

Advanced crop quality

Lecture-8

Dr.Sundus Abdulkariem
Agriculture college

sugarcane :measuring commercial quality

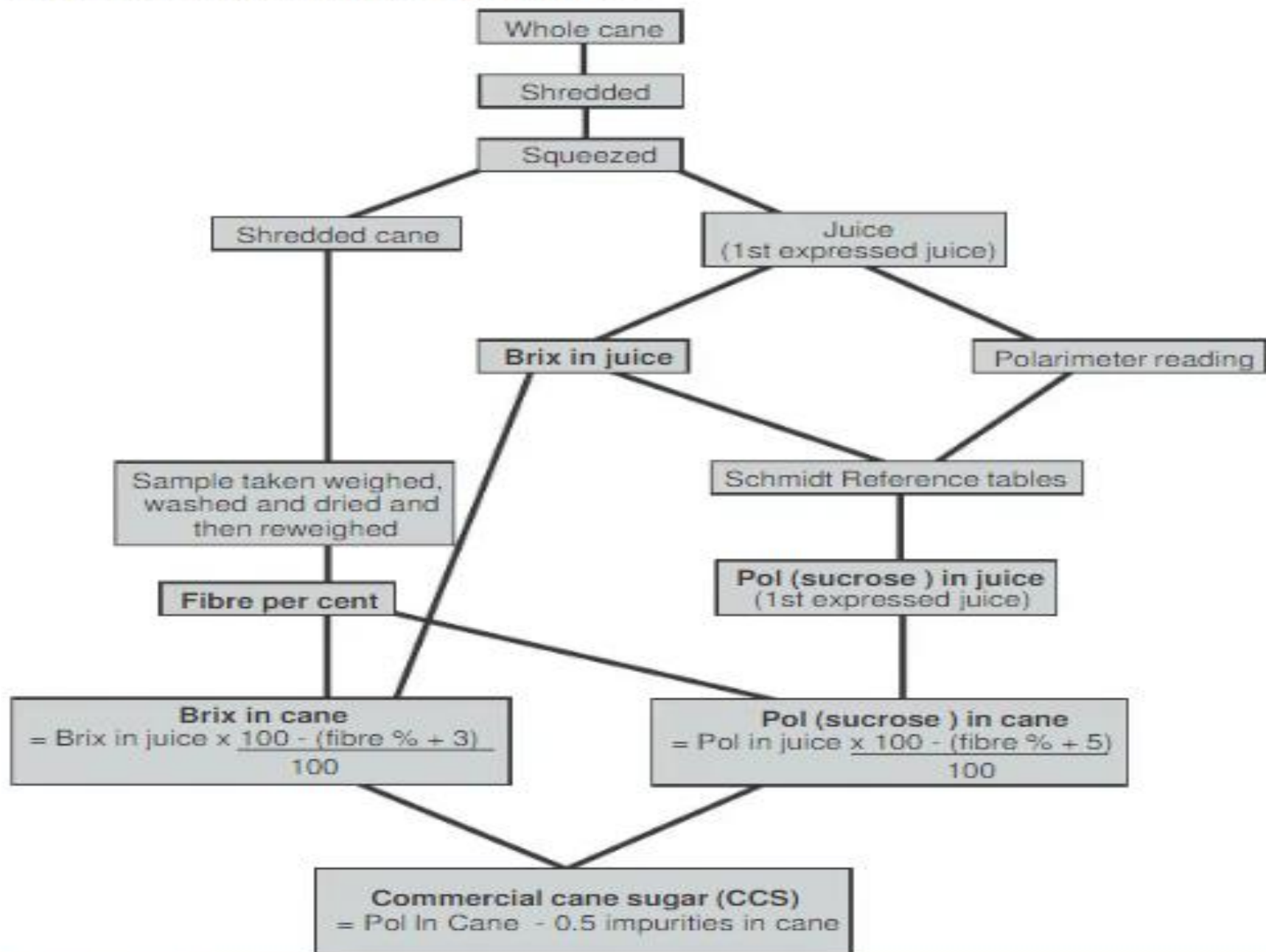
■ There are a number of measurements that contribute to assessing the quality of sugarcane:

- pol (sucrose) percent in juice;
- brix (total soluble solids) percent in juice.
- pol (sucrose) percent in cane.
- brix per cent in cane.
- fibre per cent.
- commercial cane sugar (CCS).
- purity.



- ## ■ The process of determining sugarcane quality requires several measurements.
- The diagram below summarises the process.

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Pol (Sucrose) percent in juice

Pol (Sucrose) percent in juice:

-It is the percentage of sucrose contained in 100 cm³ of juice and is measured by a Polarimeter.

Brix (Sucrose) percent in juice:

-It is the percentage of dissolved solids in 100 cm³ of juice, and its value is extracted using a Refractometer.

Table 1.1 Extract of the reference tables for converting Polarimeter and brix readings to a per cent sucrose in juice.

| | | Brix | | | | | | | |
|------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 19.0 | 19.5 | 20.0 | 20.5 | 21.0 | 21.5 | 22.0 | 22.5 |
| Polarimeter reading | 71 | 17.16 | 17.13 | 17.09 | 17.05 | 17.02 | 16.99 | 16.95 | 16.92 |
| | 72 | 17.41 | 17.37 | 17.33 | 17.30 | 17.26 | 17.23 | 17.19 | 17.16 |
| | 73 | 17.65 | 17.61 | 17.58 | 17.54 | 17.50 | 17.47 | 17.43 | 17.40 |
| | 74 | 17.89 | 17.85 | 17.82 | 17.78 | 17.74 | 17.71 | 17.67 | 17.63 |
| | 75 | 18.13 | 18.09 | 18.06 | 18.02 | 17.98 | 17.95 | 17.91 | 17.87 |
| | 76 | 18.37 | 18.34 | 18.30 | 18.26 | 18.22 | 18.19 | 18.15 | 18.11 |
| | 77 | 18.61 | 18.58 | 18.54 | 18.50 | 18.46 | 18.66 | 18.39 | 18.35 |

Fibre in cane

- To calculate the sucrose in cane or CCS a figure for fibre is also needed.

Method for Determining Fibre Percentage at the Sugar Mill

Over a period of 24 hours samples are collected immediately after the cane has passed through the shredder. These samples are combined, and a 500 gram sub sample taken.

- Sub sample is put through a cutter grinder.
- The ground sample is then placed into a fibre machine where it is washed to remove brix (soluble solids) and fine dirt.
- The sample is then dried using hot air and weighed.

The final weight divided by the initial weight provides a fibre percentage.

Example: Original weight of 500 grams, final weight of 75 grams.

$$\begin{aligned}\text{Fibre percentage} &= (\text{final weight} / \text{original weight}) \times 100 \\ &= (75 / 500) \times 100 \\ &= 15 \%\end{aligned}$$

Brix percent in cane

$$\text{Brix in cane} = \text{brix in J} \times (100 - (\% \text{ fibre} + 3)) / 100$$

Therefore with brix in juice of 21.0 and fibre of 15% it is possible to calculate brix in cane.

$$\text{Brix in cane} = 21.0 \times (100 - (15 + 3)) / 100$$

$$= 17.22$$

Pol (sucrose) per cent in cane

$$\text{Pol in cane} = \text{pol in J} \times (100 - (\% \text{ fibre} + 5))/100$$

Therefore with our brix reading of 21.0, the pol in juice calculated to be 17.95 and fibre of 15% it is possible to calculate pol in cane.

$$\begin{aligned} \text{Pol in cane} &= 17.98\% \times (100 - (15 + 5))/100 \\ &= 14.38\% \end{aligned}$$

Impurities in cane

$$\begin{aligned}\text{Impurities in cane} &= \text{brix in cane} - \text{pol in cane} \\ &= 17.22 - 14.38 = 2.84\end{aligned}$$

(CCS) Commercial cane sugar

- ❑ Commercial cane sugar (CCS) is calculated knowing both:
brix in cane and pol in cane.
- ❑ CCS provides an estimate of the percentage of recoverable sucrose from cane.
- ❑ $CCS = \text{pol in cane} - 0.5 \text{ impurities in cane}$

Therefore from the example;

$$CCS = 14.38 - (0.5 \times 2.84)$$

$$= 12.96$$

Purity of cane

Cane purity is a measure of the level of sucrose present in cane relative to the total level of soluble solids.

Purity is generally expressed as a percentage.

Purity of cane = (pol in cane/brix in cane) x 100

Purity of cane = 14.38/17.22 x 100

= % 83.5



**THANK YOU
FOR
LISTENING**