The Nutrient Lowdown - SAP and SNAP by Byron Burch

The *SAP* Panel

This is our basic panel. Included tests are Sugar, Total Acid, and pH. These are the three tests deemed most essential in the majority of winemaking situations.

Sugar

Most home winemakers know at least something about testing for sugar. Just about everybody understands that it's the sugar level that gives your wine its alcohol content, so there's at least one obvious reason to be concerned about the sugar level of your juice.

I have only rarely needed to add sugar to dry red wine musts, but if the grapes come in lower than 22° Brix, I will add sugar. (Amateur winemakers can do so legally). A pound of Cane Sugar dissolved in ten gallons of wine will raise raise the Brix just over one degree.

There are other reasons to be concerned about your sugar content, and it's not just a matter of whether the grapes are ripe. For example, if you want to make a "Port-type" wine, it is helpful to start with grapes that are up around 30° Brix or so. The closer you can get, the less brandy you'll eventually have to add to stabilize the wine.

On the other hand, if you want to make a dry table wine, it is important to use a yeast strain that can handle the level of sugar in the grapes you have. Every wine yeast strain has an alcohol tolerance level, above which fermentation simply stops.

For example, the *CSM* yeast strain has a low alcohol tolerance of 14%. That means it could be a risky yeast to use if you want to make a dry wine and your grapes come in above 25° Brix. Alcohol tolerances for the various wine yeasts we carry are given in the Yeast Recommendations chart on page 13.

Aside from these reasons for testing your juice for sugar content, the original Brix is one thing we'd want to know to help us in trouble-shooting a suspected fermentation problem.

Total Acid

Most home winemakers are also aware of the significance of testing for the Total Acid (TA) level. I think the best way to grasp the idea of Total Acid is to think of it as the measure of tartness.

Unripe grapes are high in acid and low in sugar. As ripening occurs, the acid level drops, and the sugar level rises. A grower must try to harvest during the window when both are within their desirable ranges.

For a dry table wine, the desired acid level is generally between .65% and .70% as tartaric (Note that this can also be expressed as 6.5 to 7 parts per thousand).

Dry wines with significantly higher acid levels when they are bottled may taste excessively tart and unpleasant. On the other hand, if the acid level is lower than .6%, wines may seem flat, and lacking in character.

It should be noted also that sugar and acid in wines tend to balance each other out, so that one may mask the level of the other.

In other words, if a wine is sufficiently sweet, it may still be in balance even if the acid is high, even up over 1% (as in some German wines). You may be able to balance up an overly harsh, acidic wine by sweetening it with sugar syrup, and a sweet but flabby wine may be improved by raising the acid level with a little Tartaric Acid.

There are several ways of reducing high acid levels. These include Malolactic Fermentation, as well as the addition of Calcium Carbonate, Potassium Carbonate, or Potassium Bicarbonate. The age of the wine and it's storage conditions, may dictate which adjustment method is used.

pH

New winemakers are often confused about total acidity and pH, tending to try and collapse the two concepts into one, but they are very different things.

I think the easiest way to get the general idea is to think of pH as a measurement of the stable acids in wine, while a Total Acid test, by measuring tartness, includes all acids, stable or not.

This should be easy to understand if you think of Acetic Acid (vinegar). The presence of this volatile acid adds nothing to the stability of a wine. Obviously, in fact, the reverse is true. It will, however, contribute tartness. This makes it necessary to be concerned with both Total Acidity and pH to cover all the bases in the course of making a wine.

Fortunately, most of the time, an appropriate TA level means that a wine's pH will, at least, be reasonable as well. However, it is possible for a high pH reading, combined with a high TA, to indicate a potential problem wine.

In any case, the lower the pH, the less Sulfite needs to be present to provide protection for the wine against spoilage. Please refer to the chart on page 8 and the discussion of "pH and SO_2" on that page.

Note that a wine's pH is also a factor (along with SO_2 and alcohol content) affecting whether or not a malolactic fermentation can be successfully induced.

If the pH is too low, it may keep the Malolactic bacteria from carrying out their assigned task. Remember that a low pH can stabilize a wine against bacterial action whether you want it to do so or not.

In recent years, *BP* has sold two strains of malolactic bacteria. "***Enoferm Alpha***" is said to work successfully down to a pH of 3.1, an alcohol content of 14% by volume, and SO_2 up to 50 ppm. "***MCW***" works down to an even 3.0 pH, alcohol up to 15%, and SO_2 of 30 ppm. This year we're adding a third, "***Bacchus***," which is actually a blend of three strains. The figures for Bacchus are 3.1, 13.5%, and 20 ppm.

Summary of SAP Tests:

By testing these three components in your wine; Sugar, Acid, and pH, the SAP Panel provides the minimum level of information that a serious home winemaker will generally want to have. With this information backing up some good grapes, you should be able to make the best of just about any situation you encounter.

The *SNAP* Panel

In addition to the three tests of the SAP Panel, the SNAP Panel provides detailed information in the area of nutrients. 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 could 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.

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
High YANC > 225 ppm

We also divide the yeasts into three levels of nutritional need (see table on page 13). These are 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.

With your yeast choice comes your selection of 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, see **Exceptional Fermentations** *next page*.

Nutrient Addition 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.

Helpful Estimating Tools

You will need to base your additions of nutrients on an estimate of your juice yield. It helps to know that Zinfandel and Syrah are likely to give you roughly eight gallons per 100 lbs. of grapes, and Cabernet Sauvignon only five and a half. Most other grapes will yield six and a half to seven gallons. Some variation is inevitable, and should not cause much concern.

DAP is an inexpensive source of inorganic Nitrogen and makes a major contribution to *YAN*. One gram per gallon adds about 50 ppm Nitrogen.

Fermaid K is a complex source of Nitrogen, and also contributes other important vitamins and trace minerals. One gram per gallon adds about 25 ppm Nitrogen.

Exceptional Fermentations

If the sugar level of your must is 25° Brix or higher, yeast and nutrient requirements are much higher than for low to medium sugar musts.

First, make sure to select a yeast strain which has both relatively low nutrient requirements and sufficiently high alcohol tolerance.

Second, either the yeast pitching rate, or the nitrogen level needs to be increased. To increase the yeast, simply add 1 1/2 grams of dried yeast per gallon of juice, instead of the usual one gram.

Alternatively, add an additional gram of ***DAP*** per gallon of juice when 1/3 of the sugar has been fermented with an equal amount of ***Fermaid K.*** This applies to any high sugar must with less than 300 ppm *YANC*.

Summary of SNAP Tests:

SAP tests are included in the SNAP panel. Additional testing for ammonia and assimilable Amino Nitrogen, allow you to make adjustments to nutrients that will enhance the performance of your yeast of choice. Overall improvements in wine quality may include enhanced aromas, deeper flavors and better mouthfeel, as well as a better aftertaste. Not bad for a few grams of nutrient.

The Testing Program

Our SAP and SNAP Panel testing program is a collaboration between ourselves and *Vinquiry*, the commercial wine laboratory in Windsor. Here's how the program works:

(1) Before picking your grapes, you purchase from *BP* either a **SAP** or a **SNAP** testing panel for your wine. We give you a numbered voucher to take to *Vinquiry*, along with a 225 ml. sample bottle for the juice.

(2) When your grapes are crushed, you deliver the voucher and the sample bottle full of clear, settled juice to *Vinquiry at 7795 Bell Road, Windsor, CA 95492*.

(3) Vinquiry sends the results both to *BP* and to you, so you can consult with us, if you feel it necessary, for help in interpreting the results.

Costs

The **SAP** Panel (TE98) is priced at $26.00, and the **SNAP** Panel (TE99) is priced at $72.00. If you are ordering by mail, there is no additional shipping and handling charge when combined with a mail order that meets our minimum free shipping. If ordering separately, the charge for sending the bottle and voucher is $4.00. Vouchers are non-refundable, and must be used the harvest they are purchased. You are responsible for delivering your samples to Vinquiry.

Handling & Shipping Juice

Remember that you are sending juice, and that means it is subject to fermentation. *Vinquiry* must receive your samples before fermentation begins! Unless you are in a position to take your clarified juice to *Vinquiry* yourself, you should do one of two things:

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

A better alternative is to pasteurize the juice, heating it up to 180°F., keeping it there for 2-5 min. Do not allow it to boil. Cool, freeze, and ship via next day air service. ***Indicate to the folks at Vinquiry how the sample was treated.*** Please call us at 707-544-2520 if you have further questions.

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