

Genotype-dependent development of marc, betaine and sucrose in sugar beet

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Introduction

Besides other factors the genotype is an important determinant of sugar beet technical quality. This applies to non-conventional quality parameters like betaine and marc as well. Resulting from physiological relationships connected with yield formation these constituents may be associated with sucrose storage in the beet. Therefore genetic variation for sucrose content appears likewise in the accumulation of betaine and in the marc content. It can arise from differences in synthesis and partitioning processes of the various substances.

Material and methods

- Field trials with 5 genotypes at 5 locations, arranged in block design with 4 replications
- Hand harvest of 10.8 m² plots in four-week intervals from July to October with determination of sucrose, betaine and marc contents

Results

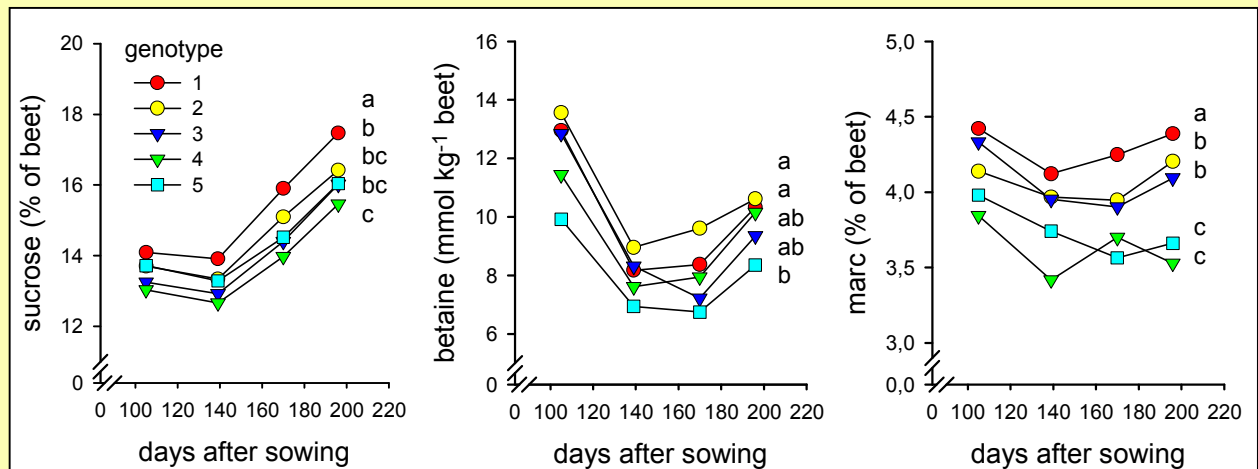


Fig. 1: Development of sucrose (left), betaine (middle) and marc (right) concentration of five sugar beet genotypes (mean of five locations) in 2002. Different letters indicate significant ($p < 0.05$) differences between genotypes at final harvest.

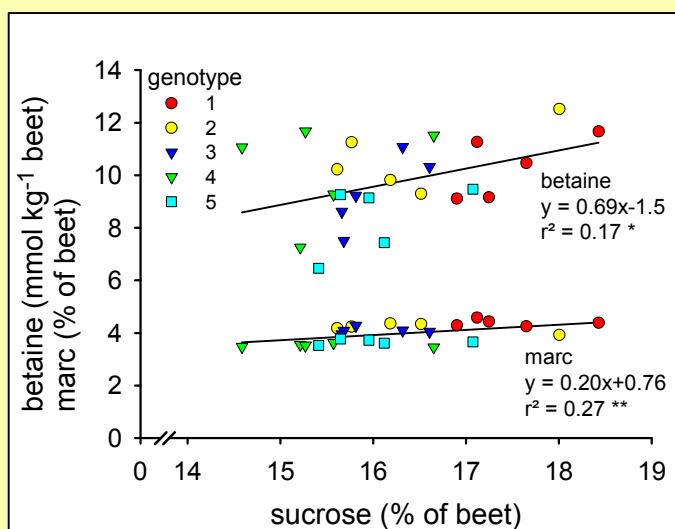


Fig. 2: Relationship between sucrose, betaine and marc concentrations of five sugar beet genotypes at 196 days after sowing (5 locations in 2002).

Conclusions

Sugar beet genotypes differ with respect to the contents of sucrose, betaine and marc in the storage root. These differences are established already in early growing stages and persist until the end of the vegetation period. The level of sucrose, betaine and marc is subject to changing environmental conditions with different genotypes responding uniformly. Both betaine and marc concentration were positively correlated with sucrose concentration in different genotypes and at different trial sites.

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