Information Sheet

15. CANE QUALITY

*4.5 ~~15.3~~ Losses in cane quality due to harvest to crush delays

** Note: The number of this information sheet has been changed to fit in with our new classification system and will be updated in due course.*

Introduction

Both grower and miller would benefit greatly if it were possible to process cane immediately after it is harvested, although in practice this never happens. Delays of three to four days, and sometimes much longer between harvesting and crushing the cane are common, resulting in losses of recoverable sugar due to deterioration in cane quality. Such delays are therefore extremely detrimental to the economy of the South African sugar industry.

Deterioration trial results

Over the past three decades a large number of whole stalk cane deterioration trials have been conducted by the South African Sugarcane Research Institute (SASRI), the Sugar Milling Research Institute (SMRI), the Sugar Industry Central Board (SICB), and various sugar companies. The results have clearly shown that cane starts to deteriorate from the time it is harvested whether it is :

- Cut green (unburnt)
- Burnt and cut immediately
- Burnt and left standing in the field.

The rate of cane deterioration varies considerably with the weather conditions, being most rapid in the hot humid summer months. It is characterised by a decline in both purity and sucrose % cane, although the latter may be obscured by a simultaneous drying out of the cane and respiration, leading to weight loss.

Cane cut green generally deteriorates more slowly than burnt cut cane. However, due to rapid conversion of sucrose to reducing sugars, the juice purity of unburnt cane usually declines more rapidly than that of burnt cut cane in the first few days after harvest, though subsequently it is soon overtaken by the burnt cane.

Under moist soil conditions, cane which is burnt and left standing often shows a more rapid decline in recoverable sugar percentage than cane which is burnt and cut immediately. Also, the dilution effect caused by uptake of water from the soil by cane roots after burning may reduce recoverable sugar. Therefore allowing burnt cane to stand, even for a short period before cutting, often causes it to deteriorate more rapidly than cane cut immediately after burning. This emphasises the importance of burning only enough cane to meet the requirements for one day's allocation.

Chopper harvested cane, whether burnt or cut green, deteriorates much more rapidly than whole stalk cane due to the physical damage, which again emphasises the importance of transporting cane to the mill as soon as possible. In Australia, where all the cane is machine harvested, for a grower to avoid penalties the allowable cut to crush delay is generally not more than 12 hours!!

It is important that harvested cane be delivered as soon as possible to the mill to prevent potential revenue loss.

Reducing the cut to crush delay

Where burning is practised, the best time to burn is at dawn. Evening burns increase the delay to crushing by 10 to 11 hours. Where enough cane is burnt for two days' allocation, the delay is increased by a further 24 hours, and if burning is only done once a week the delay is increased by at least 60 hours. Cutting green cane eliminates the burning delay, thus resulting in fresher cane being delivered to the mill.

It is therefore very important that the harvested cane reaches the mill and is crushed as soon as possible after burning or cutting (i.e. on the same day as harvesting). Currently in South Africa the average burn to crush delay is over 72 hours, so the industry is losing much potential revenue. The average purity loss is estimated at about 1.25% per day, i.e. 2% RV loss or 2.2% sucrose loss. At the current export price (2004) this would be worth about R79 million per annum to the industry, of which about R48 million would go to the growers.

It should be noted that over and above the losses of sucrose and the accompanying reduction in purity mentioned above, there are also losses in the factory caused by degradation products (e.g. dextrans and oligosaccharides). These secondary losses in the factory could increase the loss of sugar by at least a further 20% over 96 hours, and by even more for longer delays.

Thus a concerted effort is urgently needed to reduce the overall burn or cut to crush delay. This could well involve the following :

- More green cane harvesting.
- More group or contract harvesting which would reduce the number of cutting faces.
- Six and a half or seven day cutting to synchronise with rate of crushing.
- Ensuring that most cane, burnt or cut, leaves the field on the same day.
- Overall reduction in the transport fleet and the use of bigger haulage vehicles working longer hours.

Updated by Peter Lyne (Agricultural Engineer)
February 2017