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Organic Tomato (*Lycopersicon esculentum*): Nutritional Quality and Late Blight Disease (*Phytophtora infestans*) Susceptibility

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Abstract

The role of organic agriculture, whether in farming, processing, distribution, or consumption, is to sustain and enhance the health of ecosystems and organisms from the smallest in the soil to human beings. Tomato is one of the most popular and consumed vegetable worldwide. During growing, tomato is exposed to late blight disease that spreads very rapidly and kills plants once it is established in a cultivation area, caused by fungus *Phytophthora infestans*. The purpose of this study was to investigate the variation in some nutritional quality parameters and susceptibility to infection by late blight disease in six selected tomato cultivars from Germany: Resi, Rosa Roma, Ferline F1, $SO_3$0a, Ostravske Rane and Harzfeuer F1, which differ in their size, colour and susceptibility to the late blight infection. These cultivars were organically grown in two different locations: Schönhagen (Thuringia) and Ellingerode (Hessen) in which organic manure was applied in October 2004 and January 2005, respectively. The organic tomato plants were planted on 25th Mai 2005 in both locations.

Results indicated variations among the cultivars within and between the locations regarding the nutritional quality and infection level by *Phytophtora infestans*. The fruit infection was higher in Ellingerode than in Schönhagen. The cvs. Ostravske Rane and Harzfeuer F1 expressed higher infection level but cvs. Resi and $SO_3$0a showed lower infection level in both locations. Consequently, the yield was higher in tomatoes grown in Schönhagen (1094 g plant^{-1}) compared to those from Ellingerode (932 g plant^{-1}). Furthermore, the higher lycopene content was determined in tomatoes grown in Schönhagen (41.52 mg/100 g FW) than in Ellingerode (28.37 mg/100 g FW). Tomato fruits from Schönhagen were characterised by higher amounts of Ca and Fe (0.22 g/100 g DM, 6.5 mg/100 g DM), respectively. No differences were found between locations in the case of N, P and K contents in the fruits.

Generally, tomatoes grown in Schönhagen achieved higher yield with fruits characterised by higher contents of lycopene, Ca, Fe and lower *Phytophtora infestans* infection. Better quality of tomato was due to the better soil conditions of cultivation area in Schönhagen. The soil was of good structure, deep and of high water holding capacity.

Keywords: Cultivars, late blight disease, lycopene, nutritional quality, organic tomato

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