THE EFFECT OF EXTRACTION CAKE OF OAT GERM ON THE STRUCTURAL AND MECHANICAL PROPERTIES OF RYE-WHEAT DOUGH AND THE QUALITY OF BREAD

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The article presents the results of research regarding the effect of 10–20% of extraction cake of oat germ on the structural and mechanical properties of rye-wheat dough and the quality of finished products. The effect of extraction cake of oat germ on the spreadable and viscoelastic characteristics of rye-wheat dough was studied using dough model systems made from the mixture of medium rye flour and wheat flour of first grade. It has been shown that the adding of the additive contributes to reducing the dough ball running within 90 minutes of fermentation. Using the elastoplastometer of Tolstoy by the method of parallel plane shift, it has been proved that adding of 10–20% of extraction cake of oat germ contributes to increasing of modulus of instantaneous elasticity and rye-wheat dough elasticity by 1,4–2,9 and 1,1–1,5 times, the growth of plastic viscosity of dough is 3,8–6,3 times in comparison with the dough without additive (control sample). The fact that the addition of the additive being studied contributes to increasing of dough effective viscosity both immediately after kneading the dough and after 90 minutes of it’s autolysis, has been shown on the rye-wheat dough model systems, which is most likely due to the high moisture absorbing and water-retaining capacities of non-starch polysaccharides contained in the extraction cake of oat germ.

Based on the experimental studies, better gas holding capacity of the dough with the addition of 10–20% of extraction cake of oat germ has been proved, as evidenced by an increase of dough volume during fermentation by 7,3–22,0% compared to the control sample. On the one hand, such changes are associated with the improvement of dough structural and mechanical characteristics, and on the other, with the activation of dough fermentation microflora due to the high content of mono- and disaccharides, amino acids, vitamins and minerals in the extraction cake of oat germ. The positive effect of extraction cake of oat germ on the formation of dough structural and mechanical characteristics is also evidenced by an increase in the compressibility factor of bread crumb by 32,3–61,2%. It has been established that the introduction of extraction cake of oat germ in the interval being studied, increases the specific volume of products by 10,0–25,0%, dimensional stability – by 6,7–15,5%, porosity – by 5,0–11,7%.

Thus, it has been shown that the use of 10–20% of extraction cake of oat germ instead of flour contributes to increasing of the viscosity, resilience, elasticity and plasticity of mixed rye-wheat dough, improving its form-holding and gas holding capacities, which allows to obtain products with high structural-mechanical and physicochemical quality indicators.

Keywords: extraction cake of oat germ, structural-mechanical, viscosity, resilience, elasticity, quality.