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Antioxidant Activity of Breads.

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ABSTRACT

The antioxidant activity of the main raw material technology of grain mill products reviewed. Shows a comparison the antioxidant activity of grain mill products in traditional and new technologies.

Keywords: grain mill products, germination, antioxidants.

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INTRODUCTION

Grain mill products occupy an important place in human nutrition. Currently, to ensure the population with bread with high biological value requires a search and application of new raw materials, as well as improvements in their structure-based range of products of a functional purpose. It is necessary to create bakery products with an increased content of the most important vitamin - vitamin C, B vitamins and essential mineral compounds such as silica, as well as preventative and therapeutic purposes products with high antioxidant activity.

To avoid mass diseases caused by unbalanced diet, especially by bakery made from refined thin milling wheat flour with the pressed yeast, there is a promising direction of development of special types of bread products from germinated wheat and wholegrain flour with the addition agricultural crops with a given contents of nutrients and biologically active substances: vitamin C, E, folic acid, dietary fiber, fat, carbohydrates, B group vitamins, enzymes, micro- and macroelements.

Traditionally, the quality criteria of pan bread made from first grade wheat flour are such factors as the correct form, the specific volume, appearance (color and state of the upper crust, the color of the side crusts), the state of the crumb (elasticity, uniformity and size of pores) et al., taste, aroma, titratable acidity, crumbling et al., that is neither the manufacturer nor the buyer (consumer) never thought about the question - who need white bread crumb and why it should be lush?

Once doctors prescribed in certain diseases of the gastrointestinal tract to use the white bread and bakeries were baked this bread for special requests, and mass sorts of bread were prepared from wholegrain flour of coarsely ground using hoppier liquid yeast called liquid hoppier leaven containing in its composition mainly thermophilic *delbrueckii* lactic acid bacteria and yeast cells. The process of preparation of the dough included three phases - liquid yeast leaven → thick predough (lasting 6-7 hours of fermentation in bowls with volume of 600 liters) → dough (the duration of the fermentation 1-2 hours). Bread was obtained fragrant, delicious, safe. However, progress made amendment. In the late 80s, the former Soviet Union government has calculated that the level of prosperity of the population of the largest country reached such a level that has decided to feed the people with white, refined fine flour bread. Meaning is that the grain of wheat removed his heart - the germ, and along with it the vitamin E which is a powerful antioxidant, that directly affects the reproductive system of the organism, also the stripped shell of grain is a source of fiber and B vitamins, leaving a snow-white flour rich in starch and gluten [1 - 5]. Due to this increases the number of patients with diabetes, especially children, there are other new disease called "diseases of civilization" such as celiac disease, allergies, etc. Bread has become ill too. In 1968, bakeries of Almaty faced with a mass potato disease of bread, which is caused by the use of refined flour.

Instead of liquid hoppier leaven began to use compressed yeast, expelled phase of predough and the period of fermentation of dough of the technology in general has disappeared, ie, technology was named "without fermenting dough before cutting". Started a real tragedy in the technology of bread. Then was still alive Director of the Institute of Microbiology and Virology of Almaty (Kazakhstan) David Lazarevich Shamis, who helped us to the study on targeted antagonism of the microbial world based on cereal.

The essence of this technology consists in biotechnological processes occurring in the test, which is contained in the composition of many ingredients, including yeast and lactic acid bacteria, whether we introduced them in the form of pure cultures of microorganisms, or they have been developed since we have combined flour and water. The final result depends on the literacy of manufacturer goals and objectives. Nature is ordered and has given certain plants microorganisms: on a small grain located millions and billions of yeast cells, lactic acid bacteria, fungi and other species, but if the moisture content of grain or flour does not exceed 15% the microorganisms does not live, this phase we named "asleep". But if we increase the humidity of the grain or flour at least one percent, we are seeing "spoilage" of the product - it is covered with mold, heats up and it is already spoiled. [6]

Therefore, researchers must skillfully navigate and know well how to process grain, flour, what parameters to control to get the bread with the required organoleptic and physico-chemical parameters.

Back in 1983-1987 years famous Russian physiologist, surgeon, academician of the Academy of Sciences Soviet Union Alexander Mikhailovich Ugolev in his works warned the government of the former Union of the adverse effects of gluten and products containing it, that is clogging the intestinal villi, as a consequence of metabolic disorders that lead to various pathologies (from colds to cancer). In his complaints to the government, he called for a reduction in the release of white flour milling and expand production of whole wheat large grinding. However, his warnings were not heard, as in 1987 already "was" reorganization, and then did was not up to the health of workers.

Now in Appliances mass media began to talk about the dangers of white bread for humans. Back in 1990 in Prague, Professor Lambert spoke anxiously about the adverse health effects of refined white bread prepared using pressed yeast. Prolonged ingestion of the bread (and we eat it for years) has led to a number of violations described Lambert called gemogliaz. This disease is manifested by headaches, drowsiness, irritability, digestive problems, slows down thinking, decreased sexual activity, increased blood viscosity. Lambert believes that gemogliaz more common and more dangerous than tuberculosis. But the most serious problem of white bread, which arises from the constant use of it - constipation, slugging of the body that shorten life [4].

In Kazakhstan consume mostly white yeast bread made from fine flour, devoid of vitamin E, B vitamins, PP fiber and other important substances.

The absence of major nutrients in bread can lead to decreased immunity and disease that is now observed in Kazakhstan. According to years of research, it became known that Kazakhstan takes one of the first places in the world for cancer and penultimate place (behind us is Kyrgyzstan) for the consumption of fruits and vegetables. The result of this is the food consumption from refined flour - white cookies, white dough for the beshbarmak, all types of pasta and noodles, white with a shiny crust buns, various hot-dogs, etc.

White bread fed children not only at home but also in children's facilities, canteens, health centers, and thus laid a childhood illness and eating habits rolls, white bread from fine flour. [4].

Use bread flour made from coarse grinding is such that the flour retains minerals, vitamins and fiber in full volume. The rougher and darker flour the more fiber in it, so it makes bread healthy and nutritious. Fiber decreases blood pressure, improves digestion, normalizes blood sugar, lowers cholesterol, reduces the risk of atherosclerosis.

In Italy, the bread made from white flour called "kastratus", ie in this bread is nothing beneficial.

British centenarians said that their health and longevity can be explained by the fact that they ate bread made from wholegrain flour coarse grinding [7].

To solve the above issues by scientists Almaty Technological University (ATU) in problem research laboratory for the creation of a new generation of food under the supervision of Prof. A.V. Vitavskaya more than 10 years conducted exploratory development of new technologies breads therapeutic and prophylactic purposes, of sprouted grains and wholegrain flour using various unconventional raw materials.

For today there is various innovative technological methods to reduce maintenance and destruction of the gluten in wheat grain.

One of the areas of research is the study of the antioxidant activity (AOA) of certain types of bread produced for mass consumption.

AOA study was conducted jointly with the Institute of Human and Animal Physiology under the guidance of Dr., Professor M.K. Murzahmetova. The results were first published in the journal "Health and Disease" in 2005 and then in 2006, which shows the effect of the bread flour coarse grinding on the state of the macro internal organs, peroxide resistance and permeability erythrocyte membranes of rat [2, 3, 7].

About the antioxidant activity of some types of bread has sounded in the book N. Shaskol'skii "The most useful food: the sprouts", where the highest rate recorded in AOA grain bread made from sprouted grains [1].

The urgency and the need for such studies (chemists, engineers, hygienists, etc.) is so obvious that we are scientists, as - as if awakened from years of lethargy. Is very important to maintain the integrity of bread grain, bread and ideally do not need to expose any heat treatment, so as not to destroy and not to "kill" a gift of nature - the most important life vitamin - vitamin C, a complex of enzymes and folic acid, scientists call "food brain" [4].

B.V. Bolotov suggested that in order to strengthen the immune system should be consumed raw dough [8]. However, dormant wheat grains vitamin C is absent, and the interaction of water and grain life begins, synthesis and appears vitamin C.

Methodology of the experiment.

As control options were adopted traditional tin bread from wheat flour of the first grade, threaded loaf of wheat flour of the first grade, and all your favorite bread "Borodino". Experienced options were cereal species hearth bread cooked in a problem research laboratory to create a new generation of food ATU.

Grain bread without flour prepared from fermented wheat and homogenized with the addition of highly acidic grain, probiotic, hop ferment without pressing yeast, salt, vegetable oil, herbal supplements that are high in dietary fiber, pectin, natural dyes, flour shells and seeds of wild plants black berries elderberry fermented rye malt, dough moisture is adjusted to 44-45%, and fermented for 3.5 hours at a temperature of 250C. Then the dough acidity H 7 degrees divided into pieces weighing 450 grams and baked at 180-220 0 C with abundant moisture for 40-45 min.

The research problem - to explore and give a comparative description in terms of antioxidant activity of bread.

RESULTS AND DISCUSSIONS

Studies conducted earlier in collaboration with scientists of the Institute of Human and Animal Physiology in Almaty to reveal the influence of dispersion of particles of flour, bread preparation technology on the state of cell membranes and the life of animals [3, 9, 10]. It turned out that, unleavened bread made from wheat flour with the addition of coarse dough in highly acidic probiotic grain, hops ferment of mesophilic lactic acid bacteria can improve the condition of the viability of animals.

In this case, studied the antioxidant activity of wheat and different types of flour (wheat, rye and wholegrain flour from germinated wheat grain) and grain products that are commercially available (threaded loaf, tin bread from the first grade flour and bread "Borodino") and samples of grain products developed in the research laboratory to create a new generation of food ATU. The study of AOA was conducted by amperometric method [11, 12]. The results of studies of various types of wheat flour and bakery products given in Tables 1 and 2.

Table 1: Comparative indicators of AOA wheat grain and different types of flour

Name of raw materials	AOA, mg/100 g
Wheat grains initial	9,6
Whole wheat flour	9,6
Wheat Flour Extra Class	6,5
Wheat Flour First Class	6,9
Rye Flour	12,5
Whole grain flour from germinated samples of wheat (duration of germination 4 days)	14,2

Table 2: Indicators of AOA and fiber content in different types of bread

Name of bakery products	Fiber, g/100 g	AOA mg/100 g
Baton rifled from wheat flour first class with compressed yeast	0,2	10,9
Traditional tin bread from wheat flour first class, with compressed yeast	0,2	18,9
Rye bread "Borodino", using a 0.2% of compressed yeast	0,2	21,3
Crispbread "For schoolchildren" (corn wholegrain flour coarsely ground with additives, without yeast, without leaven)	14,36	27,41
Grain bread made from wheat flour whole wheat coarsely ground hoppier with probiotic ferment of mesophilic lactic acid bacteria and additives	8,64	34,3
Bread made from homogenized fermented grain without of compressed yeast with added probiotic hoppier leaven of mesophilic lactic acid bacteria	2,0	34,3
Probiotal bio bread "Minus appetite" (made from whole wheat flour and bran without of compressed yeast, dried at temperature not higher than 45°C)	15,85	133,5

The results showed that the antioxidant activity of breads made from refined flour milling by traditional technology is considerably inferior to the samples of grain products developed in the laboratory scientists ATU as AOA bread directly depends on the content in the final product of dietary fiber, vitamins B, C and E. foods with high antioxidant activity increases the resistance of cellular membranes, reduces the effect of stress factor and can protect the body by the action of unfavorable environmental factors [9].

Cell membranes are most sensitive to the action of various agents, and metabolic changes in them can be used as an objective criterion for evaluation of the functional state of the organism.

CONCLUSION

The choice of raw materials for the production of grain products, special attention should be given to those crops that contain a considerable number of compounds that have the highest antioxidant activity.

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