NUTRITIONAL VALUE OF LATVIAN TRITICALE, BARLEY AND POTATO ACCESSIONS GROWN IN CONVENTIONAL AND ORGANIC CONDITIONS

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INTRODUCTION
The aim of the study was to evaluate the influence of growing technology on yield quality traits of winter triticale, spring barley and potatoes.

MATERIALS AND METHODS Field trials were arranged with four winter triticale, six spring barley and 12 potato genotypes under conventional and organic growing conditions at State Priekuli Plant Breeding Institute from 2010 to 2012.

For four triticale genotypes - three different fertiliser rates were applied in the conventional field (fertiliser rate 1 = N12, P35, K70 in autumn + N60 in spring; fertiliser rate 2 = N17, P50, K100 in autumn + N150 in spring; fertiliser rate 3 = N17, P50, K100 in autumn + N150 in spring + leaf fertilizer ‘Kristalons’ 5 kg ha\(^{-1}\)). Two seeding rates were applied in the organic field – 450 and 550 germinable seeds per m\(^2\). Quality traits of the yield as 1000 grain weight, protein and starch content, amount of amino acids were detected.

For six barley genotypes - three different fertiliser rates were applied in the conventional field (N1 = N90, P35, K70; N2 = N140, P49, K98 + fungicide ‘Tango Super’ 1.5 l ha\(^{-1}\); N3 = N140, P49, K98 + fungicide ‘Tango Super’ 1.5 l ha\(^{-1}\) + leaf fertilizer ‘Kristalons’ 5 kg ha\(^{-1}\)). Quality traits of the yield as 1000 grain weight, content of protein, starch and β–glucan, as well as amounts of Fe, Zn, tocopherols and amino acid lysine were detected. Plot size 12.5 m\(^2\) in four replications.

For 12 potato genotypes, different for maturity type, were included in trials. Varieties differed in flesh color from white to yellow. Two fertiliser rates were used, C1(N60 P55 K90) and C2 (N120 P55 K90), in conventional field (Table 1). Plot size 5 m\(^2\) in three replications. Potato tuber yield and content of starch, vitamins C, A in tubers were detected. Vitamin C was detected using HPLC while carotene (vitamin A) content was detected using spectrophotometry.

RESULTS
Triticale. The results showed significant influence of triticale genotype and fertilizer rate on grain yield in conventional growing conditions (p<0.05). Influence of seeding rate and genotype was insignificant (p>0.05) in organic growing conditions.

Protein content was significantly influenced by genotype and fertilizer rate in conventional growing conditions (p<0.05). The influence of seeding rate on protein content was insignificant in organic growing conditions (p>0.05).

Genotype and fertilizer rate had a significant influence on starch content in grains in conventional field (p<0.05). The impact of triticale genotype on starch content was significant (p<0.05) but the impact of seeding rate – was insignificant (p>0.05) in organic growing conditions. In both conventional, and organic growing conditions genotype had significant impact on content of amino acids (p<0.05).

Barley. The results showed significant influence of barley genotype and fertilizer rate on grain yield in conventional growing conditions (p<0.05). Influence of seeding rate and genotype was insignificant (p>0.05) in organic growing conditions.

The influence of seeding rate on protein content was insignificant in organic growing conditions (p>0.05).

Genotype and fertilizer rate had a significant influence on starch content in grains in conventional field (p<0.05). The impact of barley genotype on starch content was significant (p<0.05) but the impact of seeding rate – was insignificant (p>0.05) in organic growing conditions.

In both conventional, and organic growing conditions genotype had significant impact on content of Fe and Zn content (p<0.05).

Potato. Results showed significant (p<0.05) influence of genotype and fertilizer rate on tuber yield in conventional growing system. Genotype influenced significantly tuber yield in organic growing conditions (p<0.05).

Significant influence of genotype and fertilizer rate on starch content in tubers was detected in conventional field (p<0.05). The impact of potato genotype on starch content was significant in organic growing conditions (p<0.05).

Both the fertilizer rate, and genotype had significant impact on vitamin C amount in potato tubers (p<0.05). The influence of genotype on vitamin C content was not significant in organic growing conditions (p>0.05).

The fertilizer rate did not influence vitamin A content in tubers significantly in conventional field. In both conventional and organic growing condition potato genotype had significant impact on vitamin A content (p<0.05).

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