DEVELOPMENT OF TECHNOLOGY OF BIOBREAD FROM SPROUTED WHEAT GRAIN ENRICHED WITH VEGETABLE INGRIDIENTS

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Introduction. Bread and bakery products play an important role in the human diet, especially in our country, where its production is linked to a long and ancient tradition. Bread and other flour products are the main suppliers of carbohydrates, the main energy component of food.

The traditional technology of baking bread is to use flour. And flour after grinding and sifting loses a large percentage of trace elements and vitamins that regulate the activity of enzymes and functions of vital activity in the human body. But biological value can be increased, for example, by replacing flour with sprouted wheat grains. Minerals, like vitamins, are concentrated in the shell of the grain and are largely removed by conventional grinding. To save them it is rational to use grains in the form of cereals, flakes, or in the form of pre-soaked grains.

Of particular interest are products of pre-germinated grain. In the technological process of making bread from sprouted grain, flour is not used, and instead of water to obtain the test of the desired consistency, you can use the liquid fraction obtained in the process of grinding the swollen grain. The enrichment of the dough with a liquid fraction (instead of ordinary water) also provides a "technological function": the gluten protein, which has passed into the liquid fraction of the aqueous suspension of the grain mass, provides additional cohesion of the structure in the process of kneading the dough.

Aim. Development of bio-bread recipe and technology based on sprouted grain and enriched with plant components to give the product therapeutic and preventive properties. To obtain these products, it is necessary to establish the optimal modes of germination of grain, to study the ways of accelerating this process and to develop and refine the technology of bread from whole sprouted wheat grain under laboratory conditions.

Materials and methods. Cereal crops – wheat and triticale, yeast bakery, vegetable enrichment components – sprouted broccoli seeds, sea buckthorn bark powder and enzyme preparation were selected for the development of biobreads with potential therapeutic and prophylactic properties, which were selected in the preliminary production and production of wheat (the choice of these ingredients was based on research by Koryakina et al). The studies were performed according to classical microbiological, physicochemical and technological methods, in particular determination of the activity of proteolytic enzymes, protein content in the grain, amount of crude gluten, determined the modes of germination of grains, namely:

Results and discussion. As a result of germination, the action of the grain enzymes is greatly enhanced, and the process of cleavage of complex substances deposited in the endosperm with the formation of simple ones begins. Starch is converted into sugars, protein into amino acids, fat into glycerin and fatty acids.

Similarly, in the process of germination, antioxidant activity increases several times, which has a beneficial effect on the human body. Whole germinated wheat bread serves as a source of biologically active substances (amino acids, vitamins, minerals) and dietary fiber (cellulose, hemicellulose, lignin), which is a necessary component of a rational diet. Therefore, the development of technology for such bread is relevant. According to the researches, it can be concluded that increasing the thickness of the grain during germination leads to a decrease in germinated grains. The data obtained indicate that the optimum temperature for obtaining a sprout 1-2 mm long is 20 ° C.

Also, an important part of the experiment was the determination of the effect of additives on the number of sprouted grains, the dosage of sea buckthorn powder and sprouted broccoli seeds on the intensity of grain germination and not less important indicators of the content of microorganisms in wheat and triticale.

The analysis of the obtained data shows that wheat grain contains the amount of mesophilic aerobic and optional anaerobic microorganisms of 200 cells in 1 gram of grain, yeast and mold – less than 10 colonies, bacteria-forming cells – 5 in 1 gram of grain. Grit triticale has the amount of mesophilic aerobic and optional anaerobic microorganisms – 200 cells in 1 gram of grain, yeast and mold - 5 colonies, spore-forming bacteria-5 cells in 1 gram of grain. These results are valid for the production of bread products.

The final stage of the experiment was the development and practice of bread technology from whole grain and wheat triticale. The technology of preparation of grain bread includes several stages: preparation of grain for production (washing, germination); grinding of sprouted grain; kneading the dough; fermentation of the dough; processing of test pieces; proofing of test pieces; baking bread. Bread

made on the basis of sprouted grains and with the addition of plant components is technologically profitable for production on an industrial scale, even though the additional stage is taken – sprouting of grains.

Conclusions. To date, quite a lot of research is devoted to the development of recipes for baked goods from sprouted grain, but domestic companies are in no hurry to implement it because of the need for costs. Our proposed bio-bread recipe based on sprouted grains and enriched with plant components is beneficial for enterprises, and its introduction will allow to expand the range of bakery products and produce a useful product.

INFLUENCE OF THE adpA PLEIOTROPIC REGULATOR ON THE ANTIBIOTIC ACTIVITY OF ACTINOMYCETES FROM PHYLLOSTACHYS VIRIDIGLAUCESCENS (CARR.) A. ET C. RIVIERE RISOSPHERE

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Introduction. Actinomycetes are a major source of biologically active compounds, including commercially available antibiotics. They produce about two-thirds of all known antibiotics, most of which are produced by Streptomyces. In addition, actinomycetes synthesize a wide range of other biologically active compounds, such as antibacterial, antitumor, or antifungal agents.

Using traditional methods of searching for producers of new antibiotics, many of the natural isolates are not active, so they are not used in further studies. However, such strains can produce new compounds at very low level, making it impossible to detect them during general screening. Previous studies have shown that pleiotropic regulators allow activation of cryptic clusters of secondary metabolism genes that are not expressed under regular conditions.

Aim. The aim of the work was to study the influence of the adpA pleiotropic regulator on the antibiotic activity of actinomycetes from Phyllostachys viridiglaucescens (Carr.) A. et C. Riviere. rhizosphere.

Materials and methods. Recombinant plasmid pTESadpA$_{gn}$ with the adpA$_{gn}$ gene, which is controlled by the strong constitutive ermEp promoter, was transferred to actinomycetes strains by Escherichia coli WM6026 cross-linking conjugations. The plasmid contains a marker gene for resistance to apramycin, which is a selective marker because most natural strains of actinomycetes are sensitive to this antibiotic.

Results and discussion. We used 110 transconjugants containing the integrative plasmid pTES with the transcription regulation gene adpA$_{gn}$. Transconjugants appeared at a frequency of 10^{-5} to 10^{-3}.

For the study we have selected a set of strains that were not active against test cultures (Staphylococcus aureus ATCC 25923, Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 9027, Klebsiella pneumonia ATCC 13883, Proteus vulgaris ATCC 29905, Candida albicans ATCC 885-653) in their wild type form.

It was found that after the heterologous expression of the pleiotropic regulatory gene adpA$_{gn}$ 13.7% of actinomycetes exhibited antibacterial activity against S. aureus. Among them, 3.1% of the transconjugants had an activity index (AI) of 3-6. 10% of transconjugants inhibited the growth of E. coli, of which 4.5% of actinomycete strains had an activity index of more than 6.