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EFFECT OF AGRONOMIC FACTORS ON INVERT SUGAR ACCUMULATION IN SUGAR BEET

ABSTRACT

The activity of endogeneous and exogeneous sucrolytic enzymes in sugar beet results in the cleavage of sucrose into invert sugar. Besides sugar loss due to invert sugar formation, accumulation of invert sugar in sugar beet decreases the beet processing quality. It results in increased consumption of energy and processing aids and reduction of the sugar yield. Therefore, the invert sugar content has to be minimized to maintain an acceptable technological beet quality.

Since 2013, the glucose content of all beet samples from beet reception and field trials is routinely analyzed in The Netherlands using a biosensor which is integrated into the automatic beet laboratory system. The invert sugar content is subsequently calculated from the glucose content using a conversion factor which has been determined previously. This additional information helps to identify beet deliveries with a questionable beet quality at an early stage and provides valuable information on various agronomic factors that increase invert sugar accumulation in the beet.

Based on results obtained during the past years, different factors will be highlighted that affect the invert sugar content in the beet. Among these factors, presence of root rot due to infestation by pests and diseases and beet deterioration following frost damage have shown to increase the invert sugar content dramatically. In addition, unfavorable storage conditions and bad harvesting quality had a substantial impact on invert sugar accumulation. Growth conditions and beet variety also influenced the invert sugar content markedly, although to a much lesser extent.

Using the obtained data, the most important control measures that enable growers to prevent undesired invert sugar formation in their beets will be discussed.
