

The influence of the additive of spelt flour on the processes of fermentation of wheat dough

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Abstract

The possibility of a partial replacement of wheat flour for spelt flour in the production of wheat bread has been investigated. The range of studied concentrations of spelt flour was 10-30 % of the mass of wheat flour. It was found that the optimal concentration is 10% by weight. The increase in the share of spelt flour in the flour mix did not lead to an improvement in both the indices of the flour mix itself and the characteristics of the fermentation process. The addition of spelt flour at a concentration of 10% by weight led to an increase in the gas-forming ability of the flour mixture by 4%. This increase is explained by the insignificant increase in the enzymatic activity of the flour mixture with spelt flour. It is known that flour, produced from spelt, has a complex of enzymes, characterized by high levels of activity. More significant results were obtained with respect to the water absorbing ability of the mixture. In this case, there was an increase of 13.5%. Similar results can be explained in terms of changing the fractional and chemical composition of the mixture, which is enriched with dietary fibers that are part of the flour produced from the spelt. The analysis of the dough process showed a positive dynamics in the increase in the dough volume compared to the control. And this effect was observed practically from the moment of kneading of the dough and was preserved during the whole process. The maximum in both cases was observed after two hours of fermentation. Further exposure led to the dropping of the dough. The rise of the dough was accompanied by a more intensive accumulation of yeast. An increase in the intensity of acid accumulation was noted, which is probably associated with a more active reproduction of lactic acid bacteria. It can be assumed that the observed phenomenon is due to the higher level of moisture in the dough sample in comparison with the control. High level of moisture stimulates the development of yeast due to the fact that they belong to hydrophytes. A wetter dough contributes to the development of lactic acid bacteria, in the same way as baking yeast. Possible causes of the results are discussed.

References

- [1] L.P. Pashchenko, I.M. Zharkov. Technology of bakery production. *Lan, St. Petersburg.* 672p.
- [2] V.A. Yukov, E.I. Likhachev. *Mixed feed.* **2004.** Vol.7. P.40-41.
- [3] L.F. Zvereva, Z.S. Nemtsova, N.P. Volkova. Technology and Technochemical Control of Bakery Production. *Light and Food Industry. Moscow.* **1983.** 16p.
- [4] T.G. Bogatyreva, E.V. Iunikhina, A.V. Stepanova. Using rotten flour in the technology of bakery products. *Bakery.* **2013.** No.2. P.39-42.
- [5] S.In Torgashova, A.S. Savelyeva, A.Yu. Krynitskaya. Pear flour-a promising supplement for the production of wheat bread. *Bulletin of scientific conferences.* **2017.** No.4-5(20). P.142.
- [6] I.A. Bazhenova. Diss. cad. tech. Science, St. Petersburg Trade and Economic Institute. *St. Petersburg.* **2004.** 152p.

- [7] Krynitsky P.P., Krynitskaya A.Yu., Morozov G.A., Sukhanov P.P. Effect of an electromagnetic field of extremely high frequencies of low intensity on baking yeast. *Butlerov Communications*. **2016**. Vol.45. No.2. P.119-122. ROI: jbc-02/16-45-2-119
- [8] R.D. Polandova, S.D. Shestakova, T.P. Volokhova. An analysis of the methods of activation of baker's yeast and an alternative option. *Storage and processing of agricultural raw materials*. **2000**. No.8. P. 9-21.