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## YEAST CHARACTERISTICS

Yeast is a single-celled fungus that turns wort into beer, so it makes sense to select the best strain and try to provide optimal fermentation conditions. Yeast is a key factor in beer flavour, producing (among other things) esters, aldehydes, fusel oils, sulphur compounds and diacetyl. Most of these chemicals are produced in greater quantities at higher temperatures, so it is important to try to moderate fermentation temperatures to produce a clean tasting beer. Yeast also like steady temperatures and lots of oxygen when pitched, so try to keep this in mind when conducting your fermentations.

## YEAST TYPES

Brewers yeast can be roughly divided into two types- *Saccharomyces cerevisiae*, ale yeast, and *Saccharomyces uvarum*, lager yeast. As a general rule, ale yeast are top fermenters and work best at around 18-20°C. Lager yeast are bottom fermenters and are happiest at 8-10°C. Different yeast strains display varying levels of activity, and some are more vigorous fermenters than others. Lager strains in particular do not show as much activity on the surface as many of the ale strains. To ensure a good healthy start to the fermentation, making up a starter is recommended.

## Instructions for Making Yeast Starters

### Introduction

Pure strains of liquid yeast, such as Wyeast or White Labs, are sourced from commercial breweries and cultured under sterile laboratory conditions. Use of these yeasts in your brewing can greatly enhance all aspects of fermentation and beer flavour, and especially aid proper attenuation of all-malt beers. However, the cell count in the Wyeast "smack packs" and White Labs phials is low, and should be increased by making a starter culture (essentially a mini-ferment) to ensure that fermentation of your wort gets off to a strong start.

**Equipment** - small saucepan, airlock, bottle with stopper, malt extract, small funnel

### What to do

3-4 days before you plan on brewing, break the inner pouch of the Wyeast packet and mix the contents well. When the pack swells to 3-4 cm thick, make up your starter by boiling 3 tablespoons of malt extract (DO NOT substitute other sugars) in 500 ml water for 15 minutes. Cover the saucepan and force cool in a sink of cold water. Meanwhile, sanitize your stopper, bottle, airlock, scissors, funnel and the Wyeast pack. When the malt extract solution is below 30°, transfer to the bottle and shake well to aerate. Shake the Wyeast pack well, then carefully cut one corner with your sanitized scissors. Empty the entire contents into the bottle, fit the stopper with airlock, and leave in a warm spot. Within a day or two, visible signs of fermentation will be evident (build up of foam, bubbling in the airlock). Your yeast is now ready to pitch. Simply give the bottle a good swirl to suspend the yeast, sanitize the lip of the bottle (flaming with a lighter works well), then tip the entire contents into your waiting wort. Make sure to aerate well, by "scooping" air into the wort with your spoon. Ideally, the yeast should be pitched at 20° for ales, and less than 15° for lagers. Yeast like steady temperatures, and it is better to ferment a bit cool than too warm. Most strains of ale yeast will ferment happily, if not a bit more slowly, down to 15°, lager yeast will work down to 4°.

### **Cultivating Yeast from Commercial Beer**

The procedure for activating the dormant yeast from a bottle of Coopers (or any unfiltered, unpasteurized beer) is almost identical to the above. Carefully decant 3/4 of the beer into a suitable vessel (eg. your stomach) pour the cooled malt extract into the bottle, shake the bottle, fit the stopper and airlock, and wait for the yeast to begin working.

### **Re-using Yeast**

Yeast from the primary fermentation can be saved and repitched into subsequent batches of beer. Boil a clean glass jar and a spoon for 10 minutes to sterilize. Allow to cool and scoop up 100-150 ml of yeast from the bottom of the fermenter after the beer has been drained off. Cover with plastic wrap, fit the lid loosely and place in the coldest part of your fridge, where the yeast will keep for 7-10 days. When you are ready to brew, let the jar come to room temperature, and pitch the entire contents into the cooled wort. This can be done once or twice before the accumulation of trub and bacteria makes it necessary to return to a fresh yeast culture. The risk of infection is too great to attempt more "harvesting".

### **ATTENUATION**

Attenuation refers to the ability of the yeast to ferment sugars in the wort. For example, a 75% attenuation would bring a 1.040 wort down to 1.010. Attenuation normally ranges from 67 - 77%, and varies with the composition of the wort, the yeast strain used, the health of the yeast and a number of other factors. Attenuation will affect the residual sweetness and body of the finished beer.

### **FLOCCULATION**

Flocculation refers to the ability of the yeast to clump together and drop out of suspension. The degree of flocculation varies for different yeast, and is indicated in the specifications by low, medium or high.

### **ALCOHOL TOLERANCES**

The alcohol tolerance for most strains of liquid yeast is at least 8%. Barley wines to 12% can be produced by most ale strains, provided the pitching rates are adequate, and the wort is well oxygenated