

Investigation into the vitamine C content using different analytical methods with potatoes, grown with farmyard manure and inorganic fertilization dependinf upon storage time

(original title:

Untersuchungen zum Vitamin C-Gehalt mit verschiedenen Methoden bei Kartoffeln nach Rottemist- und Mineraldüngung in Abhängigkeit von der Lagerung)

Diploma Thesis, Faculty of Agricultural Science and Landcape Architecture,
University of Applied Sciences Osnabrueck

submitted by: Marion Wiegele, on 6 July 2005

1st supervisor: Prof. Dr. C. Wonneberger
Dept. Vegetable Growing, FH Osnabrück

2nd supervisor: Dr. J. Raupp
IBDF – Institute for Biodynamic Research, Darmstadt

Summary

The subject of this diploma thesis was to determine L-Ascorbic Acid in potatoes, variety 'Quarta', grown with different types and levels of fertilization. Different methods have been used to determine L-Ascorbic Acid, the method *Biopharm* and the method *Merck*. The potatoes have been cultivated in the long-term fertilization trial carried out by IBDF (Institute for Biodynamic Research in Darmstadt, Germany). It includes a treatment with composted farmyard manure (CM), a second one with composted farmyard manure plus biodynamic preparations (CMBD) and a third treatment with inorganic fertilizer (IN), each applied at a low, medium and high level (50, 100 and 150 kg ha⁻¹ total nitrogen, respectively). The potatoes were harvested in August and stored afterwards. The analysis of L-Ascorbic Acid took place at two dates, i.e. in November (1st date) and later in March (2nd date). Additionally the dry matter content of the tubers was determined.

The analysis according to the method *Merck* was unsuitable for this purpose. Contents of L-Ascorbic Acid have been found to decline from November to March with all treatments. According to the method *Biopharm* in March a significantly higher content of L-Ascorbic Acid in fresh matter was found in the minerally fertilized tubers (7.9 mg/100g fresh matter) compared to the farmyard manure treatment (6.9 mg/100g fresh matter). The same effect was observed based on dry matter, however, already in November. Furthermore, higher values have been analysed in March in the tubers of IN. These samples showed a content of 39.7 mg/100g dry matter and differed significantly from the treatments CM (34.8 mg/100g) and CMBD (34.3 mg/100g). The total amount of nitrogen was equivalent in each type of fertilization. The organic fertilization was applied in spring, and it can be assumed that the N effect of farmyard manure was much smaller than of mineral fertilization. In March, at the end of the storage period the potatoes of the high fertilization level had a significantly higher content of L-Ascorbic Acid (39.2 mg/100g dry matter) compared to those of the low level (32.5 mg/100g).