

Properties of gluten from organic wheat measured by oscillation measurements

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EXTENDED ABSTRACT

Bread making quality of wheat is mainly related to protein and gluten content of the grain and flour. The protein content of wheat grain is mainly determined by the cultivar, but also, to some extent by environmental factors (Daniel and Triboi, 2000; Luo et al., 2000). For conventionally grown wheat, high levels of protein and gluten content may be obtained by addition of chemical nitrogen fertiliser. Organic wheat, which is grown with restricted amounts of nitrogen, tends to have lower protein and gluten contents. However, results from baking tests seem to be fairly good, even with low protein and gluten content. This indicates, that the restricted nutrient availability in organic farming result in gluten proteins, which differ in structure compared to the conventional farming. Therefore, the influence of the growth conditions on the gluten properties needs more investigation.

In the present work, a spring wheat cultivar was grown in a field trial with application of different organic manures and different N-levels. Gluten was extracted from the wheat flour by washing, and the viscoelastic properties of the gluten were characterised by oscillation. Storage modulus (G') and phase angle (δ) of the gluten were affected by N-level and type of manure applied (with fixed N-level). Thus, even small differences in growth conditions are reflected in the oscillation measurements of the gluten. The viscoelastic properties of wheat gluten are mainly determined by the ratio between

glutenins and gliadins (Khatkar et al., 1995). Therefore the differences in viscoelastic behaviour of the gluten are suggested to be a result of changes in the gliadin/glutenin ratio.

REFERENCES

1. Daniel, C. and Triboi, E. 2000. Effects of temperature and nitrogen nutrition on the grain composition of winter wheat: Effects on gliadin composition. *Journal of Cereal Science* **32** 45-56.
2. Khatkar, B.S., Bell, A.E. and Schofield, J.D. 1995. The dynamic rheological properties of glutes and gluten sub-fractions from wheats of good and poor bread making quality. *Journal of Cereal Science* **22** 29-44.
3. Luo, C., Branlard, G., Griffin, W.B. and McNeil, D.L. 2000. The effect of nitrogen and sulphur fertilisation and their interaction with genotype on wheat glutenins and quality parameters. *Journal of Cereal Science* **31** 185-194.