

POSTER SUMMARY

ELUCIDATING FACTORY LOSSES WITH NIRS PREDICTIONS

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Abstract

All South African sugar mill laboratories have access to Near Infrared Spectroscopy (NIRS) instruments with process stream calibrations supplied by the Sugar Milling Research Institute NPC (SMRI). The calibrations include sucrose, fructose, glucose, pol and brix predictions for mixed juice, clear juice, syrup, and all the various grades of molasses and massecuites. Dry solids can also be predicted on C-molasses, and conductivity ash on mixed juice and C-molasses. All samples, other than mixed and clear juices, are diluted and measured using transmission spectroscopy.

The rapid and reliable predictions by NIRS can be used by factories to improve recoveries and report factory performance figures. This paper elucidates on some approaches to achieve this.

Below are further details of how the SMRI-NIRS predictions can be used:

- Inversion loss determinations. Factory tests across evaporator stations are specifically reported on, as well as the method developed for these tests;
- Weekly sucrose-based factory stock-takes. The SMRI-NIRS predictions make direct sucrose results possible for the weekly stock-takes instead of having to perform pol-based stock-takes and then applying a pol/sucrose ratio for conversion of recoveries to a sucrose base;
- Losses around the extraction plant. The SMRI-NIRS prediction equations were used to investigate purity differences between mixed juice and juice from the direct-analysis-of-cane (DAC).
- Mill determination of the C-molasses Target Purity Difference (TPD) from each centrifugal. These can be performed on a shift-basis as a check for where sucrose may be lost. At present 'purity rise' across the centrifugals aims to do this but, at best, only one centrifugal is tested per shift due to lack of personnel and the limited number of Nutsch filters (not required for SMRI-NIRS TPD predictions).

Keywords: NIRS, laboratory, Undetermined Losses (UDL), TPD, inversion, sucrose