

Influence of Biodynamic Preparations on the Quality Indices and Antioxidant Compounds Content in the Tubers of Coloured Potatoes (*Solanum tuberosum* L.)

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Abstract

Biodynamic preparations 500 and 501 are plant strengthening agents of biodynamic agriculture method, prepared of manure and powdered quartz. The objective of the present study was to determine effects of biodynamic (BD) preparations 500 and 501 on the quality indices and antioxidant compounds content in the tubers of coloured flesh potatoes. The experiment included two factors: potato cultivar and treatment with BD preparations as field sprays. The experiment was carried out in four replications, in a randomly design. Results showed that application of BD preparations did not influence significantly the contents of dry matter, crude fibre and crude ash in all tested cultivars. Separately used BD preparation 500 increased content of total anthocyanins in tubers of ‘Vitelotte’ and ‘Red Emmalie’ and leucoanthocyanins content in ‘Blue Congo’, but decreased the content of total phenolics in all cultivars. Treatment with BD preparation 501 had significant effect on the contents of total phenolics and total anthocyanins in all cultivars. However, treatment with BD preparation 500 in combination with BD preparation 501 substantially increased the contents of total phenolics and total anthocyanins in all cultivars. Tubers of ‘Vitelotte’ with dark-purple flesh contained significantly more antioxidant compounds than the light-purple and red.

Keywords: coloured potato cultivars, biodynamic agriculture, crude fiber, crude ash, anthocyanins, phenolics

Introduction

Potato is one of the most widely grown vegetables and represents an important source of nutrients in many countries (Leo *et al.*, 2008). It is a balanced food containing high energy, nutritional quality proteins, dietary fibre and minerals (Pełksa *et al.*, 2013; Danilčenko *et al.*, 2014). In current years, more attention is being given to the research of red and purple coloured potato cultivars, due to their antioxidant property, which is related to various polyphenols (Nayak *et al.*, 2011; Jariene *et al.*, 2013). There are number of studies showing that these antioxidants of high free radical scavenging activity may reduce the risk of chronic health diseases and age related neuronal degeneration (Teow *et al.*, 2007; Dai and Mumper, 2010; Khurana *et al.*, 2013).

There are number of reports on the negative effects of using chemicals in agriculture on the quality of vegetables and fruits (Lairon, 2010).

Therefore, in order to preserve the quality of potatoes it is necessary to look for alternative farming methods like biodynamic agriculture. Similar to traditional organic agriculture, biodynamic agriculture eliminates synthetic chemical fertilizers and pesticides. A major difference is that biodynamic farmers use eight specific preparations (Zaller and Kopke, 2004). Biodynamic (hereinafter BD) preparations are plant strengthening agents and they belong to two classes: preparations sprayed directly onto the soil or crops (500 and 501) and preparations added to composting farmyard manure (502-507). The main aim of these preparations is to improve soil and plants quality (Reganold, 1995; Raupp, 1999; Koepf *et al.*, 2001).