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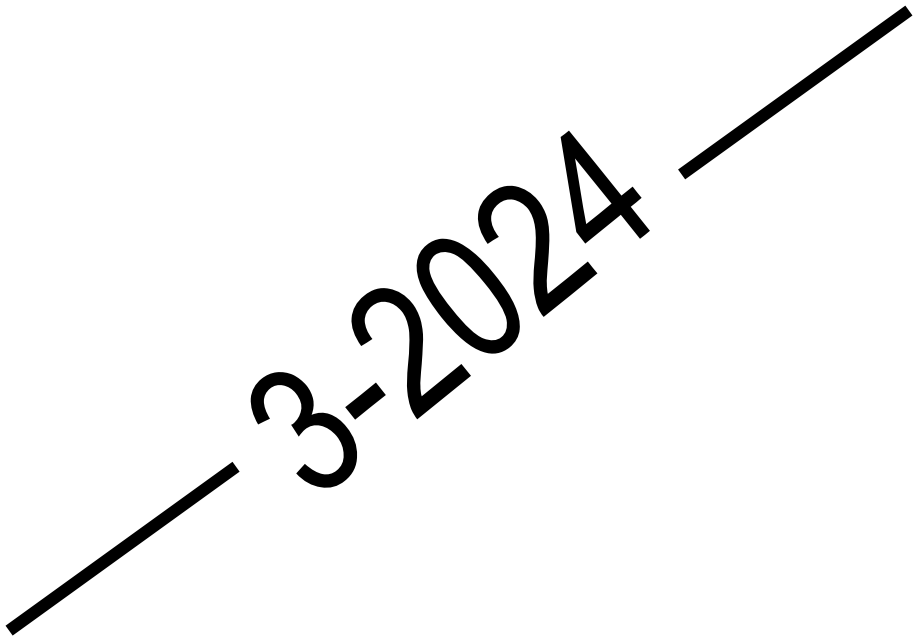

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PRODUCTION OF YOGURT ON THE BASIS OF EXPRESSED WHEAT MALT

UNGAN BUG‘DOY ASOSIDA YOGURT ISHLAB CHIQARISH

ПРОИЗВОДСТВО ЙОГУРТА НА ОСНОВЕ ОТЖАТОГО ПШЕНИЧНОГО СОЛОДА

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Abstract

The article provides information on the relevance of improving the production technologies of food products with a balanced chemical composition, high nutritional and biological value, especially fermented milk products, enrichment of yogurt, which is one of the functional food products, with natural products and biologically active substances. Important chemical parameters that determine the specific useful properties and nutritional value of the extracted wheat grains are highlighted. The main goal of the research is to treat wheat flour with various non-conventional, in particular, ultra-high frequency electromagnetic fields in order to preserve the nutrients contained in wheat as much as possible. Also, the advantages of using malted wheat grains treated with ultra-high frequency electromagnetic field rays in the production of yogurt are explained. Conveniences of drying and using wheat malt collected by hydroponics method are provided. The optimal values of malt to be added to the composition of yogurt were determined, and the effect on important quality indicators of yogurt was studied. These fortified yogurts are said to help restore intestinal contractile function, thicken intestinal walls and restore elasticity and muscle tone.

Annotatsiya

Maqolada muvozanatli kimyoviy tarkibi, yuqori ozuqaviy va biologik qiymati, ayniqsa fermentlangan sut mahsulotlari, funktsional oziq-ovqat mahsulotlaridan biri bo‘lgan yogurtni tabiiy mahsulotlar va biologik faol moddalar bilan boyitish bilan oziq-ovqat mahsulotlarini ishlab chiqarish texnologiyalarini takomillashtirishning dolzarbligi to‘g‘risida ma'lumot berilgan. Olingan bug‘doy donalarining o‘ziga xos foydali xususiyatlari va ozuqaviy qiymatini aniqlaydigan muhim kimyoviy parametrlar ta'kidlangan. Tadqiqotning asosiy maqsadi bug‘doy tarkibidagi ozuqa moddalarini iloji boricha saqlab qolish uchun bug‘doy unini turli xil noan'anaviy, xususan, ultra yuqori chastotali elektromagnit maydonlar bilan davolashdir. Shuningdek, yogurt ishlab chiqarishda ultra yuqori chastotali elektromagnit maydon nurlari bilan ishlangan maltlangan bug‘doy donalaridan foydalanishning afzalliklari tushuntiriladi. Gidroponika usulida yig‘ilgan bug‘doy solodini quritish va ishlatish qulayliklari ta'minlangan. Yogurt tarkibiga qo‘shiladigan solodning optimal qiymatlari aniqlandi va yogurtning muhim sifat ko‘rsatkichlariga ta'siri o‘rganildi. Ushbu mustahkamlangan yogurtlar ichakning kontraktil funktsiyasini tiklashga, ichak devorlarini qalinlashtirishga va elastiklik va mushaklarning ohangini tiklashga yordam beradi.

Аннотация

В статье представлена информация об актуальности совершенствования технологий производства пищевых продуктов со сбалансированным химическим составом, высокой пищевой и биологической ценностью, особенно кисломолочных продуктов, обогащения йогурта, который относится к функциональным продуктам питания, натуральными продуктами и биологически активными веществами. Выделены важные химические параметры, которые определяют конкретные полезные свойства и питательную ценность экстрагированных зерен пшеницы. Основной целью исследования является обработка пшеничной муки различными нетрадиционными методами, в частности электромагнитными полями сверхвысокой частоты, с целью максимального сохранения питательных веществ, содержащихся в пшенице. Также объясняются преимущества использования солодовых зерен пшеницы, обработанных лучами электромагнитного поля сверхвысокой частоты, при производстве йогурта. Представлены удобства сушки и использования пшеничного солода, собранного методом гидропоники. Были определены оптимальные количества солода, которые следует добавлять в состав йогурта, и изучено его влияние на важные показатели качества. Считается, что эти витаминизированные йогурты помогают восстановить

сократительную функцию кишечника, утолщают его стенки, возвращают эластичность и мышечный тонус.

Kalit so'zlar: *yig'ilgan bug'doy, arpa, solod, solod ekstrakti, yogurt, o'yin, boyitilgan yogurt, don fermentlari, funktsional oziq-ovqat, xalq tabobati, vitaminlar, fermentlangan sut, ozuqa moddalari.*

Key words: *harvested wheat, barley, malt, malt extract, yogurt, O'YuCh, enriched yogurt, grain enzymes, functional food, folk medicine, vitamins, fermented milk, nutrients.*

Ключевые слова: *пшеница, ячмень, солод, солодовый экстракт, йогурт, овсянка, обогащенный йогурт, зерновые ферменты, функциональное питание, народная медицина, витамины, кисломолочные продукты, питательные вещества.*

INTRODUCTION

Due to ecological disparity, various allergic and chronic diseases, currently 70% of the population on average feels the need for additional enriched food products. One of the most important problems facing researchers is the production of new types of food products, which are rich in substances that have a positive effect on human health, and have high nutritional and biological value that meet daily needs. [1], [2].

LITERATURE ANALYSIS AND METHODOLOGY

Currently, researchers are carrying out a series of researches on improving the production technologies of food products with a balanced chemical composition, high nutritional and biological value, especially fermented milk products, and enriching the composition of yogurts, which are considered one of the functional food products, with natural products and biologically active substances is going [3].

It is important to use hydroponically collected and dried wheat malt, which is considered one of the natural products, to enrich the composition of yogurts, to determine the optimal values of the malt added to the yogurt composition, and to observe the extent to which yogurt quality indicators change.[4].

The collected grains contain vitamins, important amino acids and polyphenolic compounds, enzymes, minerals such as lysine, methionine, tryptophan, histidine, arginine, which regulate the processes of metabolism in the body [5]. A distinctive feature of milled grains is that the amount of plant enzymes amylase, protease, and lipase increases during grain milling. Also, during extraction, proteins are broken down under the influence of proteolytic enzymes in grains, and the enzymes bound to them become freely active. As a result of increased activity of enzymes, high molecular compounds in the grain are broken down into low molecular easily absorbed substances [6].

Elevation of moisture in the composition of milled wheat leads to a decrease in its utilization rate. The extracted wheat malt mainly consists of two parts, the first part is the malt juice (extractive substances) and the second part is the various dry substances of the malt (dry fraction). Malt juice can be used on a wide scale, the nutrients such as carbohydrates, water-soluble vitamins, and proteins contained in malt juice serve as a natural medicine for the restoration of human health [7]. In our researches, wheat malt was dried in different ways in order to preserve the juicy and other necessary components of malt, dry it unchanged, and then add it to get enriched yogurts intended for folk medicine.[8]. As we know, the main criterion in drying technology is to reduce the moisture content of the material (with maximum preservation of other useful components) [9]. In order to preserve the nutrients contained in the extracted wheat, a number of research experiments were carried out on the processing of extracted wheat flour using various non-conventional, in particular, ultra-high frequency electromagnetic fields.[10].

EXPERIENCE PART

The research experiments are as follows: in extremely high frequency electric magnetic fields at a frequency of 2450 MHz; processing time 13-15 minutes; power -150 W and temperature 75-80°C was carried out in soft modes. The processed dried wheat malt had a moisture content of 10-12% and was milled to a level that passed 80-85% when sieved for 10 minutes on a 1 mm sieve. [11], [12].

EXECUTION OF WORK

The process of milk fermentation is carried out by freezing at a temperature of 400 °C and for 5-6 hours. Yogurts obtained in this way have a taste and smell characteristic of pure yogurt, without extraneous tastes and odors, and the color is uniform throughout the mass. The product made with 1.5% grain malt flour has a pleasant taste and aroma of weak distinctive grain malt, and the presence of flour is not noticeable.

Usually, the following general technological processes are carried out in the production of yogurt: preparation of ingredients → standardization → cleaning → pasteurization → homogenization → cooling → fermentation.

Preparation of the feed: 1st grade milk with reductase test not lower than 1st class, acidity not higher than 20 0T and without mechanical impurities is used for production. Partially or fully reconstituted high-fat dry milk can also be used.

Cooling: after the product has reached the desired acidity, it is cooled immediately with the formation of yogurt. It is required that the temperature does not exceed 80C.

DISCUSSION OF RESULTS

Experiments were conducted and analyzed on yogurt samples produced at "Express milk" LLC. Also, yogurts were enriched with wheat malt samples selected as optimal indicators of ultra-high frequency processing (at 2450 MHz, 300 W for 15 min), and their organoleptic and physicochemical parameters were studied.

The main organoleptic indicators of yogurts taken for the experiment are given in the following table:

1 - table

Organoleptic indicators of yogurt obtained for the experiment

Indicator name	Description
Appearance	A viscous mass of uniform thickness. When stabilizers are added, it can be jelly-like or creamy. When using flavoring and smelling FSs - their mass fraction may vary.
Colour	The same milky white color throughout the mass. Produced with flavoring and food coloring, it is determined by the color of the added ingredient.
Taste and smell	It has a unique smell and taste of pure fermented milk without extraneous odors and tastes. It gives a moderately sweet taste when processed with sugar or sweeteners. Flavorings provide the corresponding flavor and aroma of the component added in manufacturing with FSs.

As can be seen from the table, it was found that the organoleptic indicators of the yogurts taken for the experiment correspond to the requirements specified in GOST 31981-2013 (Yogurts. General TSh).

The collected wheat grains used in the production of yogurt, after being processed under the conditions mentioned above, were made into flour and added to the composition of ready-made yogurt prepared in the traditional way in different proportions in relation to the yogurt mass. Yogurt mass prepared on the basis of fermented wheat malt with food additives was fermented at 40℃ for 5-6 hours.

The organoleptic and physicochemical parameters of yogurt samples enriched with wheat grains collected for the experiment are presented in the following table:

2- table

Organoleptic indicators of yogurts prepared by adding wheat malt in different proportions

№	Quantity of food supplement	Organoleptic indicators			
		Appearence	Color	Taste and smell	homogeneity
1	1,0	A viscous mass of uniform thickness.	The same milky white color throughout the mass	It has a unique smell and taste of pure fermented milk without extraneous odors and	homogeneous

				tastes. You can't feel the malt taste	
2	1,5	A viscous mass of uniform thickness.	The same milky white color throughout the mass	Pure original fermented milk without extraneous odors and flavors and has a weak pleasant malty smell and taste.	homogeneous
3	3	A liquid mass of two different densities	The same milky white color throughout the mass	It has a unique smell and taste of pure fermented milk and malt without extraneous odors and flavors.	Heterogeneous (created whey)
4	5	A liquid mass of two different densities	The same milky white color throughout the mass	Pure original fermented milk without extraneous odors and flavors and has a strong malty smell and taste.	Heterogeneous (created whey)

It can be seen from the table that when 1.0-1.5% of the food additive is added to the yogurt, the taste and smell of the yogurt is preserved, when 3-5% is added, a weak pleasant taste and smell of the spiked grain malt is felt in the yogurt. As the amount of food additive increased, the flavor of the food additive became dominant instead of the taste of yogurt. It was also observed that increasing the amount of wheat malt has a negative effect on the homogeneity of yogurt.

The results of the study showed that it was sufficient to add food additives based on wheat malt collected in yogurt production in the amount of 1.5% of the yogurt mass.

In the enrichment with additives, the flour and yeast of the recovered grains were added together. Yogurts obtained in this way have a taste and smell characteristic of pure yogurt, without extraneous tastes and smells, and the color is uniform throughout the mass.

For the correct maintenance of technological accounts, the material calculation was carried out, taking into account losses in production, in relation to 1000 kg of finished products. The recipe for 1 t of fortified yogurt is given in the table below:

3-table

Enriched yogurt recipe

№	**Raw material name**	**Amount of products required for 1000 kg yogurt 1% fat yogurt mixture**	
		According to the traditional recipe	**According to the proposed recipe**
1	Milk (fat content 4%, fat content 12%)	250,0	650,0
2	Skimmed milk (fat content 0.05%, w.m. 8.0%)	620,0	620,0
3	Dry milk (fat content 1.5%, fat content 95.0%)	23,0	23,0
4	Sugar (sucrose content 99.75%)	56,0	56,0
5	Ingredients for enrichment:		
	Fruit filler and chemical ingredients	51,0	36
	Food supplement	-	15
6	Yogurt yeast, 2% per 100 g of product	0,2	0,2

It can be seen from the table that in the traditional recipe, fruit filler and chemical ingredients are 51 kg (5.1%) in relation to the mass of yogurt, while in the proposed recipe, this

figure is 15 kg (1.5%) due to the addition of food additives, fruit filler and chemical ingredients. It was 36 kg (3.6%).

Mass percentage of fats in yogurt is an important chemical indicator. Therefore, depending on the amount of fat in milk (%) as the starting raw material, milks are: skimmed milk (below 0.1), low-fat milk (from 0.1 to 1.0), medium-fat milk (from 1.0 to 2. to 5), divided into classes such as cream milk (from 7.0 to 9.5). Similarly, milk protein is one of the important chemical indicators that determine the quality of the finished product. For yogurts without additives, the protein content is required to be no less than 3.2%, and for yogurts with fruits and vegetables, no less than 2.8%. Also, the mass fraction of skimmed milk products should not be less than 9.5% for yogurts without additives, 8.5% for fruit and vegetable yogurts. It is controlled that the acid number is in the range of 75-140 °T, and the production temperature is +4±2.

The results of research on microbiological indicators of yogurts prepared on the basis of new food additives are presented in the following table:

4- table

Microbiological indicators

Indicator name	Norm
The number of lactic acid microorganisms (S. Thermophylys and Lactobacterium bulgaricum) in 1 g of the product until the end of the shelf life, not less	10^7
The amount of Bifidobacterium (Bifidobacterium), the amount of 1 g of the product until the end of the shelf life, is not less	10^7
The number of lactobacillus acidophilus bacteria (Lactobacillus acidophilus), the amount of 1 g of the product until the end of the shelf life, is not less	10^7

For component yogurts, the mass fraction of proteins should not be less than 3.2%. There are usually two main types of proteins in milk. They include whey protein and casein. Casein content is high in milk, and whey protein includes albumin and globulins. Their amount increases during milk fermentation. Casein is slowly absorbed by the body and coagulates in an acidic environment, which makes it possible to create fermented milk products. Also, the mass percentage of dry skimmed milk residue in component yogurts should not be less than 9.5%.

Yogurts enriched with biologically active additives, intended for folk medicine, met the requirements of the microbiological indicator set for production products.

5-table

Chemical parameters of fortified yogurt

№	Composition	Norm	According to the traditional recipe	According to the proposed recipe
1	The total amount of oil,	Not less than 1.0%	1,0	1,0
2	Total amount of milk protein	Not less than 2.8%	3,4	3,0
3	Total protein content	Not less than 4.2%	4,3	5,1
4	Acid number, 100 gr.m.n. 0.1 N NaOH	From 75 ºT to 140 ºT	80	85
5	Amount of phosphatase	Not allowed	Not identified	Not identified

It can be seen from the table that, based on the proposed recipe, when 1.5% of processed yogurt is added and malt obtained from dried wheat grains is prepared, the total amount of milk protein is 0.4 compared to the traditional recipe. decreased by %, the acidity index increased by 5 °C. At the same time, the amount of total protein in the obtained yogurt was higher by 1.1% compared to the traditional recipe.

The acidity of yogurt obtained according to the proposed recipe is 5 ºC higher, the amount of milk protein is 0.4% less, and the amount of total protein is 1.1% higher. enables the production of functional yogurts designed for patients.

The results of the study showed that it is sufficient to add food additives based on wheat malt collected in yogurt production in the amount of 1.5% of the yogurt mass. The organoleptic and physico-chemical indicators of yogurts enriched with milled spiky grains fully meet the requirements given in regulatory documents using chemical analysis.

Based on the proposed recipe, when the enterprise produces 1.0 tons of yogurt made with the addition of biologically active food additives, the mass of added fruit additives can be reduced by 1.5%, the consumption of imported chemical reagents that ensure the integrity of the quality of yogurt during the storage period, and the consumption of biologically active ingredients can be reduced. It has been proven that the low cost of preparation of active food additive is economically beneficial to the enterprise.

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