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### **METHANE YIELD OF WINTER BEET**

#### **Rendement en méthane de betteraves automnales / Methanertrag von Winterrüben**

#### **ABSTRACT**

The cultivation of winter beet offers a possibility to further increase the yield potential of sugar beet. Winter beet are sown in August and grown until the summer of the following year. This prolonged growing season can result in assets and drawbacks. The agricultural production system is more challenging because cultivation management in the field has to be adapted to a longer growing season including the autumn and winter month. During winter, the sugar beet plants shift from vegetative to reproductive growth and subsequently they produce bolters. Bolted beets are not suitable for sugar extraction and bolting resistant varieties of sugar beet are not available so far. Producing biogas from winter beet could be an appropriate option for utilizing the shoots and roots.

First results of a current study show that the roots of winter beets (three genotypes), which were grown in plot trials at three locations (Göttingen, Harz, Kiel) from 2009 to 2012 and harvested at June, achieved higher specific methane yields (342 - 405 IN/kgODM) than their shoots (249 - 326 IN/kgODM).

It could be observed, that the specific methane yield decreases during the growing season, due to the variation of the ingredients, especially the content of fiber and easily digestible carbohydrates. In contrast, the dry matter yield increases, in particular the yields of the shoots. Thus methane yields were achieved in the range of 194 to 1842 Nm<sup>3</sup>/ha for roots and 251 to 2516 Nm<sup>3</sup>/ha for shoots. The environmental conditions have the greatest impact on the specific methane production and methane yield, whereas the genotype rather has no influence.

Under optimal conditions (Göttingen, growing season 2010/2011) the winter beets (whole plant) reached maximum methane yield of 4358 Nm<sup>3</sup>/ha, so that they would be competitive with maize. Under less optimal conditions, the yields were significantly lower.

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