KOBRINSKY, HUDI S.*, NICK MORITZ, DAVID R GROOM, and BILL MCKEWAN, American Crystal Sugar Company, 1700 North 11th Street, Moorhead, MN 56560.

Assessment of sucrose solubility in American Crystal Sugar Company's Technical Sucrose Solutions.

Currently, American Crystal Sugar Company (ACSC) evaluates seeding refractive dissolved solids (RDS) by calculating supersaturation (SSAT) at a given RDS, temperature, and purity. This was traditionally completed utilizing Grut's coefficients of impure solution solubilities to calculate *ysat* for a given non-sugar to water ratio (ns/w). During the past several campaigns, ACSC realized the need for higher seeding RDS on batch crystallization pans. The necessity to maintain higher seeding RDS was made evident by realization of increased instances of dissolved mill seed at a target SSAT. To better understand the need for higher seeding RDS at ACSC, an evaluation of sucrose solubility on ACSC's technical solutions was undertaken. ACSC collected monthly samples of saturated spin-off syrups for high green, intergreen, and molasses during the fiscal years 2024 and 2025 beet slicing and extract campaigns. The samples were prepped to obtain different ns/w ratios. The samples were crystallized with excess sucrose at 80ºC for 24 hours for each run. Mother liquor was separated from the crystals for each sample pneumatically and evaluated for RDS and purity. This data was used for calculation of qsat,i. The ns/w ratios were charted against the saturation coefficient to obtain a new 4th order polynomial equation. To date, it appears this will be a more accurate representation of ACSC's technical solutions at a given ns/w for estimating the saturation coefficients. The saturation coefficient of a specific ns/w ratio at a given RDS, purity, and temperature is then used for calculating sucrose supersaturation. ACSC was interested in how much ACSC's technical solutions sucrose solubility changed over the course of a campaign as non-sugar load shifted through extended storage days.