

The influence of organic and conventional production on yield and quality of carrots

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Implications

Although numerous experiments have been carried out to compare nutrient and contaminant contents of organically and conventionally produced vegetables, further research is recommended (Rembalkovska 2007, Hoefkens et al. 2009). This study contributes to the investigations of the levels of various nutrients in organic and conventional carrots. The trial data of 3 years were contradictory for yield and quality. The yields of organic trial were not significantly lower compared to conventional trial. Longer trial period is needed to conclude the role of weather conditions, cultivation regime (used herbicides, insecticides and fungicides) and their interaction.

Background and objectives

Vegetables and fruits are important sources of vitamins, minerals, trace elements etc. Yield and quality of raw products is determined by the availability of plant nutrients. The aim of the present research was to evaluate how the production methods affect marketable yield and content of vitamin C, total sugars and dry matter of carrots. The trials were carried out in 2010, 2011 and 2012 at Jõgeva Plant Breeding Institute.

Key results and discussion

By the results the marketable yield of carrot did not differ between organic and conventional variants in 2010 and 2012 probably due to the lack of damages caused by insects and diseases in these years. The yield data from 2011 are absent as seed sowing and germination period was dry resulting in uneven establishment of carrot plants. Therefore earlier studies (Warman and Havard 1996, Fjelkner-Modig et al. 2000) and also practice have shown that organic yield is usually lower than conventional.

Our results showed that no significant differences of the content of vitamin C in carrots were found between organic and conventional production in 2010 and 2011. Only in 2012 significantly higher vitamin C content were found in the organic treatment. Vitamins content of plants depends usually on a number of factors such as climate, genetic properties, fertilizer and soil (Mozafar 1994). According to Worthington (2001), organic crops (including carrot) contain significantly more vitamin C than conventional crops. However, several scientists (Warman and Havard 1996, Warman and Havard 1997, Fjelkner-Modig et al. 2000) could not verify significant differences in vitamin C content caused by different cultivation methods.

Conventionally and organically grown carrots did not differ in their total sugars content in 2011 and 2012. Only in 2010 significantly higher total sugars content were found in the organic treatment. According to the Polish scientists Rembalkowska and Hallmann (2007), organic carrots contained more total sugars than conventional ones. This contradicts an earlier study carried out at the Jõgeva Plant Breeding Institute that did not indicate any significant differences in content of total sugars between organically and conventionally grown carrots (Bender et al. 2008).

Dry matter content of organic carrots was significantly higher in 2010 and 2012. Our earlier study indicated no significant differences in DM content of carrots (Bender et al. 2008). According to other studies by Leszczyn'ska (1996) and Fjelkner-Modig et al.

(2000), organically grown crops (including carrot) had higher DM content compared with conventional ones.

It can be summarized that carrot yield and quality in organic trial was not significantly lower compared to conventional trial.

How work was carried out?

Data for this work were gathered from a 3-year trial. Materials and methods for the trial of carrots were described for carrots in Bender and Ingver (2012). The conventional treatment in this work was treated with 5 chemicals: two herbicides, two insecticides and one fungicide. Mineral fertilizer was applied to conventional plots and horse manure compost to organic plots at N 80 kg ha⁻¹ (both trials).

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