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Spring barley grain quality changes in conventional and organic growing conditions

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In Latvia traditionally barley grain is used for food in the preparation barley groats and peeled barley. The main quality parameters which processors take into account when determining the price of grain are volume weight and crude protein content. Processing enterprises have established the minimum volume weight at 640 g l⁻¹. For the grain production for food and animal feed varieties with high protein content are more valuable; starch content is also essential for use in animal feed. Data summarized from 18 conventional and 6 organic farms in the project “Technological solutions in cereals production in Latvia” in 2008 showed that on conventional farms, the volume weight ranged from 578 to 712 g l⁻¹ and on organic farms from – 613 to 667 g l⁻¹; the crude protein content on conventional farms varied between 9.7 – 15.2% and on organic farms between 10.4 - 14.0%, and the starch content from 59.65 to 63.3% on conventional and from 61.5% to 62.1% on organic farms. In organic farming it is important to choose varieties which produce high grain quality at reduced levels of nitrogen supply. The aim of our study was to investigate barley grain quality differences between conventional and organic farming systems and to clarify which conditions are more suitable for the selection of genotypes appropriate for organic farming. Ten diverse barley varieties were included in a three year trial at two organic and two conventional growing sites. The following grain quality parameters were evaluated: thousand grain weight (TWG), volume weight, protein content and starch content. Results of the investigation showed that grain quality significantly depended on both variety and growing conditions. The organic growing site O2 showed a significantly lower TGW and volume weight than the organic growing site O1 and both conventional sites. The highest protein content was obtained in the conventionally managed trial field C2 with high mineral fertilization level (120kgN/ha). At the organic site O2 the protein content was higher compared to O1. This may be explained by the use of manure and soil differences. Assessing the correlations of grain quality parameters and the different environments, it was found that in order to improve the barley's grain quality genotypes should be selected for TGW, volume weight, and protein content under the organic growing conditions.

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