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## **EFFECTS OF DIFFERENT SOIL MANAGEMENT SYSTEMS ON NITROGEN AVAILABILITY IN A LONG-TERM TRIAL**

### **ABSTRACT**

The influence of different soil management systems on the growing process, yield and essential quality criteria has been tested in a long-term field experiment, set up in 1996 by the University of Natural Resources and Life Sciences, Vienna. Three systems with reduced tillage (mulch farming) respectively minimum tillage (shallow mulch farming and non tillage) were compared to conventional ploughing. Another system combined conventional and minimum tillage (integrated tillage). The effects on sugar beet were tested in 2010 and 2011 in two parallel crop rotations as well as in 2014 in one of these. Supplementary focus was set on the description of the nitrogen availability in the tested systems. Soil analysis was done by the electro-ultrafiltration method (EUF).

For 2010 and 2011, in case of insufficient water supply during critical growing stages of sugar beet, reduced and minimum tillage show an increase in yield. Principally, the results 2014 confirm these observations. At pre-crop harvest 2010 – compared to plough – reduced tillage causes increased nitrate content in the top soil layer, while concentration for the whole layer 0-30 cm remains comparable. Only non tillage shows a higher content, which may be observed in the layer 30-60 cm as well. Data for spring 2011 record stable amount of nitrogen for the layer 0-60 cm for all systems, except non tillage, where distinct reduction can be observed. Lower nitrate content in this system was already observed in spring 2010. As for nitrate, a higher concentration in the top soil layer of the systems with reduced tillage can be reported for phosphorous and potassium.

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