

Relation of the Protein Fractions Composition to the Qualitative Parameters of Wheat for Different Ways of Utilization

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Abstract: Ability of wheat flour to create viscoelastic properties of dough depends on character of wheat proteins. When the flour is mixed with specific amount of water, proteins hydrate, go to interactions with specific carbohydrates and lipids and make gluten. The quality of gluten for specific final utilization depends on combination of many physical and chemical properties of the protein complex and is determined especially by optimal combination of storage proteins – gliadins and glutenins. Each of them affect rheology in a different way – viscosity is affected by gliadins (soluble in alcohol) and elasticity by glutenins (soluble in weak solutions of hydroxides and acids). Fifteen varieties of winter wheat, representing different quality classes (E, A, B, C) and different soil-climatic conditions of the Czech Republic, were used for evaluation of protein fraction composition based on discontinual sequential fractionation according to Osborne (albumins, globulins, gliadins, glutenins) and determination of parameters of technological quality of the wheat grain. Better specification of the wheat varieties for different ways of utilization will be possible based on information about relationships between protein fractions composition in the wheat grain and parameters of technological quality of wheat. It is evident from our results, that for production of quality wheat for baking, warmer conditions (such as in the sugar beet region) are better because they are better for protein synthesis in plants. Wheat varieties grown in colder conditions (cereal growing regions) typically had a higher content of starch, lower farinographic parameters and worse results of baking experiments. Wheat production from better regions should be exploitable for other ways of use (wheat for biscuits, starch, ethanol, fodder purposes). Effect of wheat grain protein fractions composition on technological quality is evident from results, too. Varieties with higher content of glutenins behaved as a technologically better varieties, suitable for baking utilization (production of the rise dough). These varieties reached for higher values of Zeleny sedimentation index, better values of rheological parameters (farinograph, extensograph) and higher yield of bread in baking experiments.