Scientific paper: Near-Infrared Determination of Total Soluble Nitrogen and Betaine in Sugar Beet

Reliable and fast measurement of content of TSN and betaine in sugar beets with NIR.

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The total soluble nitrogen (TSN) content in sugar beets strongly hinders sugar extraction. Traditionally, the amount of TSN is not measured directly, but inferred from the amount of amino nitrogen (*30% of the TSN) in the beet. Betaine, the other main TSN component, accounts approximately for another 30%. Betaine also interferes with sugar crystallization, and it is a highly interesting metabolite in pharmaceutics and agronomics. The aim of this study was to develop non-invasive near-infrared (NIR) applications to measure the TSN and betaine content in beets in a fast and reliable way. Sugar beets were harvested for up to five harvest periods, and pulp samples were measured with a NIR system. Calibration models reached correlations (R) between laboratory and predicted values of 0.823 for TSN and 0.947 for betaine, respectively. The prediction of independent validation sets showed also high correlation coefficients for both TSN (R = 0.756) and betaine (R = 0.837). These NIR applications could be very helpful in the assessment of beet quality in breeding programs and industrial processes.

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