

Yeast Fermentation

1. Introduction

Fermentation of the must (grape skins and juice) is the first and most important step of the vinification process. In addition to your choice of grape variety and its quality, the final qualities of your wine are influenced by your ability to control key parts of the winemaking process. Such factors as temperature, sugar concentration, pH, acidity, SO₂ level, the rate of fermentation, tannin level, colour, and many other factors combine to make your wine either superb, average or less than desirable. Your choice of yeast, and then how you start and manage your fermentation, are critical to ensure it completes without problems.

Yeast is more than just something that causes fermentation; it can also affect the look, taste and smell of your wine.

Fermentation can start on its own without the aid of cultured yeast. There is an abundance of wild yeast in the air and on grape skins that will greedily consume the wonderful, nutritious sugars on your prized grapes. Wild yeast fermentation is a risky business for most beginning winemakers. Managed incorrectly it can result in off odours and tastes in your wine through microbial spoilage. It is highly recommend that you start your winemaking using good quality, freshly purchased yeast.

2. Yeast Selection

There are a very wide range of yeasts available from manufacturers such as Lallemmand (Lalvin), Scott Labs, White Labs, Wyeast and others. However, the selection available for home winemaking is very limited because most are packaged in quantities that are more suited to commercial volumes. Lalvin have a small range of yeasts that are sold in sizes that are more appropriate for home winemakers. Many of the home winemaking and brewing suppliers will also sell generic "Red" and "White" wine yeasts that are suitable to start with.

Standard dose = 0.2 gm of yeast to 1 litre of wine

3. Yeast Nutrients

Yeast is a living organism requiring food. So called micro and macro nutrients help the yeast to complete a healthy, trouble free fermentation.

Supplementing the grape juice/must with a good mix of vitamins and nitrogen sources should be part of what you do to ensure sound fermentation. Add your nutrients to the juice/must BEFORE you inoculate with your chosen yeast.

Diammonium Phosphate (DAP) is the most common and cheapest nutrient and will suffice most of the time. Use at a rate of 0.2 grams per litre of juice/must.

Balanced yeast foods are generally a better choice since they contain a mixture of DAP, Vitamins and other organic nutrients. These are generally used at a rate of 0.5 to 1 gram per litre of juice/must. Check the dosage recommended by the manufacturer for the yeast food that you purchase.

No matter what you decide to use, it is important that you calculate and measure your additions carefully, then mix with enough juice to ensure it is fully dissolved. Mix this solution well into the juice/must to be fermented.

You will optimise the uptake of added nutrients by staggering your additions. There are many suggestions on the timing of nutrient additions. A good place to start is by adding one-third of your

total nutrient addition before you add your yeast to the must. Add a further 1/3 when fermentation starts, Add the remaining 1/3 when the Specific Gravity of the must (Brix/Baume) has reduced by 1/3.

4. Preparing the Yeast

Correct preparation of your yeast will go a long way towards avoiding fermentation problems. Although it may work, it is not recommended to just sprinkle dried yeast over the juice/must and hope for the best!

One method of starting yeast fermentation is to follow this procedure.

Re-hydrate dried yeast by sprinkling yeast over 1/2 cup of warm (37.5 C) water and leave for about 10 minutes. Do this in a wide, flat dish to ensure that all of the dried yeast is evenly hydrated. Otherwise you will end up with messy clumps of yeast.

Add a pinch of DAP

Mix one cup of fresh grape juice and one cup of water. This will form the starter base for up to 40 L of must. For more than 40 L of must, double or triple volume of juice and water.

Mix yeast cup with diluted juice in either a carafe or jar.

Add a pinch of DAP to the above starter solution

Plug with a cheese cloth and set in a warm place. It is important to complete the above dilution within 15 to 30 minutes of hydrating the yeast.

Starter solution should be actively fermenting within an hour or two

Inoculate must when starter solution is actively fermenting before inoculating must

5. Ensuring a trouble free fermentation

Ensure the yeast you choose can ferment the level of sugar present in your must. High sugar musts can be difficult for some yeast strains.

Each yeast strain has its ideal temperature range, so check this with the yeast manufacturer's data sheet. Most commercial strains are content to ferment between 16 to 35 degrees C.

Acclimatise the started yeast before you add to your juice. Your fermentation can be off to bad start if there is a difference of more than 10 degrees C. Acclimatise by Slowly (over a period of 5 minutes) combining an equal amount of the must (juice) to be fermented with the yeast suspension. This will help the yeast adjust to the different temperature of the must (juice) and will help avoid thermal shock. This temperation step may need repeating for very low temperature must (juice). Each atemperation step should last about 15-20 minutes.

Yeast inoculation should not occur within 30 minutes of adding sulphur to the juice/must. Keep sulphur additions below 50 parts per million at the juice/must stage.

Be sure that you are using a yeast that will cope with the sugar level present in your juice

Ensure that you have an appropriate level of nutrients in your must

Monitor fermentation temperature and ensure it is kept below 35 C. for red wines, and below 27 C for white wines. These are absolute maximums to keep below, not necessarily desirable maximum fermentation temperatures for red and white wines.

Use only sound, mould-free fruit otherwise you risk having competition from too many other microbes.

Do not use yeast that is beyond its expiry date, or 12 months after opening.

References:

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