

Assessing the sugar content of a crop for managing the harvesting sequence

The Commercial Cane Sugar (CCS) of a crop can vary due to the variety; age of the crop; arrowing; and moisture; nutrient; or temperature stress. Growers can use a refractometer prior to each harvesting round to enable them to select blocks to harvest with potentially higher CCS to maximise whole-farm sugar yield.

A portable refractometer (or hand held Brix meter) is a useful tool to use when planning your block harvesting sequence on your farm.

A refractometer can measure brix in cane juice. Brix is a measure (in degrees) of the amount of dissolved solids (or sugar) in a liquid. A higher brix reading indicates a higher sucrose content.

The refractometer measurements taken from stalks of cane in the field can be used as estimates of the relative sucrose content between blocks. The brix readings are not equal to CCS of the cane crop at the mill but can be used as an indication of relative crop sugar content. The brix measured in the field is different to CCS for many reasons, including sampling error, fibre content, harvesting process and environmental factors.

Juice sampling equipment

A proper juice sampling device or dibbler (Figure 1) makes the process easy. Pliers can be used to squeeze juice out of the stick, but this is slow and each stalk will be destroyed.



Point to pierce cane stalk

Figure 1: Juice sampler – dibbler.

When taking juice samples, pierce the rind with the dibbler. Push the dibbler firmly into the stalk and twist it a few times to get the juice to flow into the collector.

Practice good farm hygiene and ensure that the juice sampling equipment is cleaned and sterilised with 70 per cent methylated spirits/water mixture between blocks. This ensures that any diseases that might be present are not spread.



Figure 2: A refractometer.

Refractometer

- Follow the manufacturer's instructions for refractometer reading, maintenance, cleaning and calibration.
- Take readings in natural light and ensure the sample has time to reach the ambient temperature.
- Clean the instrument (both the cover plate and the top of the prism) using a soft, damp cloth.
- Make sure the prism and cover plate are dry. Any remaining water will dilute the juice sample.
- Place 2-3 drops of juice on top of the prism.
- Close the cover plate and take your reading through the eyeglass. Figure 3 shows how to read the refractometer.

To assess block average sucrose content

- Make sure you get a representative sample of the block by sampling at least 5 locations spread across the block and at least 10 m in from the edge/ends.
- Sample the juice from 10 to 20 sticks of cane at each location. Accuracy improves when more sticks are sampled.
- Take the sample at the same height from the ground, such as waist height, on each stalk.
- Take one brix reading from the collected juice sample at each of the locations and then average the 5 readings to give an overall brix for the block. If one of the five brix readings varies by greater than 10 per cent from the average, discard it from your calculation.

To assess the maturity of the block

The sugar content varies throughout the stalk and the lower internodes will have higher sucrose content than the upper ends of the stalk on an immature plant. Basal internodes of the stalk fill with sugar while the top of the stalk is still actively growing. With stalk maturation, more internodes reach maximum CCS.

You can use this characteristic to assess whether a sugarcane crop has reached its maximum CCS by sampling the stalks separately at top, middle and bottom. Use the same technique above, but at each site collect CCS samples from the 3 positions along the stalk length.

A crop with more similar readings at the top and bottom of the stalk will be more mature and a limited increase in overall crop CCS will result from delaying the harvest.

A crop with a bigger difference between the brix reading at the top of the stalk compared to the bottom will be less mature and a higher overall crop CCS may result if harvest is delayed till the next round.



Figure 3:

View through the refractometer with a juice sample brix reading of 23.



Figure 4: A refractometer with a digital readout.



Figure 5: Harvesting for maximum sugar yield.

Maximising the sugar yield on each block by planning the harvester sequence will improve whole farm productivity