

# Dry Yeast Rehydration

Rev 1 (2/14/07)

Q: How should I prepare dry yeast for use in making WM & C?

A: Dry yeast should first be properly rehydrated, and then proofed.

1) To restore their function yeast cells must reabsorb all of their cellular water. This step of **rehydration** is perhaps **the most critical phase** in using dry yeast cultures. Only proper rehydration can ensure healthy cells which retain good fermentation characteristics.

When dry yeast is exposed to water or aqueous solutions the cells rehydrate, absorbing the needed water within seconds. **If rehydration is not properly carried out**, the cell can leak important cellular compounds through the membrane, which is extremely permeable at the time of rehydration. Consequently, the yeast will lose viability and the remaining populations will be unable to initiate a rapid fermentation. Difficulty will also be experienced if the yeast are dispersed directly onto the must as the granules will clump and stick together. Also, in some instances, a must may contain SO<sub>2</sub> or residual fungicides which could be lethal during the rehydration stage. Once rehydrated the cells can resist SO<sub>2</sub> and low concentrations of fungicides, but not during water uptake

Important points in proper dry yeast rehydration are:

- **Allow 30 minutes** for yeast to come to room temperature before rehydrating.
- **Rehydrate in clean water** (See Notes 1 & 2 below) rather than in must, and never use distilled water.
  - Allows the cell to re-establish normal cell membrane functions more quickly - early in the rehydration process the yeast will not be able to differentiate between good & toxic substances.
  - In the first critical minutes of absorbing water, the yeast can take up micronutrients (if provided) as well as water - largely due to the pH of the water being near neutral, which makes it less stressful for the yeast to incorporate these nutritional elements
- **Use the proper water temperature (99-105°F)** - The rehydration temperature makes a big difference as to how the yeast cells reconstitute from their dried state. The addition of dried yeast to cool water(60°F), or must, can decrease cell viability by as much as 60%.

Rehydration should not exceed 30 min (**20 min is ideal**). Any longer and the yeast will exhaust their available food source. (Ref: WineMaker, Oct-Nov 2003, pgs 48-52)

Every strain of yeast has its own optimum rehydration temperature - all of them range between 95 F to 105F (most of them closer to 105°F). The dried yeast cell wall is fragile and it is the first few minutes (possibly seconds) of rehydration that the warm temperature is critical while it is reconstituting its cell wall structure. As you drop the initial temperature of the water from 95 to 85 or 75 or 65F the yeast leached out more and more of its insides damaging the each cell. The yeast viability also drops proportionally. At 95 - 105 F, there is 100% recovery of the viable dry yeast. At 60F, there can be as much as 60% dead cells. The water should be tap water with the normal amount of hardness present. The hardness is essential for good recovery: 250 -500 ppm hardness is ideal. This means that deionized or distilled water should not be used. Ideally, the warm rehydration water should contain about 0.5 - 1.0% yeast extract.

For the initial few minutes (perhaps seconds) of rehydration, the yeast cell wall cannot differentiate what passes through the wall. Toxic materials like sprays, hops, SO<sub>2</sub> and sugars in high levels, that the yeast normally can selectively keep from passing through its cell wall rush right in and seriously damage the cells. The moment that the cell wall is properly reconstituted, the yeast can then regulate what goes in and out of the cell. That is why we hesitate to recommend rehydration in wort or must. Very dilute wort seems to be OK.

We recommend that the rehydrated yeast be added to the wort within 30 minutes. We have built into each cell a large amount of glycogen and trehalose that give the yeast a burst of energy to kick off the growth cycle when it is in the wort. It is quickly used up if the yeast is rehydrated for more than 30 minutes. There

is no damage done here if it is not immediately add to the wort. You just do not get the added benefit of that sudden burst of energy. We also recommend that you attemperate the rehydrated yeast to within 15F of the wort before adding to the wort. Warm yeast into a cold wort will cause many of the yeast to produce petite mutants that will never grow or ferment properly and will cause them to produce H<sub>2</sub>S. The attemperation can take place over a very brief period by adding, in increments, a small amount of the cooler wort to the rehydrated yeast.

Many times we find that warm water is added to a very cold container that drops the rehydrating water below the desired temperature. Sometimes refrigerated, very cold, dry yeast is added directly to the warm water without giving it time to come to room temperature. The initial water entering the cell is then cool.

**One very important factor** that the distributor and beer maker should keep in mind is that Active Dry Yeast is dormant or inactive and not inert, so keep refrigerated at all times. Do not store in a tin roofed warehouse that becomes an oven or on a window sill that gets equally hot. Active Dry Yeast loses about 20% of its activity in a year when it is stored at 75 F and only 4% when refrigerated.

(source: Dr. Clayton Cone, rec.crafts.brewing 03/03/03)