

TECHNOLOGY OF CORN BREAD

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The possibility of making bread from a cracked grains with triticale rich kefir starter without baking yeast cake. Experiments were carried out using varieties of triticale breeding Moscow Nemchinovsky 56, the most satisfying requirements for grain in bread making. To improve the quality of the finished product was carried out soaking the grain in the extract of coriander with cellulolytic enzyme preparation of celloviridine G20h under conditions optimal for the action of the enzyme complex of the drug. In the process of making bread using kefir starter thick, prepared with flour from whole grain triticale. The finished products were evaluated by organoleptic, physico-chemical, structural and mechanical characteristics of quality.

Keywords: grain, grain triticale, enzymes, kefir starter

Proper nutrition is one of the major factors affecting human health. It is estimated that if people rationally fed, the average life expectancy would increase by 50-70 years. Deaths from chronic diseases that is largely due to the nutritional factor in Russia is significantly higher than in most European countries and the power of the majority of the adult population does not conform to the principles of healthy eating.

In this regard, one of the objectives of State policy in the field of nutrition for the period to 2020 (the Order of the Government of the Russian Federation of October 25, 2010 № 1873-p) is to develop a package of measures aimed at reducing the incidence of diseases related to nutrition. So one of the expected outcomes of state policy in healthy nutrition is to increase the production of consumer products, fortified with vitamins and minerals, including the massive variety of bakery products, up to 40-50% of total production

Analysis of the structure of the diet of Russian population has revealed that the bread and bakery products occupy the leading place in the human diet because of the large advantages compared to all other foods. Bread has a constant, not decreasing with daily use of digestibility. Good taste and smell of fresh bread stimulates the appetite and stimulates the activity of the digestive organs. Thus, bread plays an important role in the overall physiology of nutrition.

The fact that the modern baking industry is highly developed food production, no one is beyond doubt. Indeed, currently offered to the consumer a wide range of bread, corresponding tastes of many people. Nevertheless, the world's leading manufacturers today do not just take care of the uniqueness of flavor of bread, and in the first place – the preservation of its natural components, which were originally laid in the grain.

From the standpoint of common sense, get wasted, first remove and then add. The question is: do not logical to expand the production

of corn bread, obtained from a cracked corn? In addition, the grain is always cheaper than flour, since it does not include the cost of the process of grinding mills, which raises the cost of the final product. Big importance has and that grain to keep much easier, than flour.

Therefore natural that in the world becoming more common work on the creation of grain baked goods, other than a high content of dietary fiber, are a source of B vitamins, niacin, minerals, full of proteins and lipids. It is known that eating whole-grain bread helps cleanse of toxins, carcinogens and toxic substances, the normalization of metabolism, reduce cholesterol, improve bowel motility, reducing the risk of cardiovascular diseases [1].

However, statistical data release of the product groups at the present time does not exceed 15,6%. In this regard, the development of technologies of corn bread is relevant and has important theoretical and practical importance.

However, the shell and aleurone grains have high strength, which makes use of cracked corn in food technology. The strength of shells of grain β -glucan is determined, xylans and other hemicelluloses, which form cross-links in the structure of the matrix of the cell wall. To soften the grain instead of peeling the covers appropriate use of biocatalysts (enzymes) on the basis of cellulases on stage soaking grains [4].

Promising crop for expanding raw material base of the baking industry in technology grain bread is triticale. Triticale – a hybrid that combines the usefulness of the proteins from rye bread-baking properties of wheat. This cereal has a high frost resistance, resistance to fungal and viral diseases, low soil fertility for demanding, high content of valuable protein and mineral content [2].

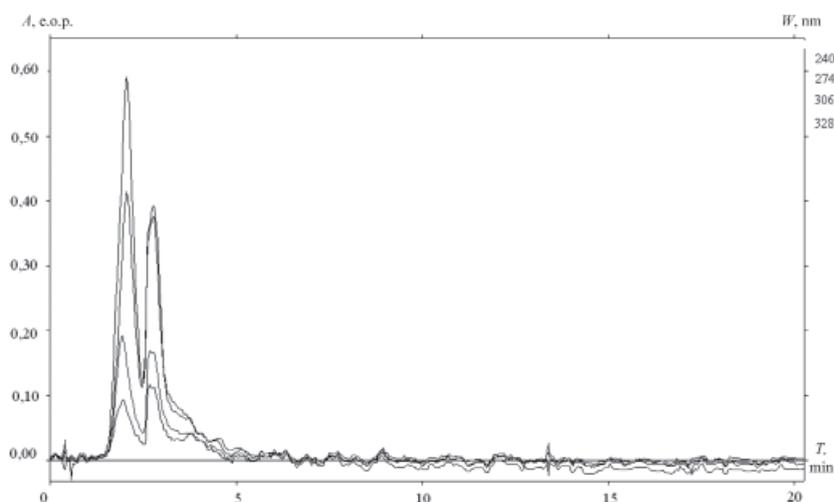
Currently, there is used in bread making in the production of rye and rye-wheat bread technology using kefir starter, which improves the organoleptic, physico-chemical, structural and mechanical properties of the quality of the finished product, as well as to exclude the use of compressed baker's yeast [6].

The aim of this study was to investigate the possibility of making bread from a cracked grains with triticale rich kefir starter. We used a variety of triticale breeding Moscow Nemchinovsky 56, which satisfies most requirements for grain in bread [5].

Preparation of grain bread involves soaking the grain triticale prior to its swelling. To soften the shells used cellulolytic enzyme preparation of celloviridine G20h, the dosage of which the optimal parameters of triticale grain soaking in his presence have been identified experimentally. Dry grain triticale significantly Dissemination microorganisms, so in order to

reduce the number of microflora of grain after soaking, wetting of lead in the presence of a preservative of natural origin – extract of coriander. The extract was prepared according to recommendations of the pharmacopoeia.

The aqueous extract of coriander is used in bread to improve the taste and aroma products, and also contains phenolic compounds, which have antiseptic and antioxidant properties [3]. It is established that the aqueous extract of coriander, used for steeping grains of triticale, contains substances that have antibacterial properties, as evidenced in Figure driven chromatogram.



Chromatogram of an aqueous extract of coriander

Chromatogram of extract of coriander contains peaks corresponding to the retention time of 2 to 5 minutes, which is characterized by the presence of organic acids. Small peaks in the chromatogram, corresponding to the retention time of 8 to 15 minutes, typical for the presence of anthocyanins in the extract [7]. These substances have antibacterial properties.

The area of peaks corresponding to the output of organic acids, is high enough, indicating that their contribution to the reduction of microbiological contamination of grain.

Analysis of experimental data (Table 1) showed the feasibility of using extract of coriander as an antiseptic on the stage of soaking the grain triticale, as the number of colonies mesophyllic aerobic and facultative anaerobic microorganisms (KMAFAnM) decreased by 55,26%, spore-forming bacteria – 91,11%, the number of fungi and yeasts decreased by 71,05%, respectively.

Table 1

Effect of extract of coriander on the microbiological quality of the grain

Mikrobiologicheskie faktors	Number colony, sht.	
	Grain soaked in water	Grain, soaked in extract fruit coriander
KMAFAnM	380	170
Sporobrazuyuschie bacterias	45	4
Plesnevye mushrooms and yeast	8/30	1/10

The dosage of the enzyme preparation celloviridine G20h was 0,11% by weight of dry matter of grain. The process of soaking

the grain triticale performed under conditions optimal for the action of the enzyme complex preparation: temperature – 50 °C (in a thermostat), pH 5,0 (using citrate buffer), the duration of soaking – 10 hours. After soaking the grain was ground on disperser Homogenizer 1094.

Triticale grain is characterized by increased amylolytic activity, which increases during soaking of grain. Under the action of α -amylase splits the starch with the formation of low molecular weight dextrans basically, that results in bread with sticky crumb jams. In addition, increased activity of proteolytic enzymes, whose action is in the process of preparation of the test leads to its thinning and relaxation. In this case, the most effective means of improving the quality of bread from whole-grain triticale – increasing the acidity of the test. This can be achieved using starter cultures, the addition of which reduces the activity of proteases in the test, but also reduces the temperature of inactivation of α -amylase in baking corn bread.

In this paper we propose to use in the production of corn bread from whole-grain triticale thick kefir starter. The microflora of kefir fungi starter is strong symbiosis, consisting of homo- and heterofermentative lactic acid bacteria, yeast, and fermenting lactose nesbrazhivayuschih, atsetobaktery etc. Literature data indicate the lability of the microflora of kefir starter from the influence of external factors. This unique ability, as well as the composition of the microflora of kefir starter predetermined our choice on the application of symbiotic yeast for the production of corn bread from triticale.

For the preparation of thick kefir starter used dairy kefir fungi. In razvodochnom cycle activation of yeast produced using grain concentrate from whole-grain triticale. Mass accumulation was carried out in two phases at a temperature of 32 °C by the resumption of the activated yeast nutrient mixture consisting of water and whole-grain triticale. The final acidity of the starter in razvodochnom cycle was 16 degrees. Resumption of yeast in the production cycle was carried out using the same formula, as in razvodochnom.

The resulting yeast was used for preparation of the test. It is known that the amount of yeast, made when dough has a significant impact on the performance of the process and the quality of bread. Therefore, the dosage was determined experimentally introduced starter. In the analysis of the finished corn bread was found that the best quality of different breads, made with the introduction of 50% of triticale grain with yeast. For the control sample was taken bread, made without yeast.

The fermentation test was carried out in a thermostat at 30 °C. After fermentation, the finished dough was divided into pieces weighing

350 g, which gave the elongated-oval shape with a smooth surface. Proofing the dough pieces were performed at a temperature of 38-40 °C and relative humidity of 75-80%. End-proofing was determined organoleptically as a test piece. Bake bread at 200 °C for 40-50 min.

The quality of bread were studied after 12-14 h after baking. The results of studies of the effect introduced by the starter on the quality of corn bread from whole-grain triticale on the physico-chemical quality of the finished product are shown in Table 2.

Table 2

Quality of corn bread

Characteristic	The test samples	
	Control	Sample experienced
Moisture, %	46,42	44,39
Acidity, hail	6,0	8,2
Specific volume, sm ³ /g	1,42	1,53
Porosity, %	45,13	51,49

Analysis of experimental data showed that the use of kefir starter shortened the duration of the fermentation test, increase, compared with controls, the specific volume (to 7,75%) and porosity (at 14,09%) of bread. The specific strain of crumb compression using kefir starter is reduced to a lesser degree, compared with controls. Thus, studies have shown the possibility of using thick kefir starter for the production of corn bread from triticale with high physical and chemical indicators of quality and longer shelf life without the use of compressed baker's yeast.

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