

## **AN INNOVATIVE APPROACH TO SELF-OPTIMIZING BATCH VACUUM PAN CONTROL**

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Various approaches to vacuum pan control have been utilized in the sugar industry for many years with varying degrees of success and ability to produce a consistent massecuite quality. The development of improved and more reliable devices for the measurement of mother syrup ds concentration (refractometric measurement) and overall massecuite ds concentration (microwave density measurement) during the sugar boiling process have enabled a more or less complete control of the boiling process to manage both syrup concentration (supersaturation) and crystal content (massecuite concentration relative to syrup concentration) during the boiling cycle. This paper discusses the theory, development and application of refractometric and microwave measurement for the automatic and self-optimizing computerized control of the batch crystallization process developed and installed at the Mini-Cassia Factory of the Amalgamated Sugar Company, LLC. Operator interaction and selection of various input set points allow adjustment for pan seeding optimization and final grain size while the control system offers feed-back for seeding set point adjustment relative to standard liquor purity (sucrose solubility) and processing conditions to maintain consistent massecuite quality and uniform crystal size distribution. Multiple operating modes allow for continued pan operation in the event of necessary refractometer or microwave measurement maintenance and calibration.