. Testing acidity levels with a titratable acidity kit such as *Vinoferm's Precision Acidometer* is the next step. If the TA (total or titratable acidity) is outside the 0.6 – 0.7% range, it should be adjusted. Testing your favorite wines can help determine the ideal TA number. To increase the acidity, add 1 oz. of tartaric acid to increase the TA by .15% in 5 gallons. To reduce the acidity, add 3.4 grams of potassium bicarbonate to reduce the TA by 0.1% in 1 gallon. Take care that there is head room in the wine storage vessel when adding potassium bicarbonate, it causes an immediate foaming reaction! Excessively acidic wines may be troublesome due to the fact that high additions of potassium bicarbonate can leave a salty or bitter taste in the wine. For this reason, don't try to reduce the TA by more than 0.2% using this method.

A final consideration before bottling a fully fermented, balanced wine with lovely aromatics is clarity. After all, you only get one chance to make a first impression. Luckily, clarification of a wine happens naturally over time. It can be accelerated with cold temperatures, a process called cold stabilization. Cold stabilization is generally preferable to the more aggressive methods such as filtering and fining because it doesn't strip as many compounds from the wine. It is best done while the wine is aging in the winter. Place the wine in a room where it can be exposed to cold nights (in the garage? A room with an open window?) and allow the temperature to drop below 40° F. for a few nights. The wine clarifies quickly. If no opportunities are available to cold stabilize, and time does not do the trick, many fining agents are available and an explanation of their use is available on page 13.

Hopefully, the grapes you pick want to be wine. Perhaps they will ferment smoothly from sweet fruit to packaged product without any doctoring. But if problems arise, do not fear---at least now you are prepared to face 5 big ones.

Winemaking Step by Step

EQUIPMENT

For most beginners, the hardest thing about making wine is simply figuring out, in advance, what equipment is going to be needed. This list should set most of these fears to rest. (See the back of the catalog for rental equipment choices and rates.)

You will need the following:

1. Siphon Hose and Racking Tube
2. Hydrometer (Saccharometer) and Test Jar
3. Acid Testing Kit
4. Sulfite Test Kit
5. Crusher or Stemmer/Crusher
6. Press
7. Corker
8. Thermometer
9. Pressing Bag (optional)
10. Funnel
11. Bottle Filler
12. Small Bucket
13. Punch Down Tool

For every 75 lbs. of grapes:

1. 10 Gallon Food grade Bucket and Lid
2. One 5 gallon glass carboy (water bottle) with a fermentation lock and a #6 1/2 or #7 drilled rubber stopper.
3. Extra glass jugs, each with a fermentation lock and #6 drilled rubber stopper. These could be gallon size or smaller.
4. Twenty–five wine corks.
5. Two cases wine bottles.

INGREDIENTS

1. Wine Yeast, (1 gram) per gallon of must or juice. (see pg. 9 for recommendations)
2. Grapes, (16 lbs.) per gallon of wine.
3. Tartaric Acid as needed.
4. Sulfite as needed.
5. Yeast Food as needed.
6. Fining Agent (optional)
7. ML Culture for some wines.

RED WINE PROCEDURES

1 **Crush (break the skins) and de-stem the grapes**. For most grape varieties, about 90% of the larger stems should be removed.

2 **Test for total acidity following the instructions in your acid testing kit.** If the acidity is less than .6%, add enough tartaric acid to bring it to that level. If you have a pH meter, also test the pH.

3 **Test for sugar with your hydrometer.** Correct any deficiencies by adding enough sugar to bring the reading up to at least 22°Brix or add water to bring the sugar down to a range between 22° and 26°Brix.

4 **When these tests and corrections have been completed, the must should be sulfited.** Estimating that you will get roughly one gallon of juice yield for every 16 lbs. of grapes, calculate the anticipated amount of juice. Using this estimate, add enough sulfite to give you a sulfur dioxide (SO_2) level between 50 and 130 parts per million (ppm). (See pages 10 & 11.)

The amount needed will depend on the condition of the grapes, with moldy grapes getting the most concentrated dose. Extremely clean grapes may be fermented with little or no SO_2.

5 **Unless you have found it necessary to add more than 65 parts per million SO_2 in step 4, yeast should be added immediately.** If using more than 65 parts per million SO_2, you must wait six hours before doing so. Add 1 -2 grams of dry wine yeast per gallon evenly across the surface of the crushed grapes (now called "must"). Stir it in thoroughly after eight to twelve hours. Also, begin your nutrient program according to the instructions on page 8.

6 **The must should be stirred twice a day until fermentation begins.** The beginning of fermentation is obvious, as the grape skins are forced to the surface, forming a solid layer, called a cap.

Once the cap has formed, mix it back down into the fermenting juice twice a day using your hand or a stainless steel punch-down tool until it is ready to be pressed.

7 **Throughout fermentation, the temperature of the must is usually between about 60 and 75°F.** For better color extraction from the skins, it is helpful to allow the temperature to rise at least once to the 80-90°F range. The fermentation itself generates some heat, which helps warm the must along with warm fall weather. If it is late in the season you may need a heater.

8 **Add an ML (malolactic) culture** (optional) to the wine which, in the case of direct pitch strains like *Enoferm Alpha or Beta,* **is added to the secondary fermentors after pressing.**

9 **When the wine has reached 0° Brix** the grapes **should be pressed to separate the wine from the skins.** This is usually about 1-2 weeks of fermentation at 70-80°F. During pressing, collect the wine into a bucket under the press and funnel the wine into secondary fermentors. Attach fermentation locks, and allow the containers to

Winemaking Equipment from crush to bottle.

Crushing and stemming your grapes.

Time Line for Red Wine Fermentation.....

Active Yeast Fermentation of Must in Primary Fermentors	Pressed wine moved to Secondary Fermentors (leave a little room for foam for a day or two, then top up.)	Rack off gross lees and top up containers	Rack off lees again, test for ML, add sulfite and store in cool place for aging, topping and sulfiting every couple months. Add oak sticks or barrel age.	Rack off lees, adjusting sulfite, fining or filtering, or just topping up	Rack to bottling container, adjust flavor with oak extract, add sulfite, cork and store. ...Usually in time for next harvest.
...5 to 14 days	...1 to 2 weeks	...1 month	...4 to 6 months	...1 to 3 months	

settle until all visible signs of fermentation have ceased (several days to a week or so). Top full when all activity ceases even if you have to add wine from another batch, or buy a similar wine, remember, you get to drink it later.

10 **When the wine has begun to clarify in 1-2 weeks, rack the wine off the gross lees** into clean, sanitized storage containers (glass, stainless steel, or oak). Top up the containers and let stand for a month. If ML fermentation is still active do not add sulfite during this time.

11 **After one month, rack the wine away from the lees again,** add sulfite to 25 or 30 ppm, and keep in topped up containers for four to six months. You must top up barrels, and visible inspect carboys. This is a good time to add oak alternatives such as sticks or chips. Add sulfite every few weeks. If you inoculated for ML, test the wine to be sure it is complete.

12 **Rack off the lees again,** and retest to see if the ML fermentation has finished. If completed, raise the sulfite to 20-30 ppm and store in a cool place for aging. If ML fermentation has not completed, keep the sulfite level below 20 ppm and warm the storage containers for a month to encourage completion.

13 **Usually during the summer** (just before you need your storage containers for the next year's crush), **carefully rack the wine to a sanitary bottling container, then siphon into bottles and cork them.** Keep the bottles neck-up for one week to allow the corks time to expand, then move the cases to their side or upside down for storage.

Bottling time is your last opportunity to make sure the wine will be bottle stable, so test and adjust the sulfite to 30 ppm. If this is a sweet wine, add Sorbistat to keep the wine from further fermentation. Most red wines will benefit from at least one year's additional aging.

White Wine Procedures, see next page.

Pressing the fermented red grapes.

WHITE WINE PROCEDURES

1 **Crush the grapes** to break the skins**.** It is not necessary to de-stem them, but it does not hurt if you happen to have a stemmer/crusher. Keep the grapes as cool as possible.

2 **Test for total acidity.** If the acidity is less than .65%, add enough tartaric acid to bring it up to that level.

3 **Test for sugar with your hydrometer.** Correct any deficiencies by adding enough sugar to bring the reading up to 20° brix for most varieties (22° for Sauvignon Blanc and Chardonnay.) If higher than 26° brix, add water to lower it between 22° and 26°.

4 **When these tests and corrections have been completed, the must may be sulfited.** Estimating that you will get roughly a gallon of juice from every 16 lbs. of grapes (varies with the variety), add enough sulfite to give you a sulfur dioxide (SO_2) level between 50 and 120 parts per million (ppm.).

The amount needed will depend on the condition of the grapes, with moldy grapes getting the most concentrated dose and very clean grapes may get by with little or no sulfite.

5 **Stir in pectic enzyme at the rate of one ounce to every 200 lbs. of grapes.** Place the crushed grapes in a covered container to stand from 2 to 18 hours (longer for the "big, less fruity" varieties.) If left to stand longer than 2 hours at this stage, the crushed grapes should be refrigerated.

6 **The grapes are then pressed to separate the juice from the skins.** Funnel the juice into topped up containers, cover, and let stand for approximately 24 hours.

7 **Siphon the clear juice away from the layer of settlings into a glass, stainless steel, or oak fermentor which is filled no more than 3/4 full.** Yeast should be added, a gram a gallon and a fermentation lock attached to the fermentor. Add nutrients according to the article on page 8.

8 **When visible signs of fermentation end, the wine must be racked off the lees,** and placed in topped up storage containers (glass, stainless, or oak). Add sulfite, 30 - 40 ppm. and let stand for a month.

9 Rack off the lees. Fine with a sparkolloid or bentonite slurry if clarity is not satisfactory. Sulfite and store full containers in a cool place.

10 **In a couple of months, rack and sulfite the wine again, placing it back in topped up containers.** This is a good time to filter if the wine has not clarifed with finings adequately on its own. For oak flavor add oak sticks or liquid oak extract now.

11 **In late Spring, before the onset of very hot weather, carefully rack the wine from the lees.** Test the wine for free sulfite content with a sulfur dioxide test kit to determine how much SO_2 is needed to bring the level to 30-35 parts per million.

Siphon into bottles, cork them, and set them aside for whatever bottle aging is needed. If you wish to sweeten the wine, do so with simple syrup (two parts sugar to one part water, boiled), and add 1/2 tsp. Sorbistat per gallon to inhibit any remaining yeast. Light, fruity, white wines may be enjoyed within two months after bottling.

Time Line for White Wine Fermentation.....

Active Yeast Fermentation of Juice in Primary Fermentors 3/4 full	Rack finished wine to clean Fermentors, topped full. Settle out lees. Sulfite	Rack off lees and fine or filter. Add sulfite and cold stabilize. Add Oak	Rack to bottling container, add sulfite, fill and cork bottles.
...1 to 2 weeks	...1 month	...2 to 4 months	...In the spring

Fruit Wine Procedures, see next page.

Placing the wood blocks and press head into the press before pressing the grapes.

FRUIT WINE PROCEDURES

Use the following procedures for Berry or Stone Fruit Wines:

1 **Smash sound, ripe Berries** (or pit Stone Fruit), tie loosely in a straining bag and place in open top fermentor.

2 Heat 6 quarts **Water with Corn Sugar** and bring to a boil. Remove from heat, cool and pour into the fermentor over the fruit.

3 Add the remaining **Water**, **Yeast Nutrient, Pectic Enzyme and Tartaric Acid and optional Grape Tannin**. Add 5 tablespoons of 3% **Sodium Metabisulfite stock solution** and mix well. *(See pg.11 for stock sulfite instructions.)*

4 **Cover with loose plastic sheet or lid** and allow to cool and dissipate the sulfite, waiting for 12 hours or overnight. Stir in the **Yeast.**

5 Once fermentation begins, **stir or push** the pulp down into the liquid twice a day.

6 **After 5-7 days, strain and press the pulp.** Funnel the fermenting wine into closed fermentors, such as glass or plastic carboys, and attach a fermentation lock. *Note: if this fermentation is very active, you may need to divide the wine between two carboys or it will foam out and spill.*

7 When bubbles are no longer actively rising through the wine, **siphon the wine back together into one full carboy**. Fine with **Sparkolloid** *(see pg. 13 for mixing Sparkolloid)*, add a teaspoon per gallon of **sulfite stock solution** and let set for four weeks under the airlock.

8 **Rack (siphon) away from the sediment**, top full with a neutral wine and leave under airlock for 3 weeks up to 4 months.

9 For **bottling**, **rack into an open container**, and **add 1 1/2 teaspoons sulfite solution** per gallon. Sweeten with **sugar syrup** to taste and add 1/2 teaspoon **Sorbistat** per gallon to stabilize. **Siphon into bottles, cork, and set aside to age for at least 3 weeks.**

RECIPES...

Blackberry or Loganberry Wine

20 lbs. Blackberries or
12 1/2 lbs. Loganberries
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
9 tsp. Tartaric Acid
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

Blueberry Wine

15 lbs. Blueberries
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
9 tsp. Tartaric Acid
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

Raspberry Wine

15 lbs. Raspberries
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
9 tsp. Tartaric Acid
1 1/4 tsp. Grape Tannin
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

Cherry Wine

22 1/2 lbs. Sweet Cherries or 15 lbs. Sour Cherries
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
9 tsp. Tartaric Acid
(Omit Acid with Sour Cherries)
1 tsp. Grape Tannin
5 grams Epernay II Wine Yeast
Original Brix: 20
Total Acid: .6-.65%

Plum Wine

15 lbs. pitted Plums
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
7 tsp. Tartaric Acid
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

Cranberry Wine

15 lbs. Cranberries
1 lb. Raisins
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

Apricot Wine

17 1/2 lbs. Apricots
12 lbs. Corn Sugar
5 gallons Water
2 1/2 tsp. Yeast Nutrient
2 1/2 tsp. Pectic Enzyme
5 Tbl. stock Sodium Bisulfite solution (initially)
9 tsp. Tartaric Acid
1 tsp. Grape Tannin
5 grams Epernay II Wine Yeast

Original Brix: 20
Total Acid: .6-.65%

JUICE TESTING FOR SUGAR, ACID, PH & NUTRIENTS

Your Testing Program

Crush your grapes and deliver a settled sample of juice to your nearest laboratory (a 250 ml bottle is the minimum volume requirement for most chemical analysis. We have three labs near the store, Vinquiry in Windsor (707) 838- 8612, Scott Labs in Petaluma (707) 765-7666, and ETS in Healdsburg (707) 433-7051. Contact them to find out information on cost as well as possible shipping options.

There are three tests deemed most essential in the majority of winemaking situations. By testing these three things: Sugar, Acid, and pH, you will have the minimum level of information needed to make wine. Instruments and kits are available at The Beverage People for testing these parameters at home. (See p.12)

In addition to the three tests mentioned above you may also want to find out the level of nutrients in your juice. Adequate nutritional levels help ensure a healthy yeast fermentation, and also help avoid problems such as: stuck fermentations, or the"rotten egg" smell of Hydrogen Sulfide.

As far as nutrients are concerned, there are two tests a home winemaker would utilize: one for *Ammonia*, and one for *Assimilable Amino Nitrogen*. The results of these two tests are added together to determine the total amount of *Yeast Assimilable Nitrogen (YAN)* present in the sample. When these figures have been combined, the result (logically enough) is called *Yeast Assimilable Nitrogen Combined (YANC)*. It is this *YANC* figure, in combination with the sugar level of the must, that tells us the nutritional requirements of our juice. If you are interested in these numbers, you will need to use a commercial lab. No home tests are available for these parameters.

Adjusting Nutrients

Because different strains of yeast have different nutrient requirements, talking about YANC levels can quickly turn complex. For our discussion here, we will consider the natural juice level of YANC in one of 3 levels: Low YANC < 125 ppm, Medium YANC 125-225 ppm or High YANC > 225 ppm.

We also divide the yeasts into three levels of nutritional need (see table on page 9). LOW, MEDIUM AND HIGH-VERY HIGH. Once you know your YANC level, it may influence your choice of yeast. Choosing one with an appropriate nutrient need will minimize your nutrient additions.

After your yeast choice is made select a nutrient addition program from the following table by first choosing Low, Medium or High YANC level and then the Yeast Nutrient program of *Low, Medium or High-very High*.

Note: all of this advice is based on "moderate" sugar levels up to 22° Brix. For high- sugar musts, choose yeast both low in nutrient requirements and high alcohol tolerant. Increase the yeast pitch 50% and add both 1 gram DAP amd Fermaid K per gallon of juice when 1/3 of the sugar has been fermented.

Yeast Nutrient Needs

YANC LEVEL	*Low*	*Med*	*H-VH*
LOW	**A**	**B**	**E**
MEDIUM	**C**	**D**	**E**
HIGH	**C**	**C**	**D**

Nutrient Programs

A) Add enough DAP to bring your YANC up to 150 ppm about 8-12 hours after pitching yeast.

For ***program A***, use these levels:

50 ppm or less YANC, add 2 grams DAP per gallon.

50-100 ppm YANC, add 1 1/2 grams DAP per gallon.

100 -125 ppm YANC, add 1/2 gram DAP per gallon.

125+ ppm YANC, add no DAP

In addition, about 1/3 of the way through fermentation, add 1 g/gal. of Fermaid K (or Yeast Food).

B) Do all of ***program A***, plus:
Add an additional 1/2 g/gal. DAP and do a second addition of 1 g/gal. Fermaid K when roughly 2/3 of the sugar has been consumed.

C) Add no DAP. Add 1 g/gal. Fermaid K about 1/3 of the way through fermentation.

D) Follow **program C**, plus add another g/gal. of Fermaid K about 2/3 of the way through fermentation.

E) Follow **program A**, plus add 1 g/gal. DAP and 1 g/gal. Fermaid K about 2/3 of the way through fermentation.

Shipping Juice

Remember that you are sending juice, and that means it is subject to fermentation. *A laboratory* must receive your samples before fermentation begins! Unless you take your clarified juice to the lab yourself, you should do one of two storage methods:

Freeze the juice in the sample jar (with the lid loose). When the sample is solidly frozen, reseal it and ship via next day air.

Pasteurize the juice, heating it up to 180°F., keeping it there for 2-5 min. Do not boil. Cool, freeze, and ship via next day air. In any case, talk over sampling and shipping with your chosen laboratory before you start.

Which Nutrient...When?

Add **Fermaid K** (Yeast Food) at the rate of 1 oz. per 32 gallons early in fermentation and prior to ML. Provides a complete and balanced food for yeast. Use with DAP if you know you need more nitrogen. Contains ammonia salts, amino acids, sterols, unsaturated fatty acids, yeast hulls, vitamins, magnesium and pantothenic acid.

Diammonium Phosphate - DAP will raise the level of free nitrogen for a healthy fermentation. Contains only ammonium phosphate. Use varies, but 1 oz. per 32 gallons is a good starting addition.

Autolyzed Yeast is used to restart sluggish and stuck fermentations. Contains pure dried yeast providing amino nitrogen, B vitamins and yeast hulls from autolyzed yeast.

Yeast Hulls help prevent stuck and sluggish fermentations and with Autolyzed Yeast to restart fermentations. This is the pure cell wall membrane of whole yeast cells and is more concentrated than autolyzed yeast. Also used to absorb toxic compounds.

YEAST RECOMMENDATIONS

Locate your grape variety or style, read about the yeast characteristics for the recommended strain(s).
We stock all of these during harvest.
Please read page 8 for **Nutrient** programs for yeast.

To find fermentation specifics, read down	*Assmanshausen*	*Beaujolais*	*Brunello BM45*	*CSM*	*Epernay 2*	*French Red (BDX)*	*ICV D254*	*M-2*	*RP15*	*P. Champagne*	*Prise de Mousse*	*Rhone L2226*	*RC212*	*Steinberger*	*VL1*	*43*
Varietal	*Pinot Noir*	*Zinfandel Syrah*	*Sangiovese*	*Bordeaux*	*Zinfandel*	*Bordeaux*	*Chard Red Rhones*	*Chard, Cabernet*	*Syrah*	*Chard Cabernet*	*White, Red*	*Rhone*	*Pinot Noir*	*German White*	*Dry Whites, Viognier*	*Restarts, Zin, Late Harvest*
Fruit Wines	*YES*	*YES*			*YES*						*YES*	*YES*	*YES*	*YES*	*YES*	
Enhances Fruit		*YES*			*YES*		*YES*	*YES*							*YES*	
Enhances Mouthfeel	*YES*						*YES*	*YES*							*YES*	*YES*
*Sensory Effect **	*EVC*	*Estery*	*EVC*	*EVC*	*EVC*	*EVC*	*EVC*	*Estery*	*Complex*	*Neutral*	*Neutral*	*EVC*	*EVC*	*EVC*	*EVC*	*YES*
Reduces Vegetal Character	*YES*			*YES*	*YES*			*YES*								
Stabilizes Color	*YES*			*YES*		*YES*	*YES*		*YES*			*YES*				
Cold tolerant					*YES*						*YES*			*YES*		
Use to Restart										*GOOD*	*GOOD*	*GOOD*				*EXCELLENT*
Temperature Range F.	*68-86*	*59-86*	*64-82*	*59-89*	*50-80*	*64-86*	*50-85*	*59-86*	*59-90*	*59-80*	*50-86*	*59-82*	*68-86*	*40-70*	*60-68*	*55-95*
Vigor	*Slow*	*Average*	*Average*	*Average*	*Average*	*Average*	*Fast*	*Fast*	*Average*	*Fast*	*Fast*	*Fast*	*Average*	*Slow*	*Slow*	*Fast*
Alcohol Tolerance %	*15*	*14*	*16*	*14*	*15*	*16*	*16*	*16*	*17*	*17*	*18*	*18*	*16*	*14*	*15.5*	*18*
High Alcohol Tolerant			*YES*			*YES*		*YES*	*YES*	*YES*	*YES*	*YES*	*YES*			*YES*
*Nutritional Need ***	*Medium*	*Low*	*Very High*	*High*	*Medium*	*High*	*Medium*	*Medium*	*Low*	*Medium*	*Low*	*High*	*High*	*Low*	*Low*	*Low*
*Reaction to Oxygen ****	*Medium*			*Low*			*Medium*		*Low*		*High*	*Medium*			*Medium*	
Comments	*Enhances spiciness*	*Fruit wines*	*Extended Macerations*	*Alternate to BDX*	*Can be stopped*	*Ideal Fermentor*	*Complex flavor Mineral Aromas*	*Complex*	*Red fruit, Mineral Tones*	*Vigorous*	*Late Harvest*	*Late Harvest*	*Good Color*	*Easiest to Stop Fermenting*	*Slow, Dry*	*Restarts Very Well, Red Fruit Character*

Notes to Text

*Sensory Effect: EVC = Enhances Varietal Character, Estery = Enhances Fruitiness, Neutral = No Enhancements

** See page 8 for Nutrient recommendations, especially for Medium and High Categories.

*** Also try additions of Oxygen with active stirring during fermentation to yeasts that react to O_2 additions.

SULFITE PROCEDURES

Sulfur has been burned in wine containers to purify them since the days of the Roman Empire, and probably much earlier. The ancients may not have known about the world of microorganisms, but they recognized that sulfur helped make their wines last longer. We now know that sulfur dioxide gas (SO_2) released by burning sulfur was the effective agent for retarding spoilage, and we have a more precise way of adding it these days. We make up solutions of sulfurous acid/water to known parts per million of SO_2. These solutions are stored and added in tablespoons or milliliters to the volume of wine.

After more than 30 years of teaching home winemakers the importance of adding sulfite to wine and monitoring the results with various testing methods, we are convinced that people are still not testing or scheduling SO_2 additions often enough.

Over the past several years we have had a chance to prove this point for customers by employing the testing device called Reflectoquant®. This tester uses a small sample of wine and a test strip that is then treated with two reagents and stored for several minutes before reading by the meter. The actual reading is done by light reflection.

While we have seen improvement during these years, many wine samples are still coming back with only a few parts per million of SO_2. These wines may not even yet show the effects of oxidation, but given enough time in this unprotected state, the fruitiness will fade, browning will occur and the taste will become pruney and harsh. To avoid this you need to understand the basics of why sulfite works so well to protect your wine.

When you add sulfite to wine, sulfur dioxide ionizes to the sulfite ion, $SO_3^{=}$, and bisulfite ion, HSO_3^{-}. A small fraction remains in the "molecular" form, SO_2. It is this molecular form that protects the wine from spoilage organisms and oxidation. As sulfite reacts with other wine components, it becomes "bound" to them and is no longer available to participate in producing "molecular" sulfite.

We cannot measure molecular sulfite directly. Rather, we measure "free" sulfite, and use a table of wine pH values to predict the amount of 'molecular' sulfite we will achieve.

This is why it is so important to frequently measure your free sulfite. No matter how high your total sulfite (within reason), it is only the free sulfite number that really counts. Don't just guess and toss some sulfite in—analyze it first—then add it.

To this end, we offer some advice on ways to keep up with testing your SO_2.

Aeration-Oxidation Method for Free SO_2

This is the original primary laboratory method for sulfite measurement in wine that helps define what "free" SO_2 means. There is a good description of the method in *Wine Analysis and Production* **by Zoecklein**, et al, but the book alone costs over $150 and the laboratory apparatus costs hundreds more. **As this catalog goes to print, we are working on bringing in a lower-cost set of apparatus that works on exactly the same principal as the full-scale lab test.** If this is successful, any careful home winemaker will be able to do near laboratory quality testing for free SO_2 at home by the aeration-oxidation method.

In this method, a wine sample is placed in a small flask and acid is added to force the sulfite ion over into the form of molecular SO_2. A small air pump pushes (or a vacuum pump pulls) a stream of air bubbles through the acidified sample. Since sulfur dioxide is a gas, it dissolves in the air stream and transfers through a tube to a trapping solution. In the trapping solution, hydrogen peroxide oxidizes the sulfur dioxide (which is sulfurous acid) into sulfuric acid. That combination—the transfer in an air stream and oxidation to sulfuric acid—gives the test method its name. Also in the trapping solution is an acid-base indicator that changes color as the sample gas accumulates. After the 10 or 15 minute transfer period, the trapping solution is titrated with sodium hydroxide solution to measure the acid formed. The free sulfite level can be calculated from the titration results.

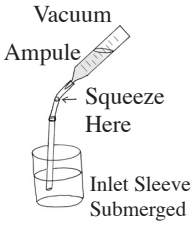
The Reflectoquant Free SO_2 Test

Until home aeration-oxidation testing becomes practical, other methods will have to suffice. For those of you able to bring a sample to us or to a laboratory, you can use the reflectoquant test. You will need **A FULL**, small bottle, with a fresh sample of wine. (187ml is more than plenty). Just drop off your sample to the lab for their technicians to test or bring it here and run the test for yourself. We charge $9.95 for one test, and an additonal $4.95 for each additional test done at the same session. It only takes about 10 minutes to set up, pay and run your test, with additional tests taking about 5 minutes.

The Titret Kit

Additionally you can track changes to your SO_2 with the Titret® Kit. Although not very accurate in terms of the quantity of SO_2, in red wines, these tests will show changes as the level of SO_2 diminishes. These are vacuum sealed, graduated ampules that come with an inlet bead-valve that allows you to titrate slowly by squeezing the valve. You have to keep the inlet tube submerged or the vacuum will be broken by air entering. The kit instructions recommend a holder which made the test more difficult to execute. Follow the instructions given here, as their kit instructions are not helpful.

Begin the test by inserting the loose plastic inlet sleeve (which is found behind the cardboard ampule holder) over the tapered end of the glass ampule. Bend the plastic sleeve 90 degrees to break the tip of the ampule. As you do this hold on tightly at the junction of the sleeve and the ampule to prevent the sleeve from sliding off. Next locate the glass bead/valve inside the plastic inlet sleeve. Insert the tip of the plastic sleeve into your wine sample and squeeze the bead to open the passageway for the vacuum in the ampule to pull wine inside the tube. As you squeeze, a color change will occur turning the sample inside the tube dark blue/black. Continue squeezing until a white wine turns light pink or clear. In the case of red wines, it will return to the original sample color. The titration is finished at this point and the ampule is stood up on its flat end. Let the contents of the ampule settle and then read the liquid level at the graduated line of the vial.



Scheduling SO_2 Additions

Initial sulfite may be added at 50-65 ppm to grapes or juice that is free of rot or mold. The presence of a lot of mold, or grapes in otherwise bad condition, might require twice that amount. Under average conditions the information that follows should keep about 20 to 30 ppm of free SO_2 available throughout the wine's cycle of production through bottling. Add sulfite for white wines at every racking.

Test your SO_2 level at least after fermentation and ML, after rackings and several times while in barrels or tanks and again before bottling. Follow the pH/molecular SO_2 table on the next page for recommendations for additions. Wines that will be consumed within three

months of bottling will not normally need a sulfite addition at bottling time as long as they are stored in a cool place until served.

pH and SO_2

It is generally recognized that only a small amount of molecular SO_2 (.5 to .8 ppm.) needs to be present to provide bacterial stability in wine, but pH has an important effect on how much free SO_2 is needed in order to provide that amount, and that's why both pH and SO_2 need to be tested.

Regard the Table of Molecular SO_2 below. The amount of free SO_2 needed, is based on the pH of the wine. A fairly safe amount for protection of the wine is either .5 ppm for Red Wines or .8 ppm for White Wines. If you know the pH, simply make sure you have the corresponding level of free SO_2, or slightly more, present in the wine during storage and bottling.

Above pH 3.5, you will notice that the amounts of free sulfur dioxide required become quite high. Adding enough to create an appropriate level may raise the total SO_2 high enough to have a negative effect on the wine's flavor. It is best not to approach the problem that way. Instead, add tartaric acid early in the fermentation cycle to lower the pH. **(But avoid an excessively high TA)**

Sources of SO_2

SO_2 is available as Campden tablets, effervescent Inodose or by powdered sodium or potassium metabisulfite. A premeasured Campden Tablet equals 65 ppm in one gallon (13 ppm in a five gallon jug) and is very convenient for those making small amounts of wine. You have to crush the tablet to a powder to add it.

The 2 gram Inodose tablets add 528 ppm per gallon or 9 ppm per 60 gallon barrel. They effervesce to disperse evenly in the container. They cannot be divided to accurately dose 5 gallon carboys. Metabisulfite should be made into a liquid preparation before use, to adequately disperse it, and because it is very potent. This is also the least expensive method and accurate to measure for any size container.

Molecular SO_2 needed for Stability

pH	.8 ppm. White Wine	.5 ppm Red Wine
2.9	11 ppm.	7 ppm
3.0	13	8
3.1	16	10
3.2	21	13
3.3	26	16
3.4	32	20
3.5	40	25
3.6	50	31
3.7	63	39
3.8	79	49

Please Note: Avoid confusing the two solution strengths.
If you have a scale that weighs in grams, and have access to a pH meter, you should use the 10% solution instructions. Have on hand Pipettes graduated in .1 ml to .5 ml, 1 ml to 10 ml volumes and a Graduated Cylinder, with a volume of 100 ml, for large additions. Otherwise, use the weaker 3% solution, using household measuring spoons.

PREPARING STOCK SOLUTION

Choose one of the following solutions to add metabisulfite to your wine. Make a 10% solution if your additions are to large vessels and if you work with metric measuring tools. Use the 3% solution for small vessels and use kitchen measuring spoons.

10% Stock Solution

Using a gram scale, **weigh out 100 grams of Sodium or Potassium Metabisulfite and dissolve in 1 Liter of water**. Tightly stopper and store labeled: poison. When adding your sulfite additions make sure you measure carefully.
Replace your solution every harvest.

10% Solution of Metabisulfite

Must/Wine	(Desired final SO_2 concentration in ppm.) 10	20	25	30	40	50	75
(gallons)	(Add milliters of 10% solution)						
1	.6	1.3	1.6	2.0	2.6	3.3	4.9
5	3.3	6.6	8.2	9.9	13.1	16.4	24.6
10	6.6	13.1	16.4	19.7	26.3	32.9	49.3
25	16.4	32.9	41.1	49.3	65.7	82.1	123.2
60	39.5	78.8	98.5	118.3	157.7	187.2	295.7

3% Stock Solution

Dissolve f**our ounces of sodium or potassium metabisulfite powder,** in one gallon of distilled water. This is a weaker solution than the 10% solution given above. However, at this concentration, the solution is still quite strong and should be clearly labeled poison.
Replace your solution every harvest.

3% Solution of Metabisulfite

Must/Wine	(Desired final SO_2 concentration in ppm.) 10	21	33	43	65
(gallons)	(Add tablespoons of 3% solution)				
1	.15	.32	.50	.66	1.00
5	.75	1.60	2.50	3.30	5.00
10	1.50	3.20	5.00	6.60	10.00

Removing Excess SO_2

If you ever need to lower your SO_2 due to a mistake in calculation try splash racking or stirring vigorously to aerate. If the FREE SO_2 is still too high do the following: for every 10 ppm free SO_2 you want to remove, add 1 ml. of 3% hydrogen peroxide per gallon of wine. An oxidative reaction occurs immediately. Use only fresh 3% Hydrogen Peroxide, available at the drugstore. Use this method to remove up to 100 ppm, more than this and the wine will oxidize and lose its flavor.

TESTING...SUGAR, ACID, and pH

by Bob Peak

Having your wines tested at a commercial wine laboratory provides reliable, accurate information. But sometimes it's fun to do your own testing. Or maybe you live too far away to take advantage of commercial lab testing. Sugar, acid, and pH are readily addressable with home testing techniques.

For the 2006 harvest, my wife Marty and I decided to give several home kits and techniques a try. We used a laboratory test panel as our reference and ran our own tests to match on our home-grown pinot noir and chardonnay. We did not have laboratory results in hand prior to running our own tests. In the interest of full disclosure, I should note that both Marty and I have bachelor's degrees in chemistry and she also has a master's in chemical engineering, but no such education is needed for *The Beverage People* test kits!

SUGAR

The harvest home test for sugar is a brix refractometer, which is the same instrument many laboratories use. We crushed the pinot noir grapes and stirred the must before taking a sample with a thief. We crushed, soaked up, and pressed the chardonnay before taking that juice sample. (The split samples for the lab were collected at the same time.) Using the refractometer is very easy. First, it is calibrated with a few drops of 20º brix reference solution. Then it is rinsed with distilled water, and a few drops of grape juice are placed on the prism. Our results were 24.2 brix for the chardonnay and 26.0 brix for the pinot noir. The lab said 24.1 for chardonnay and a matching 26.0 for the pinot. Conclusion: using a refractometer at home can provide very reliable harvest sugar readings.

ACID

Commercial labs use a sophisticated autotitrator to execute the traditional winemaking method for Titratable Acidity. They report in grams per 100 milliliters—roughly equivalent to percent. The lab results on our juice samples came in at 0.809 grams per 100 mL on the Chardonnay and 0.760 on the pinot.

At *The Beverage People*, we offer two home tests for TA. The most popular is the little *Country Wines* titration kit with its phenolphthalein indicator and sodium hydroxide titrating solution. This is based on the primary lab procedure for the same test. Executed carefully at the kitchen table, it gave us a result of 0.81 on the chardonnay and 0.62 on the pinot noir. The close correlation on the white juice (and less success on the red) probably reflects the difficulty of seeing the pink endpoint in the grayish-pink "red" must.

Next, we tried the *Precision Acidometer*. This kit includes a blue indicating solution which is itself also the basic titrating material for neutralizing the acid during analysis. The first few additions, still reflecting acid conditions in the juice, turn green. As you continue to add, the solution is neutralized when it is (not quite) blue—almost the same color as the indicator solution alone. Since this has the "not quite" feature, it's a good idea to write down your results as you get close, since you will mostly know for sure right after you go too far.

The kit also includes litmus paper to verify the neutrality of the titrated sample. If a drop on the litmus paper turns red, it is still acid. No color change means neutral (the end point) and blue means basic—you went too far with that addition. With the green-to-blue color change and litmus paper for verification, the endpoint seems a little easier to pin down than the *Country Wines* endpoint.

With this kit, results are in grams per liter, so you need to divide by 10 to match the reporting units by other methods. For the chardonnay, we got 7.9 (0.79) and for the pinot noir 6.8 (0.68). Both are close enough to lab results that we would probably not do anything different in fermenting the wine based on these answers.

pH

Laboratories use a pH meter integrated with their autotitrator for this test. Laboratory results were 3.38 for the chardonnay and 3.43 for the pinot noir. Using the *pH Tester 20* meter that we carry at *The Beverage People*, Marty and I measured 3.32 on the chardonnay and 3.36 on the pinot. At less than one tenth of a pH unit difference on each, these results are very comparable and the home results are certainly adequate for winemaking judgments.

Once fermetation begins you can no longer get an accurate reading of sugar with your refractometer. At this point you must use a hydrometer to moniter fermentation.

FINING PROCEDURES

Sparkolloid™ and Bentonite are the two most common all-purpose fining (clarifying) agents used by home winemakers.

Either may be used with success, and in the somewhat unusual circumstance that the wine doesn't clear with the first agent, the other will generally work.

Here's how they are used...

Sparkolloid is used at the rate of 1 to 1.5 grams per gallon, so to fine five gallons of wine, begin by measuring out 5 to 7.5 grams of dry Sparkolloid. Then take about 1-2 cups of water, stir in the Sparkolloid, and heat it on the stove in a saucepan.

Simmer gently (bubbles, but not boiling) for 15-20 minutes, and thoroughly stir the hot mixture into the wine. Let stand three weeks and carefully rack away from the lees.

Bentonite requires that a slurry be made up a day in advance. Measure out 750 ml. of water, and heat it to boiling. Slowly stir in 1 oz. of Bentonite. Mix it thoroughly for about one minute in a blender, funnel it into a 750 ml. wine bottle, stopper it up and let it stand for a day.

Shake up the slurry, and then thoroughly stir 1/4 cup into each five gallons of wine. Rack away from the lees in about 10-14 days

To remove oxidation or reduce bitterness, fine with Polyclar. To soften tannins, use either egg whites or gelatin, followed by Sparkolloid.

Always add Metabisulfite when adding a fining agent, to prevent excess oxidation during the mechanical stirring or pumping needed to blend in the agent.

Fining Agent	Rate of Use	Best Used For	Preparation	When
Sparkolloid	5 - 7 g/ 5 gallons	All wines	Heat 1 - 2 cups of water with Sparkolloid, simmer 15 minutes and stir into wine.	Post fermentation three weeks before racking.
Bentonite	10-40 g/ 5 gallons	White wines	Slurry with juice or water in blender.	Add to must prior to fermentation.
Isinglass	1 Tablespoon/ 5 gallons	White wines that haven't clarified with Sparkolloid.	Soak in 2 Cups water with 1/2 teasp. Citric Acid for 30 minutes. Add to wine.	Prior to a racking.
Gelatin	1/4 oz./ 5 gallons	Red wines with excess tannin.	Dissolve in 10 oz. hot water, let sit for 10 minutes. Stir thoroughly into wine.	After fermentation up to three weeks before bottling.
Egg Whites	1/2 egg white/ 5 gallons	Red Wines with excess tannin.	Whipped to a soft froth with some wine and water then mixed in thoroughly.	In barrel/glass a month or more before bottling.
Polyclar (Divergan F)	2.5-12.5 g/ 5 gallons	White wines to remove oxidation reduce bitterness.	Thorough mixing Fluffy, difficult to rack off cleanly.	Before, during or after fermentation.
Non-Fat Milk	100-250 ml/5 gallons	White wines to reduce bitterness, adds sweetness.	Follow with Bentonite Fining	Rack after 4 days A month prior to bottling.
Whole Milk	100-250 ml/5 gallons	Reduce harshness absorb aldehydes.	Follow with Bentonite Fining	Rack after 4 days A month prior to bottling.

TANKS for the Memories

By Bob Peak

But seriously, folks, we just do not seem to spend enough time and energy talking about stainless steel tanks. We often jump from glass carboys or plastic PET carboys directly to barrels, without really considering the variable capacity tanks (see p. 16). I love my tank! I have a 200-liter (52-gallon) tank that I use every wine season, usually more than once.

These so-called "floating lid" tanks allow you to place the stainless steel lid at any height within the cylindrical tank and secure it there by inflating the included vinyl gasket with the dedicated air pump. The lid does not actually float, but the placement method does allow an infinitely variable volume for the tank. Although not jacketed, the thermally conductive stainless steel shell does allow easy transfer of heat by putting the entire tank in a cooled wine cellar. In that mode, I routinely ferment my chardonnay and chenin blanc wines in my wine cellar at 55° F. For primary fermentation of whites like that, I just position the lid three or four inches above the juice surface to allow for foaming. I can easily thief out a sample through the fermentation-lock port in the lid to check for completion of fermentation. (On the subject of primary fermentation, though, I will point out that these tanks are not ideal for red primary fermentations. The tall, narrow aspect ratio makes the thick cap difficult to punch down and mix effectively).

I do, however, put my red wine in the tank for malolactic fermentation. Once again, that heat transfer comes in handy. I put the tank in a room with a space heater, add the pressed red wine, inoculate, and get good fermentation in just a few weeks at 70° F.

For either reds or whites, a tank is excellent for use of oak alternatives. Whether you use chips, sticks, or staves (see p. 15), adding the product is easy through the port or before you put the lid in place. The same thief-and-sample protocol as for fermentation allows you to check for development of oak flavor and aroma.

Finally, a tank serves as an excellent blending vessel for bottling. If you have some wine in a barrel, plus perhaps some carboys of topping wine, you can pump all of it into the tank to make a single final blend. If you can set the tank on a table or bench first, then you can make a final sulfur dioxide addition and bottle directly from the tank.

Even without putting the tank on a table first, I have found a way to fill by gravity and drain by gravity, more delicately handling my white wines. I have the tank on a hydraulic ATV/Motorcycle jack (1500 pound capacity with a 19" maximum height for about $140 from Sears.com). After setting carboys on a shelf and draining down into the tank at the lower position, I jack it up and start the bottling!

When empty, the tanks are light and easy to handle. For my 200-liter tank, I just carry it out on the lawn and brush it down with some proxycarb, then rinse with the hose. I can easily turn it upside down to drain out, before putting it back in the cellar with an old towel over the top to let it dry dust-free. For the larger sizes, you may want a helper, but no forklift is needed! Keep in mind that the 500-liter size, at 28 ¾" in diameter, is the largest one that will go through a narrow 30-inch household door.

With sizes from 100 liters to 600 liters, plus two with cone bottoms and a second drain valve, we have a tank for every cellar. Try one for a few vintages, and we'll have you saying "tanks for the memories", too!

COPPER TREATMENT

Burnt rubber? At Infineon Raceway, it's a normal aroma. But if you smell it when you rack your wine, you have a problem. "Burnt rubber" is one of many unpleasant descriptors applied to the volatile reduced sulfur (VRS) compounds than can occur during the fermentation and aging of wine. Much easier to prevent than correct, these compounds interact with each other, and the wine, in very complex ways. Simply stated, if you detect this kind of aroma, fix it quick!

The simplest, and generally first, VRS to appear is Hydrogen Sulfide, H_2S. It is commonly described as smelling like rotten eggs (peuw!). Since humans can detect the smell when the concentration in wine is only one or two parts per billion, it doesn't take much to make the wine very unpleasant. While "over sulfuring" in the vineyard (by the vineyard manager) is the most frequently cited cause (by the winemaker), those of you who grow your own grapes and then make the wine have no one else to blame! (Try to go at least 35 days between the last sulfur application and harvest). But let's face it: a much more frequent cause is lack of nutrients—primary amino nitrogen or certain vitamins—during primary fermentation. You can address prevention of that problem by analyzing your juice nutrient level as decribed on pg.9.

But let's suppose the odor shows up anyway (which it may). The most conservative treatment is to aerate the wine during racking—splash it into the receiving vessel (but be sure your free SO_2 level is up where it should be prior to the splash racking—otherwise you may oxidize your wine, turning it brown and Madeira-like). A more effective solution is to treat with copper. When exposed to copper, the sulfide combines with the copper to make copper sulfide, which is not soluble in wine. While some books will tell you to just run the wine over a sheet of copper, my experience has not found this technique highly effective. Instead, the direct addition of a small amount of 1% copper sulfate solution is usually quite effective. Add it at a rate of 3/4 of a milliliter (mL) for every gallon of wine. This will give you a maximum level of 0.5 ppm (mg/L), which is the level allowed in commercial wine. If you must treat the wine again to completely clear the sulfide aroma, you may want to remove residual copper by adding yeast hulls (at a rate of 5 grams per gallon), stirring frequently, and racking again in a few weeks. For the copper treatment alone, rack after a couple of days to leave the black copper sulfide behind (at part-per-million levels you may never see it, but it's there!).

If you have not promptly removed H_2S, your wine may go on to develop more complex VRS compounds. Next in line are the mercaptans: methyl mercaptan smells like burnt rubber or rotten cabbage and ethyl mercaptan smells like burnt matches or dirty ashtrays. These are not volatile enough to remove by aeration, but copper (just as for H_2S) still works. To check for possible effectiveness, clean a copper penny in a mild acid solution (a little citric or tartaric in some water). Place your now-bright penny in a wine glass, add wine, and swirl. Let it stand for a minute or two, and the bad smell should go away if you have a copper- treatable problem. Follow the instructions in this article and your wine should clean up.

So let's go back to the top: 35 days after last sulfur before harvest. Adequate nutrients. Aerate (with SO_2 present) if necessary. Copper. Repeat if needed.

BARREL CARE

Care of a New Barrel

Brand new oak barrels are about as sanitary as they can be because the wood has been heated over direct fire in the process of making the barrel. This is done in order to bend the staves into place, and also to enhance various flavor accents (such as vanilla and caramel).

Swelling up a Barrel

Like any wooden container, however, a new barrel must be filled with water to make the wood swell and eliminate leaks. These leaks will often seal themselves in only a few hours, or a couple of days. However, the barrel should be continually refilled until the leaks stop, and the water should be changed each day to prevent off flavors caused by rancidity or mold growth.

Acidifying a New Barrel

It is recommended that an acidic environment be created in a new barrel, which is about to receive wine for the first time. Dissolve in water 2 Tablespoons of ***Citric Acid*** for every five gallons of barrel capacity. Fill the barrel and check to make sure it isn't leaking. Drain the acid water and fill the barrel with wine.

Cleaning at each Wine Racking

Once a barrel has been used for wine storage, additional cleaning and sanitation measures are required.

At each racking, rinse the barrel thoroughly with water to remove debris. Follow by rinsing the barrel with an acid wash. Dissolve 2 Tablespoons of ***Citric Acid*** in five gallons of water, sloshing this mixture around the interior surfaces of the barrel for 5 to 10 minutes. Drain, and refill the barrel with wine.

Preparing for Storage

It is always best to keep a barrel full of wine. When this is not possible, start by removing the organic matter that has penetrated into the surface of the wood. This is done with a solution of ***Proxycarb***, a sodium percarbonate based cleaner.

Use 4 oz. (or 8 Tablespoons) of ***Proxycarb*** for every 15 gallons of barrel capacity. Dissolve in a small amount of water, and funnel the mixture into your barrel. Fill the barrel the rest of the way with water. You may leave this mixture in the barrel for as little as 20 minutes or as much as 24 hours. If the barrel has VA (volatile acidity), double the amount of ***Proxycarb*** and leave for 24-48 hours.

Drain and rinse the barrel several times with water. Re-acidify the barrel using one ounce or 2 Tablespoons of ***Citric Acid*** for every five gallons of water. Slosh this all around and drain completely. Now prepare for storage.

Cleaning Step by Step

1. Drain wine from barrel and hose out visible solids until clear.
2. Add 4 ounces (8 Tablespoons) of Proxycarb for every 15 gallons of barrel and fill with water, let stand 2 - 24 hours.
3. Drain out cleaner and rinse until water is clear.
4. Acidify barrel with one ounce (2 Tablespoons) Citric Acid for every 5 gallons water. Either make this into a volume to fill barrel, or just slosh around a 5 gallon volume and then drain.
5. No water rinse is required after the citric rinse.

Short Term Storage

If it will be less than **two months** before the barrel is used again, drain the barrel, and fill with a ***Sulfite*** and ***Citric Acid*** solution. Use one teaspoon of ***Potassium or Sodium Metabisulfite*** powder, along with 1/3 teaspoon of ***Citric Acid*** for every 15 gallons of barrel capacity. Add enough water to fill the barrel and bung the barrel tightly. Check to make sure sulfur can still be detected inside the barrel, replacing the solution if necessary. Rinse with water before refilling with wine.

Long Term Storage

If it will be **more than two months** before the barrel is used again, drain the barrel and leave it upside down overnight. Next burn a ***Sulfur Strip*** in it, hanging it down at least 6 inches below the bung on a wire. Replace the bung. Remove the sulfur strip after about 15 minutes, and bung the barrel tightly. Burning sulfur releases sulfur dioxide gas into the barrel's interior.

Repeat every two weeks (as needed) until a flashlight reveals no shiny dampness in the bottom of the barrel. Bung up the barrel and store it in a dry place until needed, allowing enough time to soak up and acidify the barrel before the next use.

Great Oak Flavor, Without A Barrel

There are several methods of adding oak flavor and aroma without using a barrel.

Oak staves take about six weeks to three months for full extraction, extracts are instantaneous and oak chips take only 48 hours.

Oak **chips** are made from full size staves, with all the normal drying and kilning but chipped for easy addition to any size container. They can even be added into the must during fermentation. Use about 3 oz. per 5 gallons. They impart great flavor, but aren't heavy in the aromatic department.

Staves can be added any time after fermentation to tanks or barrels which have lost their oak-i-ness. We now carry two types of staves. From *Mistral Barrels* we are now carrying the Mini Zig Zag®. These staves have a 30% new barrel extraction perfect for 30 gallon containers. We are still carrying the larger oak staves Chain of Oak® from *Innerstave*. These staves will give you 30% new barrel extraction in a full size barrel. Both products consist of separate oak staves that tie together with nylon ties. We carry both French and American oak in the Zig Zag® and The Chain of Oak®, in both medium and dark toast.

Innerstave®
shaping the taste of fine wine

Also see our new lineup of Oak **staves** for use in Carboys. Three sticks in 5 gallons will impart 30% new barrel oak. They come in packs of 15 in both French and American oak varieties. After extraction, the sticks can be removed and or the wine racked off the stick. Used sticks are great on the barbeque.

Finally, Liquid Oak **Extract** is a highly concentrated product, that can be added all the way up to bottling, for making fine tuning adjustments or just finishing a wine that seems lacking in aroma. See page 19 for all these products and American barrels.

2010 WINEMAKING EQUIPMENT

Presses

Wooden cage with steel base on legs, lets you quickly and smoothly press fermented red grapes or crushed white grapes.

Model	*Basket Number*	*Basket Diameter*	*Height*	*Capacity In Gal.*	*Retail Price*
WE02	#25	10"	14"	5	$325.00
WE03	#30	12"	17"	7	$425.00
WE04	#35	14"	19"	12	$500.00
WE05	#40	16"	21"	18	$650.00
WE06	#45	18"	24"	25	$750.00
WE07	#50	20"	26"	34	$825.00
WE27	#40	*(All Stainless Cage and Base and Legs)*			$975.00

#50 Piston Press

Piston Top Basket Press with Hydraulic Ram on frame with wheels. Very easy to use, with tilt frame for draining. *Size shown to right* is similar to a #50 basket press.

WE54	Piston, manual Hydraulic Press on wheels #40	16" x 21"	$1975.00
WE50	Piston, manual Hydraulic Press on wheels #50	20" x 26"	$2450.00

Water Bladder Press inflates with regular garden hose pressure, pressing the grapes against the stainless steel cage, while a lid retains the grapes. *(Not pictured.)*

WE55	#42	17"	23"	20	$1295.00
WE46	#54 with wheels	21"	28"	42	$2595.00

Roller Crusher

Crushers and Stemmer/Crushers

Crushers: Manual rollers crush by simply turning the flywheel supplied.

Dimensions of WE12 and 13 Bins: 21" x 32", WE30 and 35 Bins: 21" x 21".

WE12	Double roller grape crusher with Paint finish	$250.00
WE13	Double roller grape crusher with all stainless hopper *(Shown right.)*	$300.00
WE35	Boxed roller grape crusher, stainless with removeable supports	$300.00
WE30	Boxed APPLE crusher, stainless hopper, cutting knives, removeable supports	$425.00

Stemmer/Crushers: Manual and electric models are available, both will process around one ton per hour. Stainless steel models come with a stainless stem grate and stainless hopper. *Dimensions of hopper are 16" x 30", except extended hopper with screw feed : 16" x 36".*

WE14	Manual, paint grade stemmer/crusher	$450.00
WE15	Manual, stainless stemmer/crusher	$625.00
WE16	Electric 110V, paint grade stemmer/crusher	$775.00
WE17	Electric 110V, stainless steel stemmer/crusher	$895.00
WE22	Electric 110V, paint grade stemmer/crusher with screw feed and extended hopper	$850.00
WE18	Electric 110V, stainless stemmer/crusher with screw feed (SF) and extended hopper (EXH)	$950.00
WE25	Electric 110V, **ALL** stainless stemmer/crusher, w/SF & EXH *(Shown middle right)*	$1295.00
WE20	Support Stand w/ stainless chute	$200.00

WE25 Stemmer/Crusher

3 Spout Bottle Filler

Large Storage Tanks

Variable Capacity Stainless Wine Tanks, come with a lid, pressure relief valve and drain.

WE43	100 Liter Stainless tank (26 g.)	$375.00
WE40	200 Liter Stainless tank (52 g.)	$500.00
WE42	300 Liter Stainless tank (79 g.)	$600.00
WE44	400 Liter Stainless tank (106 g.)	$675.00
WE45	500 Liter Stainless tank (132 g.)	$900.00
WE41	600 Liter Stainless tank (158 g.)	$1000.00
WE53	300 Liter Stainless tank /Bottom cone, 3 legs	$1325.00

Fillers

WE19	Plastic Model 3 Spout Bottle Filler.	$149.95
WE28	All Stainless 3 Spout Filler Filler comes w/drip tray *(shown above)*	$450.00
WE29	All Stainless 5 Spout Filler Filler comes w/drip tray	$575.00

Equipment is priced for pick up at the store. Call for a freight quote for delivery.

KITS AND JUICE

"Premium" Wine Equipment Kit

Complete with a ten gallon primary fermentor and lid, a six-gallon PET Plastic Bottle secondary fermentor, an air lock and stopper, 25 Campden tablets, a siphon assembly, a bottle filler, Mini-Floor Corker, 100 Corks, Country Wine Acid Testing Kit, Hydrometer and Test Jar, a Bottle Brush and the book *Home Winemaking Step By Step, Iverson*.

BNW01 ..... $224.95

*(Note: For **White Wine**, kit includes 5 gallon PET Plastic Bottle in place of the bucket and lid, please identify RED or WHITE WINE on order.)*

Pure Italian Juice Wine Kits

Mosto Italiano® kits are aseptically packaged in plastic pails, that also serve as the primary fermentor. 23 liter kits are a complete package of ingredients to make 6 gallons. Ready in three months.

C030 **Cabernet Sauvignon** (R) $114.95
C031 **Chardonnay** (W) $94.95
C032 **Sangiovese** (R) $109.95
C039 **Pinot Grigio** (W) $94.95
C034 **Shiraz** (R) $109.95
C035 **Zinfandel** (R) $104.95
C036 **Sauvignon Blanc** (W) $94.95
C038 **Montepulciano** (R) $109.95

Grape Concentrate

Choose your Varietal, 46 oz 68° Brix Dilute 2-1
(C002) **Chenin Blanc**, (C004) **Chablis**, (C006) **Burgundy**
.....$12.95
(C003) **Cabernet Sauvignon**,(C005) **Muscat**, (C001) **Zinfandel**
(C008) **Chardonnay** $18.95

Seedless Fruit Puree

Each can of fruit puree from Oregon is seedless, with all the goodness preserved in the processing, full of aroma and a deep rich taste and color. Use one can in five gallons of beer, two cans to flavor a mead or four cans to make wine.

The classic wine recipe using four cans of puree, will yield 24 wine bottles of superb fruit wine. Finish it with the addition of a simple syrup just to smooth the flavor and intensify the berry taste. Reminds us of summer even in the dead of winter and tastes great for several years, if you can wait that long, but is ready to drink in three months. 49 oz. can.

FL44 **Raspberry Puree**.....$18.95
FL47 **Blackberry Puree**.....$18.95
FL46 **Apricot Puree** $18.95
FL48 **Cherry Puree** $14.95

FRUIT HANDLING

MS32 **Grape Picking Shears.** $16.95
MS16 **Grape Picking Knife. Plastic handle** $6.95
MS31 **Tote Bins for grapes, (Cross stacking, nesting tub) Hold 30 lbs** $18.95
QE36 **Grape Masher. (Cap punch tool) 24" long** $31.95
Mesh Pressing Bags:
PS32 **12" X 19"**..... $4.95
PS31 **14" X 17"** (w/drawstring) $5.95
PS16 **20" X 22"** $5.95
PS15 **24" X 20"** (w/drawstring) $10.95
PS20 **26" X 28"** (w/drawstring) $12.95
Stainless Single Mesh Sieve-Strainer:
QE39 10 1/4" Diameter. $19.95

YEAST & BACTERIA

Dry WineYeasts

Choose your yeast strain from the information chart provided on page 9. Use one to two grams per gallon and see pages 4 and 6 for directions on how to use the yeast. (***Shelf life is 3-4 months)***

YEAST	10 g All $1.95	4 oz $16.95
Pasteur Champagne	WY28	WY17
Epernay 2	WY22	WY12
		$18.95
Assmanshausen	WY38	WY37
French Red	WY30	WY20
Prise de Mousse	WY23	WY13
Rhone #L2226	WY35	WY34
		$21.95
Beaujolais 71B	WY25	WY15
Brunello BM45	WY45	WY47
CSM	WY53	WY56
ICV D254	WY44	WY43
M2	WY50	WY49
RC212	WY55	WY57
RP-15	WY24	WY42
Steinberger	WY29	WY19
Uvaferm 43	WY28	WY18
VL-1	WY31	WY21

Malolactic Bacteria Cultures

QR38 **Acti-ML.** (Nutrient for MLF for 66 gal.) 50g. $5.95
WY32 **ML Culture**, ***Wyeast #4007*** *125 ml*. pack inoculates 5 gallons directly. Pack may also be expanded in juice for a second buildup of 5-7 days to treat up to 50 gallons.
With instructions. $7.95
WY51 **ML Culture,** ***Enoferm Alpha Strain***, 2.5 g. pack inoculates 66 gallons directly. With instructions.....$27.95
WY66 **ML Culture**, ***Enoferm Beta Strain***, 2.5 g. pack inoculates 66 gallons directly. With instructions.....$27.95

SUPPLIES & CONTAINERS

Note: Call or check the web for larger sizes of all acid, sugar, nutrient and preserving aids...

Acids

A17 **Ascorbic.** 1 oz. $4.50
A05 **Citric.** 2 oz. $1.50
A14 **Malic.** 2 oz. $1.95
A10 **Tartaric.** 2 oz. $2.95
A24 **Acid Blend.** (Citric, Tartaric & Malic). 2 oz. $1.25

Sugar, Nutrients & Preserving Aids

AD15 **Corn Sugar.** 5 lbs $6.95
QR04 **Pectic Enzyme.** 1 oz. $1.85
FN18 **Potassium Sorbate.** 1/2 oz....$ .99
FN35 **Wine Conditioner/Stabilizer.** 500 ml. $6.95
WY60 **Lysozyme liquid "Lyso-easy".** 250 ml. $29.95
QR11 **Yeast Nutrient (Diammonium Phosphate).** 2 oz. $1.95
QR33 **Autolysed Yeast.** 2 oz. $2.95
QR16 **Yeast Hulls.** 2 oz. $3.95
QR06 **Fermaid K™** Yeast Food. Complete nutrient mix with trace minerals, use 1 oz. per 30 gallons. 3 oz. $3.95
QR38 **Acti-ML.** (Nutrient for MLF for 66 gal.) 50gr. $5.95
QR50 **Yeast Nutrient for Meads.** (Our special blend) Use 2 oz. per 5 gallons. 2 oz. $1.95
MS42 **Private Preserve™.** Canned inert gas....$10.95
CS24 **Sodium Metabisulfite** 4 oz. $2.95
CS20 **Potassium Metabisulfite** 1 lb. $5.95
CS17 **Campden Tablets** Pack of 25. ....$.95
CS16 **Campden Tablets** Pack of 100. ....$2.95
CS33 **2 g IO Inodose Effervesent Tablets (3 pk)**....$2.95
CS34 **5 g IO Inodose Effervesent Tablets (3 pk)**....$3.25

Fermentation and Storage Containers

Note: All Plastic take a #10 Stopper, Glass takes a #6.5 Stopper

GL55 **3 Gallon PlasticBetter Bottle™** $22.95
GL45 **5 Gallon Plastic Better Bottle™** $26.95
GL13 **6 Gallon Plastic Better Bottle™** $28.95
GL58 **5 Gallon PET Plastic Bottle** $24.95
GL59 **6 Gallon PET Plastic Bottle** $26.95
GL02 **3 Gallon Glass Carboy.** $28.95
GL01 **5 Gallon Glass Carboy.** $36.95
GL40 **6 Gallon Glass Carboy.** $41.95
GL04 **6.5/7 Gallon Glass Carboy.** $42.95
P01 **6.6 Gallon Plastic Bucket** with Wire Bale Handle, Graduation marks in half gallons $11.95
P02 **Lid for 6.6 Gallon Bucket** $2.95
P17 **Poly Drum Liner** (4 mil, 60 gal.) $5.95
P04M **10 Gallon Heavy-Duty Plastic Bucket** with molded handles. $20.95
P05 **10 Gallon Lid** $6.95

20, 32 AND 44 GALLON SIZES and lids are available at the store.

Drilled Rubber Stoppers

#	Code	Top	Bottom	Price
2	FST09	13/16"	5/8"	$ .65
6	FST12	1 1/16"	29/32"	$ .95
6.5	FST13	1 11/32"	1 1/16"	$ 1.05
7	FST14	1 7/16"	1 3/16"	$ 1.25
8	FST15	1 5/8"	1 5/16"	$ 1.40
8.5	FST16	1 11/16"	1 7/16"	$ 1.45
9	FST17	1 3/4"	1 15/32"	$ 1.55
10	FST19	1 31/32"	1 5/8"	$ 1.95
10.5	FST20	2 5/64"	1 3/4"	$ 2.25
11	FST21	2 13/64"	1 7/8"	$ 2.35
11.5	FST22	2 15/32"	2"	$ 2.95
12	FST23	2 1/2"	2 1/8"	$ 3.05
13	FST24	2 11/16"	2 9/32"	$ 3.25

Most sizes are available solid, at the same price.

Bulk Wine Handling

QE34 **Orange Carboy Handle.** 3, 5 and 6 gallon size ... $6.95
QE47 **Blue Carboy Handle.** 7 gallon size $6.95
MS02 **Carboy Carrier, Nylon Web** $12.95
P16 **10 liter Plastic Pail**, with Pour out lip and Bail Handle. $9.95
P18 **14 liter Plastic Pail**, with Pour out lip and Bail Handle. $16.95
QE37 **Barrel Funnel 16"** $19.95
QE24 **Carboy Funnel, 8" Anti-Splash** $10.95
QE23 **Funnel, 10"** $9.95
QE22 **Medium 6" Bottle Funnel** $4.95
QE21 **Small 4" Bottle Funnel**....$2.95

Air Locks and Breather Bungs

FST04 **Three Piece Fermentation Lock** $1.29
FST05 **Red Top - One Piece Fermentation Lock** $1.29
FST47 **Breather style -Silicone** - fits outside all carboys $8.95
FST41 **Breather #11 Silicone** - 2", Dalco Dual™ $7.95

Solid Tapered Corks

Size	Code	Top	Bottom	Price
# 9	TC05	23.8mm	18.6mm	$ .20
#14	TC06	31.8mm	25.8mm	$ .70
#16	TC07	34.9mm	27.9mm	$ .90
#17	TC23	35.9mm	29.9mm	$ .95
#18	TC08	38.1mm	30.9mm	$ 1.00
#20	TC09	41.3mm	34.1mm	$ 1.20
#22	TC10	44.5mm	37.3mm	$ 1.60
#24	TC11	47.6mm	40.5mm	$1.90
#26	TC12	50.8mm	43.6mm	$2.10

Oak Additions

B42 **Liquid Oak Essence.** Extracted from pure Dark French Oak $5.95

Mistral™ Oak Chips, 1 lb. bag.

B46 **American Medium Toast.** B24 **French Medium Toast** .$5.95

B25 **French Dark Toast**. $6.95

Carboy Oak Stick Inserts ***(pack of 15)*** ***(Carboy insert)***

(Each stick provides 10.4% surface of new oak in 5 gallon carboy.)

B90 **American Medium.** $20.95, B92 **American Dark.** $20.95,

B91 **French Medium** $22.95, or B93 **French Dark**. $22.95

Mistral Oak™ Mini Zig Zag ***Staves*** ***(Tank or Barrel insert)***

(16.5% surface of new oak a 60 gallon barrel.)

B26 **American Medium.** $26.95, B27 **American Dark.** $26.95,

B28 **French Medium** $39.95, or B29 **French Dark**. $39.95

Chain-O-Oak™ Innerstave™ Staves ***(Tank or Barrel insert)***

(30% surface of new oak in a 60 gallon barrel.)

B78 **American Medium.** $45.95, B79 **American Dark** $49.95,

B74 **French Medium** $49.95 or B75 **French Dark**. $54.95

Oak Barrels

Small American Oak Barrels:

B01 **American Oak, 1 gallon** *(SCT)*.....$114.95

B02 **American Oak, 2 gallon** *(SCT)*.....$124.95

B03 **American Oak, 3 gallon** *(SCT)*.....$139.95

B04 **American Oak, 5 gallon** *(SCT)*.....$189.95

Vinegar Barrels are paraffin/wax lined (P):

B09 **American Oak, 1 gallon** *(P)* $109.95

B10 **American Oak, 2 gallon** *(P)* $114.95

B11 **American Oak, 3 gallon** *(P)* $129.95

B12 **American Oak, 5 gallon** *(P)* $139.95

Charred Oak Barrels for Spirits:

B43 **American Oak, 1 gallon** *(SCC)* $114.95

B49 **American Oak, 3 gallon** *(SCC)* $139.95

B08 **American Oak, 5 gallon** *(SCC)* $189.95

Barrel Mill Oak Barrels (Thick Staves--medium toast)

B35 **American Oak, 5 gallon** $229.95

B36 **American Oak, 10 gallon** $289.95

B34 **American Oak, 15 gallon** $329.95

World Cooperage Oak Barrel (Air Dried)

B47 **American Oak, 26 gallon** - medium toast $359.00

Solid Barrel Bungs

FST48 **Silicone Barrel Bung Solid #9 (R Size)** $6.95

FST40 **Silicone Barrel Bung - Joined Size 44 x 55 mm..** $6.95

FST44 **Silicone Barrel Bung - Solid Size 10.5 - 11** $3.95

Barrel Spigots

Wood Spigots: SP31 **2.25**" $3.95,

SP32 **6**" $4.95, or SP35 **8**" $10.95

Additional spigots 2 1/2" to 12" in length available.

SP38 **Wood Spigot NADI #1**

(8" w/ wood wedge to tighten) $16.95

SP39 **Wood Spigot NADI #2**

(9" w/ wood wedge to tighten) $18.95

RACKING AND PUMPING

Siphon Hose

HS03 **5/16**" i.d. .....$ .59

HS04 **3/8**" i.d. .....$ .59

HS14 **7/16" i.d**.....$ .79

HS05 **1/2**" i.d. .....$ .79

HS06 **1/2**" i.d. thick wall. .....$ 1.09

HS07 **5/8**" i.d. thick wall. $1.19

Sold by the **FOOT**

QE11 **3/8" Racking Tube.** $3.95

FST02 **Hose Shutoff Clamp for 3/8" hose.** $1.50

QE33 **1/2" Racking Tube.** $4.95

FST03 **Hose Shutoff Clamp for 1/2" hose.** $2.95

Auto Siphon Starter

Racking tube inside a cylinder creates a vacuum as it is pulled. Plunge until the racking tube and siphon hose are filled. Order hose to match separately.

QE42 **5/16" or 3/8"** $13.95

QE43 **7/16" or 1/2"** $17.95

PS26 **Transfer Pump**, s/s head, phenolic, impellers.....$139.95

F01 **Filter/Strainer** for Pumps (Use with 1/2" hose) $20.95

PS36 **Procon Brass Pump**, 4 GPM, 1/4 HP $325.00

PS35 **Procon Stainless Pump**, 4 GPM, 1/4 HP.....$450.00

FX06 **Pump hose barb fitting**, 1/2" x 1/2" barb. Brass ..$2.95

PB05 **Pump hose barb fitting**, 1/2" x 1/2" barb.S/S $10.95

Filters

F05 **Buon Vino Super Jet Filter.** Plate & frame filter includes pump and will process 30 to 45 gallons per set of pads. Change pads and continue. Pump is also useful alone for racking wine. $495.00

Pads for Super Jet Buon Vino (Set of Three):

F09 **5-7 Micron Coarse** $3.95

F22 **2 Micron Medium**..... .....$4.50

F21 **0.5 Micron Sterile** Comes w/backing paper.....$4.95

F23 **25 Backing Papers** for Filter Pads $4.95

F03 **10" Cartridge Filter Housing.** Best for early cleanup of wine and larger volumes than the *Buon Vino*. Choose a cartridge from list below. The smaller the micron rating, the more sediment is removed. Clear, poly housing, cartridges are one use$44.95

10" Filter Cartridges:

F10 **3 Micron Coarse** $12.95

F11 **1 Micron Fine** $12.95

F12 **.5 Micron Sterile** $14.95

Hose Barb for Filter Housing.

Need two. Specify:

PS02 Fits **3/8" hose.** $1.29

PS03 Fits **1/2" hose.** $1.99

FINAL STEPS

Note: Call or check the web for larger sizes of all 1lb cleaners and metabisulfite.

Cleaning and Sanitizing

CS12 **Soda Ash** (Barrel cleaner) 1 lb. $1.95
CS29 **Sodium Percarbonate** (All purpose cleaner) 1 lb. $4.95
CS26 **TDC™ Glass Cleaner** 4 oz..... $3.50
CS31 **TDC™ Glass Cleaner** 1 Liter..... $13.95
CS02 **BTF™ Sanitizer** 4 oz..... $4.50
CS03 **BTF™ Sanitizer** 32 oz..... $15.95
QE29 **Bottle Brush** $4.95
QE30 **Carboy Brush** $5.95
QE31 **Long Handled Nylon Scrub Brush** $14.95
QE45 **Bottle Washer - The Blast** $10.95
QE09 **90 Bottle Draining Tree.** $39.95
QE44 **Carboy Draining Stand.** $8.95

Barrel Maintenance

CS24 **Sodium Metabisulfite** 4 oz. $2.95
CS20 **Potassium Metabisulfite** 1 lb. $5.95
B39 **Sulfur Strips** 2 strips ..... $ .59
B38 **Sulfur Strips** Bundle of 70 strips $18.95
B38 **Sulfur Disks aprox.15** (5 g) $4.95
B65 **Sulfur Disk Holder, Stainless Steel** $14.95
MS06 **Mildewcide** Barrel Coating, 16 oz. $9.95
B13 **Hoop Nails** Pack of 20.. ..... $1.25
B14 **Spiles for Barrels** (Fills holes) Pack of 10 ..... $1.75

Bottles *(note: actual shipping rates will apply)*

GL18 **Claret 750ml** Green Push-Up 12/cs $10.95
GL05 **Claret 750 ml** Flint Push-Up 12/cs..... $10.95
GL68 **Burgundy 750ml.** Antique Green 12/cs.. ..... $10.95
GL16 **Claret 375ml.** Flint 12/cs (also available in green).. . $14.95
GL63 **Claret 375ml.** Flint 12/cs Screw Top..... $14.95

Corkers and Cappers

BE01 **Double Lever Italian Corker.** $36.95
BE19 **Mini-Floor Corker.** *Nylon Jaws* $74.95
BE03 **Heavy Duty Floor Corker.** *Brass Jaws* $149.95
BE07 **Super "M" Crown Capper** $42.95
BE05 **Emily Crown Capper** $18.95

Bottle Fillers

QE17 **Bottle Filler for 5/16"or 3/8" hose.** $4.95
QE02 **Bottle Filler with spring for 5/16" or 3/8" hose.** $4.95
QE20 **Bottle Filler for 7/16" or 1/2" hose.** $5.95
WE19 **Plastic Model 3 Spout Bottle Filler.** $149.95
WE28 **Stainless Steel 3 Spout Bottle Filler.**
Includes drain tray..... $450.00
WE29 **Stainless Steel 5 Spout Bottle Filler.**
Includes drain tray..... $575.00

Closures

WC11 **1 3/4"Chamfered Corks.** 25 pack..... $9.95
WC06 **1 3/4"Chamfered Corks,** 100 pack $36.95
WC14 **1 3/4" Twin Disk Corks.** 100 pack $24.95
WC08 **1 1/2" NuCork® Corks.** 100 pack..... $24.95
WC07 **1 3/4" All Natural Corks.** 100 pack..... $36.95
WC13B **1 3/4" Twin Disk Corks.** 1000 pack..... $215.95
WC02B **1 3/4" All Natural Cork,** 1000 pack $325.00
TC20 **Plastic Champagne Stoppers** ea. ..... $ .12
TC21 **Champagne Wires** ea. ..... $ .10
TC18 **28 mm Black Top Bar Top Cork** ea.. ..... $ .29
TC28 **28 mm Black Top Bar Top Cork** (100pk).. ..... $ 26.95
S01 **28 mm Metal Screw Caps** ea.. ..... $ .20
S02 **38 mm Metal Screw Caps.** ea. ..... $ .25
S03 **28 mm. Plastic Polyseal Caps** ..... $ .40
S04 **38 mm. Plastic Polyseal Caps** ..... $ .90
BE10 **Plain Crown Caps** 1 gross (144 caps) $3.95

Bottle Design

Bottle Seal, Wax Available in 9 colors $9.95
SL26 *Black*, SL27 *Burgundy*, SL28 *Gold*, SL29 *Silver*, SL31 *Blue*, SL30 *Red*, SL32 *Green*, SL41 *White*, or SL34 *Purple*. 1 lb.

Heat Shrink Plastic Sleeves. Apply to bottle neck with boiling water (212°F.) or heat gun. *Specify*: SL18 *Silver,* SL33 *Green,* SL20 *Gold*, SL19 *Burgundy,* or SL09 *Blue and Black*. *Also forEuro neck Burgundy bottles Oversize Sleeves are* SL01 *Maroon,* SL02 *White,* SL03 *Black*.
Heat shrink by the Dozen..... $ 1.19
Oversize heat shink by the Dozen..... $ 1.49

Gum-Backed Label Making Paper. L38--*White* , L39--*Blue* or L40--*Green*. 18 Sheets, 8 1/2 x 11. (solid sheet) $6.95
L46. **Removable White Matte Labels** (Laser & Inkjet), 4" X 5", 4 per sheet, 12 Sheets, ... $4.95
L47. **Standard white matte label**, 4 " x 3.3" 6 per sheet 10 sheets..... $2.95
MS15 **Label Glue** 16 oz..... $6.95
MS24 **Iceproof Label Glue** 32 oz..... $12.95
MS26 **Manual Label Gluer** Glue Pot. $349.95

Finishing Supplies

MS42 **Private Preserve™.** Nitrogen gas blend in a can . $10.95
FN35 **Wine Conditioner**, 500 mL $6.95
FN18 **Potassium Sorbate,** 1/2 oz. treats 10 gallons. Stir into sweetened wine and bottle. ..... $.99
B42 **Liquid Oak Essence.** Extracted from pure Dark French Oak $5.95
FN39 **Potassium Bicarbonate,** Lowers acidity in wine/must. 4 oz..... $2.95
MS33 **Wine Agitator/Blender.** Nylon whip to stir or de-gas wine, use with a drill. $10.95

Miscellaneous

KEG58 **Food Grade Lubricant.** 4 oz. $3.95
MS03 **Silicone Spray Lubricant.** 10 oz. $9.95
MS09 **Gondola Enamel.** Food grade paint. 16 oz. $10.95
MS43 **Wine Away™.** 12 oz. Spray bottle. $9.95

WINE LABORATORY

Sugar & Alcohol Testing

TE40 **Economy Hydrometer** has Brix, Specific Gravity, and Potential Alcohol scales. 10" $9.95

TE42 **Deluxe Hydrometer 3 scale with Thermometer.** Use with the tall test jar below. 11" $16.95

Precision Hydrometers (Brix only).
Specify range: TE43 **-5° to +5°**, TE44 **-1° to 11°**, TE45 **9° to 21°**, or TE47 **20° to 50°** $21.95

TE39 **Hydrometer Proof and Traille** $10.95

TE65 **"Santa Rosa" Residual Sugar Kit.** 36 Tests (with instructions). Tests the completion of fermentation $26.95

TE23 **Refractometer**, 0-32° Brix, Automatic Temperature Compensation, boxed w/padded carrying case $84.95

TE32 **20° Brix Solution.** Sugar solution to standardize the refractometer. 2 oz. $3.00

TE13 **Vinometer.** Measures alcohol in dry wine $7.95

Labware

Regular Test Jar for 10" Hydrometer.

TE55 **Plastic.** 10" $4.95

TE08 **100 ml. Graduated Cylinder** ***Glass.*** $14.95

TE46 **100 mL Graduated Cylinder** ***Plastic*** $15.95

TE111 **250 ml. Graduated Cylinder** ***Glass.*** $18.95

Tall Test Jar for 11" Hydrometer.

TE56 **Plastic.** 1 1/2" x 14" $5.95

TE07 **1 ml. Pipet.** Each. ..... $ .95

TE62 **10 ml. Pipet.** Pack of 20. ..... $17.95

TE36 **10 ml. Pipet.** Each. $1.25

TE86 **100 ml. Graduated Beaker** ***Polypropylene.*** ..... $.95

TE87 **400 ml. Graduated Beaker** ***Polypropylene.*** $1.95

TE92 **1000 ml. Graduated Beaker** ***Polypropylene.*** $2.95

TE83 **1000 ml.** ***Polypropylene*** **Beaker** ***w/handle.*** $10.95

TE84 **2000 ml.** ***Polypropylene*** **Beaker** ***w/handle.*** $12.95

TE85 **3000 ml.** ***Polypropylene*** **Beaker** ***w/handle.*** $18.95

TE10 **500 ml.** ***Pyrex*** **Erlenmeyer Flask.** $11.95

TE09 **1000 ml.** ***Pyrex*** **Erlenmeyer Flask.** $18.95

Sulfite and Acid Testing Kits

TE02 **Titrets® Free SO_2 Test Kit.** Pack of 10. ..... $18.95

TE26 **Country Wines Acid Test Kit** $8.95

TE29 **Sodium Hydroxide Refill** (Neutralizer) (for TE26) 4 oz., 0.1 normal $4.95

TE58 **Phenolphthalein Refill.** (Indicator) (for TE26) 3 dram $1.95

TE30 **Acidometer, Precision Acid Test** Kit $24.95

TE66 **Blue Hydroxide Refill** (for TE30) (100 ml.) (for TE30). $8.95

pH Testing

TE74 **Hanna pH Meter** Digital, battery operated Hanna 98107 - Manual 2 point calibration, .1 Accuracy at 68°F (20°C) 59.95

TE73 **Waterproof pH Tester20 DJ.** Digital, battery operated, accuracy to 0.01 pH. Automatic temperature compensated, double junction electrode can be replaced. $99.95

TE35 **Replacement Electrode for Waterproof pH Testr20.** (new model) $64.95

TE101 **Hanna HI 208 bench-top pH meter** with built-in magnetic stirrer, two Teflon-coated stir bars, BNC combination electode with temperature sensor. Automatic two- or three- point calibration with stability indicator. Suitable for pH and TA measurement on wine samples $274.95

TE72 **pH Buffer Capsules.** (pH 4.0. and 7.0) One each capsule, to dissolve in 100ml. distilled water to calibrate your meter. $2.50

TE91 **Complete pH Buffer Capsule Kit.** (pH 4.0. and 7.0) For mixing and storing pH buffer solutions. $4.95

ML Testing

TE20 **Malolactic Chromatography Kit**. 6 papers, 4 oz Solvent, 100 pipets, 3 Acid Standards, funnel and Instructions $39.95

TE17 **Replacement Solvent**. 4 oz. $10.95

TE22 **Replacement Paper 3 Sheets**. $4.95

TE18 **Replacement Acid Standards-Set of 3 (Lactic, Malic, Tartaric)** $8.95

TE19 **Replacement Pipets.** (100). $6.95

Thermometers

TE53 **Instant Read Dial Top Thermometer.** 0-220°F., Recalibratable, Stainless, 1" Dial x 5" Stem $7.95

TE50 **Wine Thermometer.** 0-220°F., 1.75" Dial x 8" Stem, with pan clip, recalibratable comes with pan clip, Stainless $24.95

TE90 **Must or Juice Thermometer.** 2" Dial x 12" Stem, all the same as TE50 but larger.. ..... $34.95

TE37 **Floating Glass Thermometer. 8"**(40-210°) F. and 0-100°C). $8.95

TE81 **Fermometer.** Monitors temperature from 36 to 78°F., stick to tanks or carboys reads surface temperature $2.95

Wine Thiefs

TE49 **Wine Thief.** Plastic. One piece. $5.95

TE48 **Wine Thief.** Plastic. Assembled of 3 pcs $7.95

TE51 **Wine Thief Glass.** Pyrex. 10" $9.95

Digital Scale

TE01 **Escali™** 1-5000 grams, ounces to 16 and pounds 1 to 11, perfect for winemaking additives $42.95

WINEMAKING BOOKS AND VIDEO

BK140 ***Home Winemaking Step by Step*** Iverson. $17.95
BK20 ***Micro Vinification*** Dharmadhikari and Wilker. $46.95
BK12 ***Techniques in Home Winemaking*** Pambianchi. Newly revised, advanced home winemaking text..... $ 21.95
BK61 ***Complete Handbook of Winemaking*** American Wine Society. $14.95
BK142 ***Winemaker's Recipe Handbook*** Massaccesi. ..... $ 4.95
BK40 ***Modern Winemaking*** Jackisch. $44.95

BK54 ***How and Why to Build a Wine Cellar***, Gold..... $20.00
BK59 ***A Handbook For Must and Wine Analysis*** A cookbook approach to analysis, for home labs. Barrus & Evans. $24.95
MG11 ***Practical Winery and Vineyard Magazine***, current issue. $5.50
BK109 ***Making Wine at Home DVD,*** Cutler, 1 hour and 15 min. $25.95
MG13 ***WineMaker Magazine*** current issue. $4.99

BK09 ***The Wine Defect Wheel*** diagnostic tool..... $24.95

GRAPE GROWING, CIDER, CHEESE, VINEGAR, MEADMAKING

Grapes

BK80 ***Great Grapes,*** Proulx $3.95
BK129 ***Vineyard Simple,*** Powers $24.95
BK67 ***The Backyard Vintner,*** Law $19.95

Cider

BK70 ***Cider, Making, Using and Enjoying***, Proulx & Nichols $14.95
BK79 ***Making the Best Apple Cider*** $3.95

Mead

BK77 ***Making Mead***, Morse $16.95
BK05 ***The Compleat Meadmaker***, Schramm $19.95

Other Fermentations

BK84 ***Making Vinegar at Home***, Romanowski $4.95
BK03 ***Homemade Vinegar,*** Watkins $9.95
CH73 ***The Cheesemaker's Manual***, *Morris* $42.95
BK74 ***Making Cheese, Butter, Yogurt***, *Carroll* $3.95
CH74 ***Making Artisan Cheese,*** *Smith* $21.95
CH75 ***Home Cheesemaking***, *3rd Ed., Carroll* $16.95
BK166 ***The Home Creamery***, *Farrell* $16.95
BK100 ***American Farmstead Cheese***, *Kindstedt* $40.00
BK36 ***The Compleat Distiller***, Nixon & McCaw $25.00
BK76 ***Home Sausage Making,*** Reavis $16.95

ORDERING

Retail hours are 10:00 to 5:30 Tuesday through Friday and Saturday 10:00 to 5:00.

We are also open on Mondays from August through December. We're always ready to answer questions for our customers.

Ordering Instructions:
For the most personal service, call our TOLL FREE ORDER LINE, (800) 544-1867, which may be used with your Visa, Mastercard, American Express, or Discover card.

To place your order by check, please note the following, if you live in California, add 9.25% sales tax on non-food items. **Food items are:** concentrates, sugars, purees, and flavorings. All items shipped to points outside California are not taxable.

Fastest Shipping in the Business:

We normally ship UPS Ground service the same day the order is received, if received by 1 pm. Ground service to Zones 2 and 3 receive one day service. Zones 4 and 5 receive 2 to 3 day service. Customers in Zones 6, 7 and 8 will normally receive their merchandise in 4 to 5 working days.

For faster service to Zones 5-8, and for perishables such as liquid yeast, we recommend UPS Standard overnight Air service, or UPS 2 DAY Air service.

Add $6.00 for standard shipping to California, Nevada, Oregon and Washington. All other states, add $8.00. See exceptions on order form, next page.

Customers in Alaska and Hawaii please take note that *priority mail* service from the Post Office is recommended for packages up to 15 lbs. Heavier packages without perishables can be sent more economically via ground, *parcel post*.

Shipments to Alaska, Hawaii and out of country we must add shipping charges to these orders. These are the exact charges that USPS charges for priority mail.

ABOUT US

The Beverage People is proud to operate both a retail and on-line-order supply firm for 30 years at the same location in the heart of the Sonoma County Wine Country.

Our staff wishes you the very best with your new hobby and look forward to hearing from you. Mention that you are a new customer, so we may give you a free article from a past newsletter to help answer your fermentation questions.

The Beverage People News is a publication of **The Beverage People**, America's most respected homebrewing and winemaking supply company. Unless otherwise noted, all material is copyright **©2010 The Beverage People.**

The Beverage People
840 Piner Rd. #14
Santa Rosa, CA 95403

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NON-FOOD ITEMS

CODE	QUANTITY	DESCRIPTION OF ITEMS	PRICE	TOTAL
			Taxable sub-total:	
			California residents add 9.25% sales tax:	

FOOD ITEMS
Concentrates, Sugars, Purees, and Flavorings

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Our Guarantee:

All our supplies are quaranteed for one year, except yeast and bacteria which are perishable and should be refrigerated upon arrival. Best used in 60 to 90 days.

Order Form:

1.Organize the items by non-food/taxable and food/non-taxable to properly apply sales tax. See food item list next to order form box. (California orders only. Out of state are all non-taxable.)
2. Print legibly if sending this order sheet by fax or mail.
3. See page 22 for shipping choices to Alaska and Hawaii and out of Country.
4.Add $6.00 for shipping to California, Nevada, Oregon, Washington. For all other states, add $8.00.
5. Orders with *Mosto Italiano Wine Kits, wine equipment kits, wine barrels larger than 5 gallons, carboys, cases of bottles, floor corkers, and grape tote bins a*sk for UPS ground shipping charge. This is the exact UPS charge for your shipping zone.
6. Bulky items such as full sacks of chemicals not listed in catalog are also subject to actual shipping costs.
7. Wine equipment such as grape presses and stemmer/crushers and large presses are shipped via truck, freight collect. Tanks will be charged for crating prior to shipping.

The Beverage People
840 Piner Rd. #14
Santa Rosa, CA 95403

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Summer 2010

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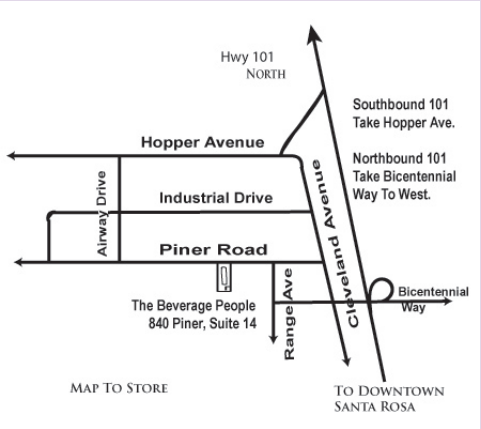


Our Hours: January through July :
T-F 10 - 5:30, and Saturday 10-5
Also Open on Mondays- August through December

Rental Equipment

CRUSHER

Apple Mill, Grinder and Press, motorized	$45.00
Grape Crusher, manual	$20.00
Grape Destemmer/Crusher, manual	$45.00

PRESSES

#30 7 gallon Basket	$25.00
#35 12 gallon Basket	$35.00
#45 25 gallon Basket	$45.00

FILTERS/PUMPS

Transfer Pump **Brass**	$10.00
Transfer Pump **Stainless**	$20.00
Buon Vino Plate Filter	$30.00

BOTTLING

3-Spout Filler	$10.00
Wine Corker	$10.00
Glue Labeller	$10.00

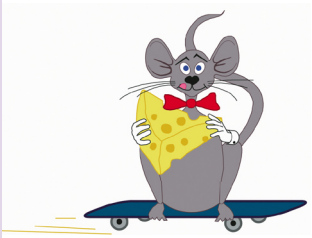
Rentals are for 24 hrs. from noon to noon, reservations accepted up to 7 days in advance, and we have a 24 hour cancelation policy. Call 544-2520 to make your reservation.

Harvest Fair

Harvest Fair of Sonoma County. Contact fair office at 545-4203, Deadline for entries are usually the last week of August. Great opportunity for local wine-makers to judge. Contact *Bob Bennett,* 433-4574 to be included on a panel. Note, as this is a local event, please deliver

Fall Winemaking Class

Phone *The Beverage People* at 707 544-2520 to reserve a place in our beginning winemaking class. There is a $20.00 fee. You will get your questions answered, and gain information about equipment & processes. Space is limited, so call today. Class will meet here at 2:00, Saturday, August 28.



Get in on the fermentaion hobby everyone is so excited about. You can make cheese at home! It is fun, easy and tastes great. Check our Spring catalog and website for pricing on supplies, rennet and cultures. We also have a list of cheese recipes on the web and in the store.

GRAPE GROWERS

We keep a book at the shop full of information provided by grape growers with small lots of grapes for sale to amateur winemakers. The program has effectively bridged the gap between the grower needing to find a home for some excess crop and the winemaker looking for a supply to harvest.

If you would like to place a listing, please send us a list of grapes available, with your name, address and phone number. Also indicate:

The estimated Picking Date
Varietals available
Minimum/Maximum available
Price with/or without picking
Age of vines
Vineyard Location

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