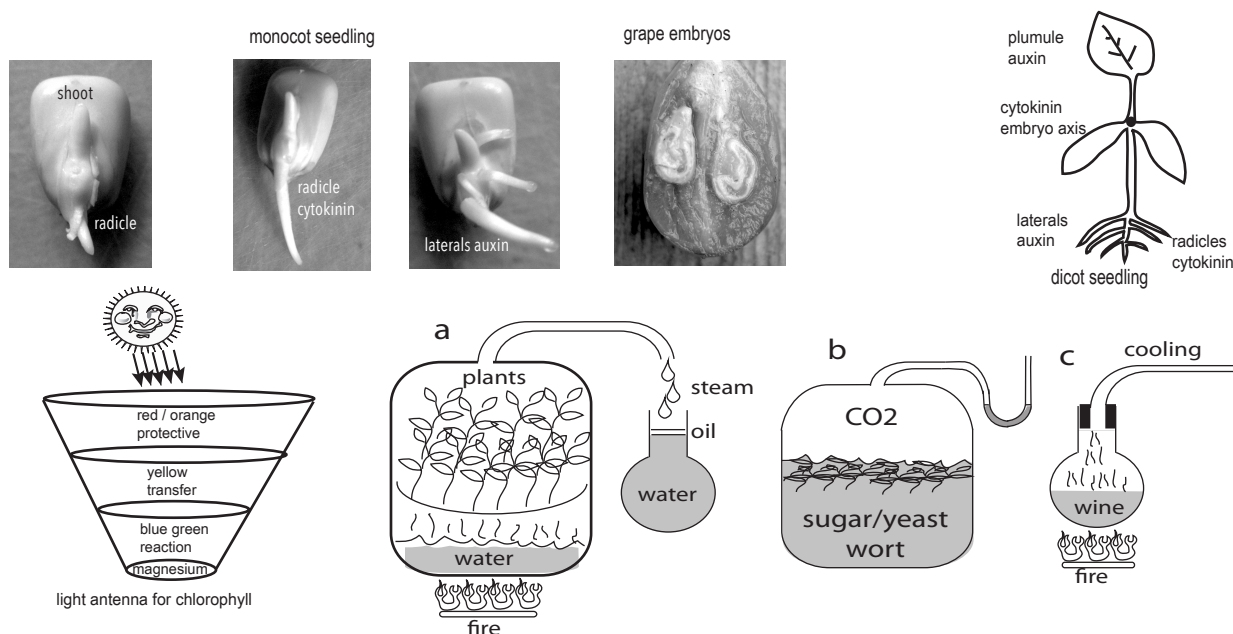




Thoughts on fermenting

1 the standard wort of plant sap (species specific) + barley malt

The mashing and fermenting process of barley malt is very temperature sensitive. Current research on the exclusion zone water and the use of infrared light in ferments is interesting in that the control of the temperatures is made possible by the addition of near infrared lighting systems similar to those found in the food industry. This stimulates the metabolic potentials of the yeasts. Care should be taken to not allow the light to overheat the wort. The light is most useful when the ambient temperatures are cool during the day. In summer do not use the light. An ideal temperature for fermenting is 27°C or 80° F. Lighting the wort during the day and then resting it at night kicks the yeasts into higher functioning through circadian rhythms. The use of ammonium phos D6 during the day 3 pillules per 5 gal. and ammonium carb 3 pillules at night is also an attempt at regulating a more robust yeast response for ferments.

infrared lights in brewing <http://revistapesquisa.fapesp.br/en/2013/04/01/light-infused-beer/>

Under certain wavelengths characteristic of the red and near infrared spectrum bands, yeast metabolism tends to increase. Light enhances the cell membrane permeability of *Saccharomyces cerevisiae* and this promotes the exchange between the internal and external yeast environment. This exchange permeability metabolizes malt sugar more quickly and expels ethanol and CO₂ from the cellular environment of the yeast. Cytokinin was identified as a component of a malt extract or additionally, a plant extract from a yeast of the genus *Saccharomyces*. Such malted barley preparations significantly increase the rate of fermentation of a yeast.

2 yeast nutrition

Besides the addition of infrared light to the fermenting process several things can be done to provide nutrients to the yeasts. Lack of nutrients for the yeast is a common source of stalled ferment especially in musts made from fruit juice without including the peelings and seeds. To create yeast nutrient, save the spent yeasts from previous ferments. The yeast dregs can be used wet or dried. An ounce of bee pollen per five gallons of wort provides protein and enzymes for yeasts. Add this to a stalled ferment in gradual doses until it begins to work again. If there are not many lees available then baker's yeast can be substituted but it must be killed by boiling for ten minutes. An additional augment for this can be ¼ tsp of very finely ground tourmaline, amethyst, mica or rose quartz per five gallons of wort. These gems can reflect the infrared light to stimulate the yeasts to greater metabolism from within the ferment.

3 pathogen control

The standard wort of plant sap/ barley malt mixtures can produce a cytokinin rich solution depending upon the sap that is gathered. Adding the pollen producing organs of willows or poplars or the early shredded bark of willow shoots to the standard wort balances these hormones. For enhancing medicinal properties at the sixth leaf the standard plant sap / barley malt wort plus the willow pollen can benefit from a mix of the wort with the addition of terpene rich hydrosols. These additions not only aid in the uptake of secondary metabolites in the growing plant but can also provide protection against many soil borne pathogens. Research shows the combination of cytokinin rich and terpene rich solutions enhanced with willow pollen, willow bark from spring shoots (auxin to balance cytokinin). (or even aspirin) aids in pathogen resistance.

GLUCOSE- SIMPLEST SUGAR QUICKLY METABOLIZED
GLUCOSE) PLANTS BUILD DAY/ METABOLIZE NIGHT
GLYCOGEN(glucose)HUMANS METABOLIZE DAY- BUILD NIGHT

FRUCTOSE- MORE COMPLEX SUGAR – BENEFICIAL FOR
BACTERIA IN THE GUT- DIFFICULT TO DIGEST FOR HUMAN
BEINGS

SUCROSE- COMBINATION OF GLUCOSE AND FRUCTOSE-
TABLE SUGAR(CANE AND BEETS) USEFUL FOR ALCOHOLIC
FERMENTATION THAT BREAKS DOWN PLANT MATERIALS

DEXTROSE- SUGAR DERIVED FROM HONEY/CORN/STARCH
BIOLOGICALLY ACTIVE FOR ENZYMATIC FERMENTS

SUGAR 24%=BRIX 24° AND POTENTIAL ALCOHOL(PA) ON
HYDROMETER 12% PA- TYPICAL WINE MUST

BEER YEAST 4.5% PA BRIX APPROX. 9 . 2X PA
YEAST- FRUIT BLOOM, ENZYMES, VITAMINS

STARTING A FERMENT- TEMPERATURE 80°F- TOAST FLOAT,
HERB CAP / AIR LOCK / FRUIT FLIES/ STALLED FERMENT-
TOO MUCH SUGAR, TOO LITTLE NUTRITION- TOO HIGH/LOW
TEMP- NOT ENOUGH ENZYMES, TOO MUCH FLUID, TOO COLD

MALOLACTIC FERMENT-CONVERTS COARSE ACIDS (MALIC)
TO FINER ACIDS (LACTIC) THIS IS DONE AS BACTERIA TAKE
OVER FOR THE YEAST FERMENTS OF THE SUGARS. THIS IS A
VERY SLOW PROCESS.(4-6 WEEKS) AFTER THAT IF WORT/
MUST IS EXPOSED TO AIR MORE BACTERIAL FERMENT
OCCURS CREATING VOLATILE ACIDS (ACETIC / VINEGAR)
VINEGAR MOTHERS

Pressure cooker adapter-Gas fittings

½ in ID x 3/8 in MIP (male iron pipe)
Brass hose barb –threads on outside

flare to female pipe coupling 3/8 flare (outer threads) x 3/8 FIP (female iron pipe- inner threads)

3/8 in flare
short rod nut



#211 O-ring ¾"OD x 9/16"ID x 3/32" wall

vinyl tubing

WHEN DRILLING THE LID OF THE COOKER TAKE CARE NOT TO MAKE THE HOLE IN THE LID TOO MUCH LARGER THAN THE STUB OF THE FLARE. (18 mm) THE STUB SHOULD JUST CLEAR THE HOLE. OTHERWISE THIS SETUP WILL LEAK.

- 1 drill a hole in the lid of the cooker with a hole saw. Use a hole that is already there and just enlarge it enough to fit the threads of the 3/8 FIP x 3/8 flare shaft through the hole. 18 mm hole saw is good.
- 2 Insert the hose barb threaded end into the female 3/8 FIP.
- 3 cut the 5/8 OD x 3/8 ID tube just long enough to fit over the barb. Warm it in water and push it onto the barb. Then cut the 7/8 OD x 5/8 ID tubing to the same size and warm it in water and push it over the barb with the other tube over it. A little bit of high vacuum grease or petroleum jelly helps this process. Then cut the large 3/4 ID tube long enough to go over these other two and then extend out long enough to accept the 24/40 male end of the glass adapter.
- 4 Warm one end of the large tube and using a little grease slip it over the other two pieces of tubing that are over the barb. This takes a bit of doing since the ID of the large tube is smaller than the OD of the middle tube that is over the barb. This ensures a snug fit. When the large tube is settled over the other two and the barb put a hose clamp on it and tighten.
- 5 Slip two more hose clamps over the large tube and warm the other end. Insert the 24/40 male end of the glass adapter into the large tube and push it down to get near to the opening of the barb. Slide one clamp over the lower part of the adapter and tighten it. Then tighten the clamp over the upper side of the glass adapter. That makes the unit secure.
- 6 Put an O ring #211 over the stub of the FIP flare section with the threads. This takes some doing but provides a secure joint against the steam. Gently put the flare end into the hole in the lid so that the O ring sits on the surface of the lid on the top of the hole. Then put another O ring on the underside of the flare stub and push it down to sit against the lid of the cooker on the inside. Screw the flare nut down onto the O ring and it should seat both of the O rings securely against the lid forming a good seal against the steam for the arrangement.

