

POSTER SUMMARY

**THE SMRI FACTORY NIRS TECHNOLOGY:
DEVELOPMENT, VALIDATION AND APPLICATION**

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The Sugar Milling Research Institute NPC (SMRI) Near Infrared Spectroscopy (NIRS) technology has been developed to provide mill operation staff with process information that can be used to better understand and control the factory, ultimately providing a quality product whilst minimising losses and maximising recoveries. The technology has been developed using NIRS transmission methods and includes all factory process streams (front end, boiling house including magmas, remelts, B- and C-sugars through to final molasses). Currently, the sugar technologist relies on brix and pol for factory control. Additional analyte results such as sucrose, etc, are typically available from centralised facilities such as the SMRI and results are delayed due to associated sample logistics, often rendering the results and conclusions of historical value only. The rapid availability of sucrose, glucose, fructose, ash, colour for all streams and dry solids for molasses using the NIRS within the factory environment offers the sugar technologist the opportunity to understand factory processes better and develop controls that were previously unavailable.

This poster describes the development, validation and application of the methodology as follows:

- the development of a simple dilution method that does not require dilute sample filtration or the addition of lead or aluminium clarification agents,
- the equation development process using metrics such as RMSEP (Root Mean Squared Error of Prediction), bias, slope and correlation coefficients,
- the validation of the prediction equations by comparing the equivalence of the NIRS predictions to results obtained from conventional methods of analysis including analysis reproducibility,
- examples of the use of the technology in a mill environment,
- consideration of possible novel applications, and
- future equation and application developments.

Keywords: NIRS, calibrations, predictions, factory streams