

4. Kefir as a promising component of organic bread production

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Introduction. In the context of the global political crisis and military actions in Ukraine over the past two years, adequate nutrition and public health protection, prudent and rational use of natural resources, and environmental conservation and protection have also become an integral part of the national resilience and security system.

Materials and methods. When considering the production of bread products during the war, the following important factors were identified based on the results of summarizing the available information:

- small production areas
- rapid response to current demand;
- production distributed among several locations;
- use of local products in production;
- development of recipes based on organic products;
- increasing energy efficiency and autonomy of production;
- waste-free production.

Results and discussion. Bread production is the most resource-intensive branch of the food industry, which exceeds the production of meat and meat products in terms of energy consumption (and is almost twice as high as the production of milk and dairy products). At the same time, like any other food product, bread should be considered both as an object of application of ingredients and material resources for its production and as a subject of the subsequent nutrition process that transfers energy and nutrients and ensures human life. One of the areas for studying alternative bread product formulations in terms of their energy efficiency is the use of kefir, a lactic acid product containing live cultures of lactic acid bacteria of the genus *Lactobacillus*, as part of the liquid phase of the dough. Existing research on technologies and formulations using kefir confirms a positive impact on consumer qualities, organoleptic characteristics, and physicochemical properties, including the specialized bread products. And studies of functional bread products made with kefir demonstrate the resistance of probiotic substances to adverse production conditions and a positive impact on human health. The possible effect of synergy in bread production of combining kefir with traditional yeast to reduce the maturation time and reduce the use of baking resources requires further study. In terms of the above-mentioned special factors in wartime conditions, the use of kefir in small and even family bread production fully meets the requirements and can be recommended for use and implementation, in particular in organic production.

Conclusions. Kefir, as one of the products known to mankind for a long time, containing live lactic acid bacteria, is used in many traditional bread recipes. In today's crisis conditions, its use may be advisable both in terms of improving energy efficiency and the quality of small bakeries, and in terms of improving the consumer quality of the final product and its positive impact on the health and performance of various consumer groups. The positive impact of kefir on the consumer qualities of bread has been repeatedly confirmed by researchers, but its share and status in the integrated system of energy efficiency measures still requires to be researched and clarified.