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## Textural properties of spelt noodles

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The texture of cooked noodles is a very important quality characteristic for both processors and consumers. Selected indicators of noodle texture of three spelt cultivars – Altgold, Ostro and Franckenkorn grown in an ecological system during the years 2010–2011 are presented. A TA.XT Plus (texture analyzer) was used to determine cooked spelt wheat noodle firmness, hardness, adhesiveness, elasticity and extensibility, following AACC (66-50) standard method. The spelt wheat noodle texture quality was significantly depended on the variety, year of growing as well as flour type. The wholemeal spelt wheat noodles were characterized with lower cutting firmness than the flour noodles. Flour noodles were more sticky but also less tensile and hard than wholemeal noodles. Spelt wheat is suitable for noodle production, however also here there is a choice differences between varieties. According to achieved results, wholemeal noodles prepared from Franckenkorn can be recommended for noodle industry due to their consistent structure and better texture quality after cooking

**Keywords:** spelt noodles, texture, firmness, hardness, elasticity

### 1 Introduction

The texture of cooked noodles is a very important quality characteristic for both processors and consumers. For the producer, texture is an indication of the correct processing parameters being applied to the raw product. Over time the incoming raw product can change dramatically and a process recipe that is correct one day can produce undesirable results on another day. Over processing will produce a product that is too soft and often breaks into little pieces, while under processing will cause the noodles to be too hard. Both of these can be undesirable traits for consumers. The ability to consistently and objectively measure texture and relate it to sensorial characteristics is a valuable capability in controlling the process (Sissons et al., 2008). Proper evaluation of noodle cooking quality requires consideration of many factors including elasticity, firmness, surface stickiness and cooking tolerance. Taste panels can be used to estimate pasta cooking quality, but they are time-consuming and impractical when sample size is limited or large numbers of samples are to be evaluated (Borneo and Aguirre, 2008). It is generally accepted that texture is the main criterion for assessing overall quality of cooked noodles (Dziki and Laskowski, 2005; Manthey and Dick, 2012).

### 2 Material and Methods

Selected indicators of noodle texture of three spelt cultivars – Altgold, Ostro and Franckenkorn grown in an ecological system during the years 2010–2011 at the locality of Dolna Malanta near Nitra in Slovak Republic are presented. A TA.XT Plus (texture analyzer equipped with a 5-kg load cell) was used to determine cooked spelt wheat noodle firmness – the height of the force peak (N), which is analogous to maximum cutting force (Smewing,

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1997), hardness – the maximum peak force (N) during the first compression cycle, the mean negative area at the curve is defined as the sample adhesiveness ( $\text{N mm}^{-1}$ ), elasticity (N) – the maximum tension force and extensibility (mm) – the distance at which was noodle strip ruptured, following AACC (66-50) standard method. Measurements were done in ten replicates. Obtained data were statistically evaluated by analysis of variance (ANOVA), LSD test was used to determine the significance of differences between the means. The least significant difference at the 5% probability level ( $P < 0.05$ ) was calculated for each parameter.

### 3 Results

The spelt wheat noodle texture quality was significantly depended on the variety, year of growing as well as flour type. The wholemeal spelt wheat noodles were characterized with lower cutting firmness than the flour noodles. Very low adhesiveness was found in Franckenkorn noodles, in both flours. Extreme adhesiveness was observed in flour noodles prepared from Ostro variety.

Hardness of the samples is expressed as the maximum force after the sample compression. Higher hardness was found in wholemeal noodles than in flour noodles. It could be caused by the presence of the bran particles in the wholemeal. The advantage of tensile testing over compression is that the start of fracture can be observed easily because is nearly always at the outside of the sample. When the elastic limit was exceeded the noodle snapped (observed as the maximum tension force) (Manthey and Dick, 2012). The elasticity and extensibility of wholemeal cooked noodles were higher than in flour noodles. Flour noodles were more sticky but also less tensile and hard than wholemeal noodles.

### 4 Conclusions

It is generally accepted that texture is the main criterion for assessing overall quality of cooked noodles. Spelt wheat is suitable for noodle production, however also here there is a choice differentiate between varieties. According to achieved results, wholemeal noodles prepared from Franckenkorn can be recommended for noodle industry due to their consistent structure and better texture quality after cooking however this statement needs further investigation.

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