

# Suitability of winter beets for biogas production

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## Introduction

High dry matter yields in combination with good technical quality for the fermentation process increase the importance of sugar beet as biogas substrate. Hoffmann and Kluge-Severin (2010) calculated that non-bolting winter beets, sown in late summer, can produce 26 % higher dry matter yield than spring sown sugar beets. A high concentration of easily degradable substances in the root (sugar, other carbohydrates) predestine sugar beets as biogas substrate. The aim of the study is to analyze the yield potential and quality of winter sugar beets for biogas production.

## Material and Methods

- Field trial Göttingen 2010/11
- sowing date: early August 2010
- 3 sugar beet hybrids
- 5 harvest dates (Oct., Mar., Apr., May, Jun.)
- Determination of dry matter of leaves and taproots and sugar concentration in taproot, Weender feed stuff analysis

## Results

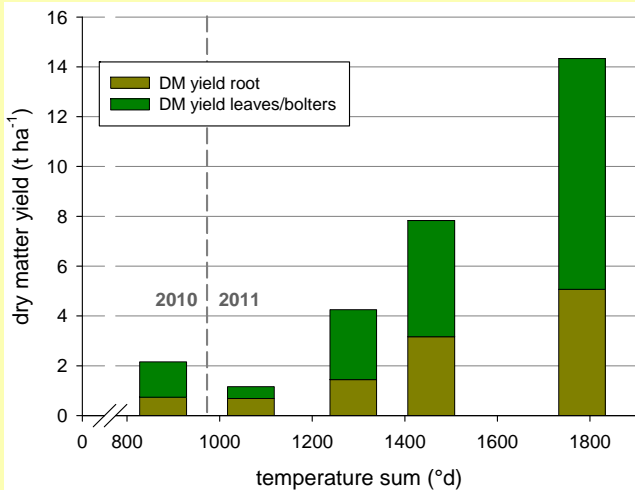


Fig. 1: Dry matter yield of roots and leaves/bolters as affected by temperature sum, mean of 3 sugar beet hybrids, Göttingen 2010/11

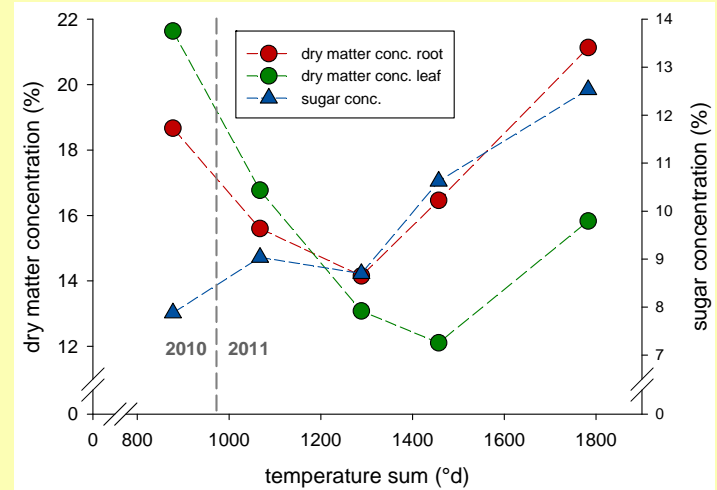


Fig. 2: Dry matter concentration of roots and leaves/bolters and sugar concentration of root as affected by temperature sum, mean of 3 sugar beet hybrids, Göttingen 2010/11

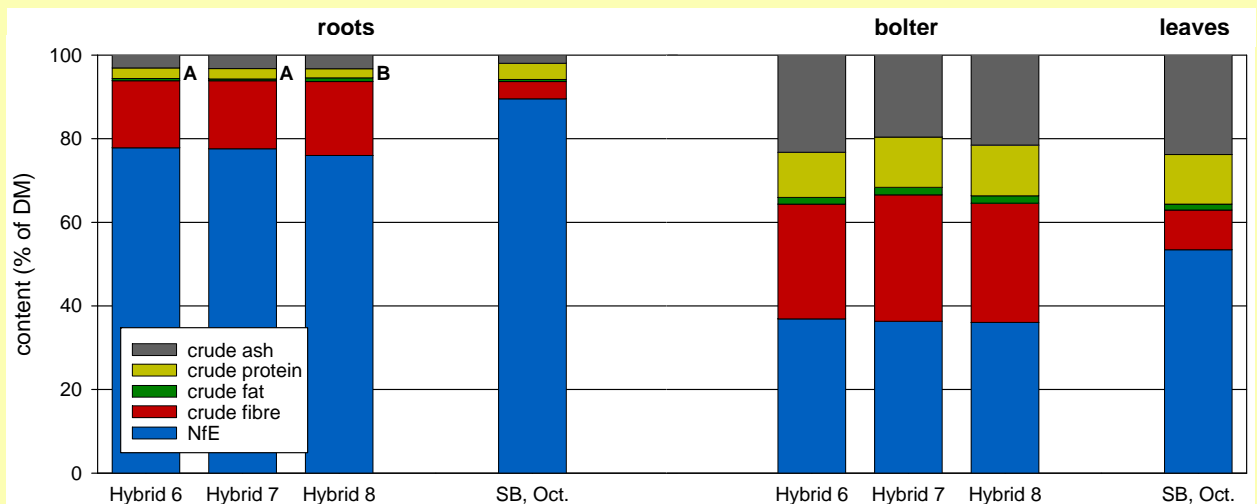


Fig. 3: Concentration of crude nutrients of roots and bolters of 3 winter sugar beet hybrids and sugar beet, Weender feed stuff analysis, harvest date of winter sugar beet June 2011, different letters indicate significant differences between the hybrids at  $p < 0.05$

## Conclusions

- Winter beets achieve high dry matter yields: 5 t ha<sup>-1</sup> root + 10.5 t ha<sup>-1</sup> leaves in June = total dry matter yield up to 15 t ha<sup>-1</sup>
- Low dry matter concentration at final harvest date in root (21%) and leaves (16%) → increasing costs of transport compared to other substrates
- High concentration of easily degradable substances (NfE = sugars and other carbon hydrates) lead to fast and almost complete decomposition in biogas plants