

[Back](#)

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Effects of gluten and transglutaminase on microstructure, sensory characteristics and instrumental texture of oat bread

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Abstract

Effects of added gluten and transglutaminase on microstructure, instrumental texture and sensory characteristics of bread baked with 51% wholemeal oat flour were compared in order to determine how changes in the state of macromolecules – protein and starch – correlate with changes in sensory and instrumental structure. Light microscopy, instrumental texture profile analysis, and descriptive sensory analysis were used to analyse the test breads. Addition of gluten and transglutaminase affected the structure of the protein network and distribution of water between the protein and starch phases. The differences in microstructure were quantified by determining the areas of starch and protein in the micrographs by image analysis. Breads baked with added gluten and water were softer and less gummy than the oat and wheat reference breads in the texture profile analysis. Addition of transglutaminase made the breads harder and gummier than the breads baked without the added enzyme. In the descriptive sensory analysis breads baked with added gluten or added gluten and water were evaluated as more soft and springy than the reference oat bread. Sensory characteristics of bread texture correlated well with the texture and microstructure measured instrumentally.

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