FOSTER'S GROUP

FOSTER'S WINE ESTATES

Surviving Baume, Brix and Vintage

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Mildura

CONSUMER LED &
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Dissolved solids

- We do not tend to directly measure sugars in juices and ferments but rather an associated property such as density or refractive index.
- Sugars make up between 90 and 95% of the total soluble solids and as such these measures are a good guide to sugar content (200~280 g/l glucose fructose in juice).
- Both refractive index and density vary significantly with sugar content.

Baume and Brix

- Two main scales
  - Baume ~ 18 grams sugar /litre per degree
  - Brix ~ 10 grams sugar/litre per degree
- Both are fine and equipment is available to measure both.
- Use the 1.8 factor for conversion (e.g. Be = 1.8 x Brix)
- Both are weight per weight measurements, not weight per volume.
- Baume is popular as it gives a (very) rough approximation of final alcohol content.
- Also have scales of Specific Gravity (SG), Oechsle and refractive index (RI) however these are rarely used for ferments in this country.

Juice Methods

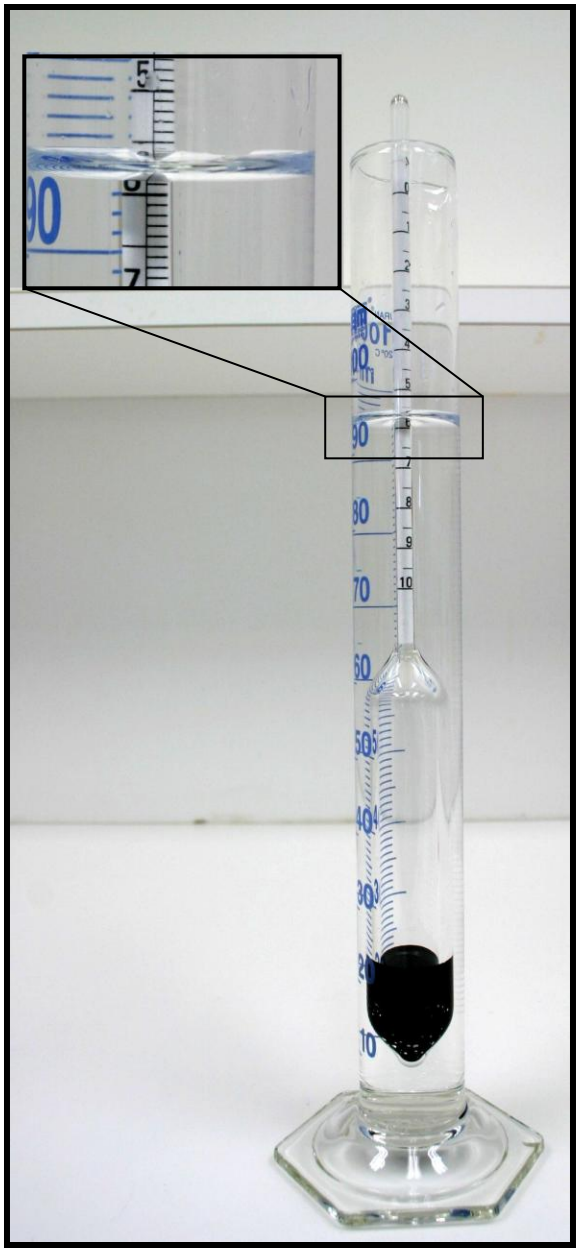
- Very important as they effect the choice of harvest time and can be linked to grower payments.
- Two common methods in use.
  - Refractive index (refractometer)
  - Density (density meter or hydrometer)
- Both methods *can* give the correct result.

Refractometers

- Very good and quick if used correctly
- Both electronic and traditional optical versions exist.
- It is temperature dependent.
- Be careful with automatic temperature correction, it has serious limits.
- Only minor effects from suspended solids so can be very quick on rough and ready samples.
- Probably the better choice for juice measurements.

Hydrometers

- Work on the Archimedes principle (i.e. the heavier it is the less it floats).
- Need to settle out solids before use.
- Need to use the correct size cylinder on a level surface (5 mm clearance).
- Must make temperature measurements on sample and do appropriate corrections.
- Should be calibrated before vintage (and every week during).
- They do not work well if they are dirty.



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Density Meters

- Work on the tuning fork principle (i.e. the density of a u-tube of liquid will effect its frequency of oscillation).
- They have in-built temperature compensation.
- Can be fooled by solids, bubbles and large temperature shifts.
- Much quicker than hydrometers but cost $3~4 K.
- They don't bounce well.

Calibration solutions.

- No matter what you use calibrate it.
- Make up sugar / water solution by mass.
- Use more than one standard.
- They work for both hydrometers and refractometers.

Brix	**Baume**	**Grams sugar**	**Grams water**
10	5.56	50	450
20	11.10	100	400
30	16.67	150	350

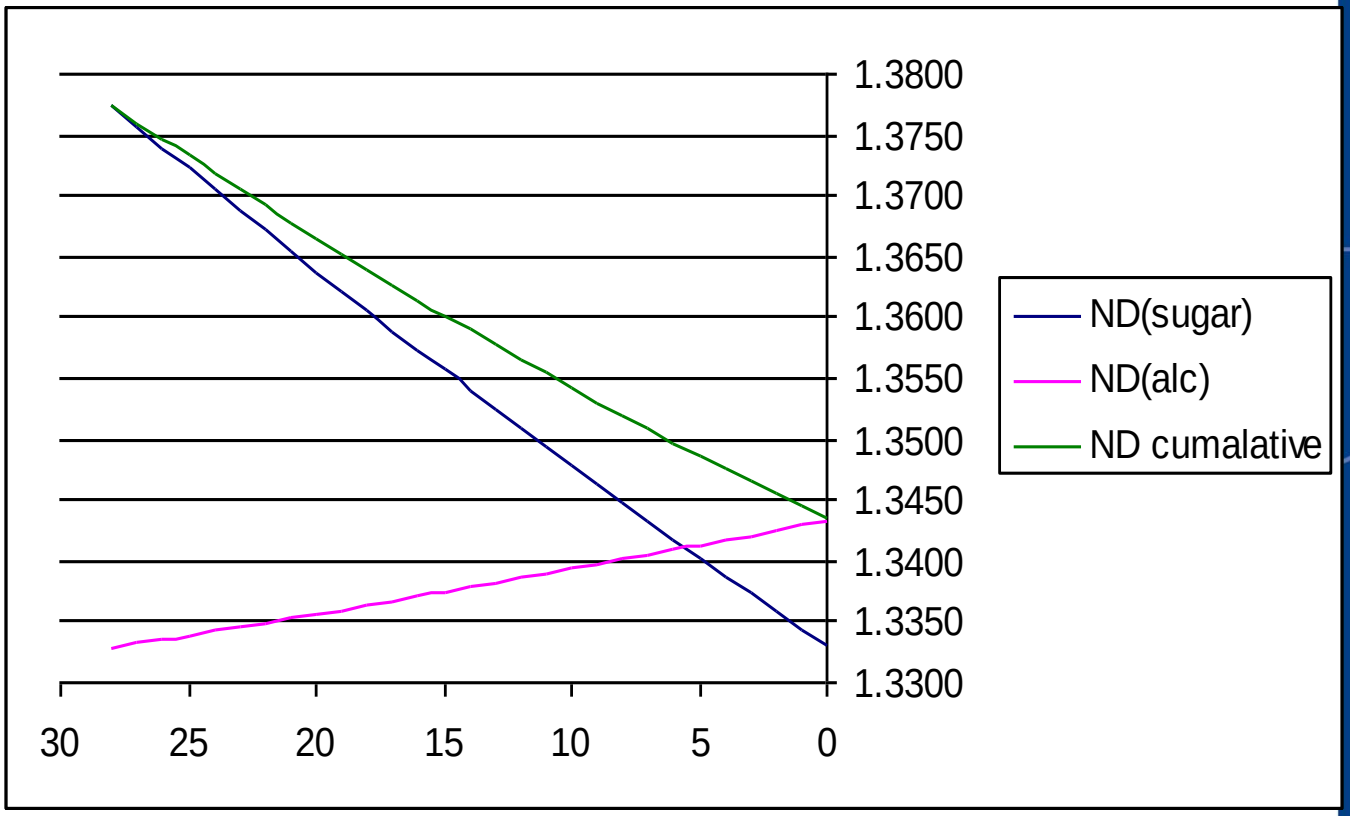
Juice Rules

- Settle juice as much as possible (especially for hydrometers and density meters).
- Measure as close to ambient temperature as possible and then correct.
- Get rid of any bubbles.
- Always try to get a representative sample.
- Density and refractive index measurements rarely agree for raw juice samples.

Monitoring Ferments

- Refractometers do not work very well as the alcohol created has a big effect on the refractive index.

Effect of Alcohol on Refractive Index.



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Monitoring Ferments

- Same effect for density but much less pronounced (obscuration).
- At 0° Baume there is ~ 18 g/l glucose fructose). Varies widely depending on the alcohol content.

Density and Ferments

- Bubbles affect all density measurements so degassing of some form is necessary.
- So do solids
- The measured density is only an indication of remaining sugar (obscuration).
- Best to graph results and follow changes, not absolute values.
- At 0° Baume need to move to a different form of analysis such as enzymatic or reducing sugars.

The FAQ's

- Differences between hydrometers and refractometers in juices are mostly due to suspended solids. They will both give the same results on standards.
- 1° Baume does not necessarily give 1% of alcohol. This is effected by
  - fermenter type,
  - yeast metabolism,
  - sugars extracted from the skins,
  - and the % of sugar originally available in the juice.

- Suspended solids and bubbles do give erroneous density values. You must degas before measurement.
- Measure the temperature!!!!!!!

References

- Patrick Ilands book!!!!!!!!! (it is what I used).
- R.Paul (2003) Concentrate – this is serious. The Australian and New Zealand Grapegrower and Winemaker, p 127-128.