Өсірілген тритикале дәнінің жақсы дәмдік қасиеттерін және химиялық құрамын есепке алып, өсімдік компоненттері бар йогурт өндірісі тағамдық және биологиялық қасиеттерін жоғарылатуға және функционалды бағыттағы сүтқышқылды өнімдердің ассортименттерін кеңейтуге мүмкіндік береді.

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STUDY OF STORAGE ABILITY OF CURD DESSERT WITH ADDITION OF VEGETABLE RAW MATERIALS

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The paper presents data on study of storage of curd dessert. The composition of product was varied to improve organoleptic and physico-chemical parameters and increase storage capacity. The process of product production involves mixing curd product with ingredients (hawthorn, apricot, carrot juice). Studied organoleptic characteristics of finished products during refrigerated storage.However, on ninth day taste deteriorated, acidity increased. Studies of microbiological indicators are presented. As result of storage on the ninth day, presence of mold was detected. The results of analyzes show that shelf life of new dessert is seven days at (4±2)°C.

Key words: store ability, microbiological indicators, curd dessert, plant material, dairy products, leaven.

ӨСІМДІК ШИКІЗАТЫН ҚОСУ АРҚЫЛЫ СҮЗБЕ ДЕСЕРТІНІҢ САҚТАУ ҚАБІЛЕТІН ЗЕРТТЕУ

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Жұмыста сүзбе десертінің сақталуы туралы зерттеулер келтірілген. Өнім құрамын органолептикалық және физика-химиялық сипаттамаларын жақсарту және жарамдылық мерзімін арттыру үшін өзгертіп отырдық. Өнімді өндіру процесі сүзбе өнімді ингредиент-

термен (долана, шабдалы, сәбіз шырыны) араластыруын қамтиды. Тоңазытқышта сақтау кезінде дайын өнімнің органолептикалық сипаттамаларын зерттедік. Дегенмен, тоғызыншы күні дәмі нашарлады, қышқылдық өсті. Микробиологиялық көрсеткіштердің зерттеулері келтірілген. Тоғызыншы күні сақтау нәтижесінде зеңнің пайда болғаны анықталды. Талдау нәтижелері жаңа десерттің жарамдылық мерзімі (4±2)°С температурада жеті күн екенін көрсетті.

Негізгі сөздер: сақтау қабілеттілігі, микробиологиялық көрсеткіштер, сүзбе десерті, өсімдік шикізаты, сүт өнімдері, ашытқы.

ИССЛЕДОВАНИЕ ХРАНИМОСПОСОБНОСТИ ТВОРОЖНОГО ДЕСЕРТА С ДОБАВЛЕНИЕМ РАСТИТЕЛЬНОГО СЫРЬЯ

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В работе представлены данные по изучению сохранности творожного десерта. Состав продукта варьировали для улучшения органолептических и физико-химических показателей и повышения хранимоспособности. Процесс производства продукта предполагает смешивание творожного продукта с ингредиентами (боярышник, абрикос, морковный сок). Исследовали органолептические показатели готовой продукции при холодильном хранении. Однако на девятые сутки вкус ухудшился, кислотность увеличилась. В результате хранения на девятые сутки было обнаружено присутствие плесени. Результаты анализов показывают, что срок хранения нового десерта составляет семь суток при температуре (4±2) ^{0}С.

Ключевые слова: хранимоспособность, микробиологические показатели, творожный десерт, растительное сырье, молочные продукты, закваска.

Introduction

Among the wide variety of food products, dairy products occupy one of the leading places in human diet, as they have the best taste quality, high nutritional and biological value.[1,2].

Among dairy products, fermented milk products are the most popular, which have high nutritional value, good consumer properties, easily digested, have moderate caloric value. At this, dairy products play an important role in human nutrition, which is major factor in prevention and treatment of various gastrointestinal and other diseases. Products such as yogurt, fermented milk drinks, cottage cheese products, sour cream are indispensable in diet for all categories of the population[1,2].

Curd products are the most balanced in composition, nutritional and biological value of human diet. Their composition can be supplemented by dietary fibers, vitamins, and minerals by combining dairy raw materials with vegetable components[3-5].

Cottage and curd cheese products are very nutritious, as they contain a lot of protein and fat. Curd proteins are partially associated with salts of phosphorus and calcium. This contributes to better digestion of proteins in stomach and intestines. Therefore, cottage cheese is well absorbed by body[1-3].

Milk and dairy products can be enriched by wide variety of dietary supplements with certain functional properties that are aimed at promoting health and preventing alimentary-related diseases. Along with traditional products in daily diet must include enriched foods. According to nutritionists, their share should be up to 30% of diet [3, 4].

Promising component in direction of combining dairy and vegetable raw materials are hawthorn, apricot, carrot. Apricot contains vitamins P, B1 and PP, but most of them are rich in carotene (provitamin A) and potassium salts. There are also minerals - potassium, magnesium, phosphorus. Iron salts and iodine compounds represent trace elements. The composition of

hawthorn includes fatty acids, pectins, tartaric and citric acids, flavonoids, vitamins C, E, P, beta-carotene. Carrots are rich in carotene and also contain vitamins B1, B2, B6, C, etc., macro- and microelements: calcium, magnesium, phosphorus.

As result of storage of dairy products, they are exposed to various bacteria (pathogenic microorganisms, bacteria of group of intestinal sticks (*E. coli* bacteria), mesophilic aerobic and facultative anaerobic microorganisms, yeast and mold). In this regard, they have small shelf life and they need special storage conditions. The most common microbiological test that used in all countries in food microbiology is to determine the criteria for number of mesophilic aerobic and facultative anaerobic microorganisms, the numerical value of which assesses effects of temperature regimes, sanitary condition of raw materials, production, etc. Microbiological methods of researching products allow identifying onset of changes in product quality and establishing possible storage periods under certain conditions.

The aim of the work was to study storage ability of cottage cheese dessert with vegetable ingredients.

Objects and research methods

The experimental part of work was carried out in laboratories of the department "Food Engineering" of M. AuezovSouth Kazakhstan State University.

Objects of work arecurd mass, vegetable components (hawthorn, apricot, carrot juice) and curd dessert.

In carrying out the work, standard and generally accepted research methods were used for finished curd dessert.

Organoleptic evaluation of cottage cheese dessert was carried out in accordance with GOST 31680-2012. Controlled the following indicators: smell, taste, texture, appearance and color.

Titratable acidity of dairy raw materials and processed products - by titrimetric method using phenolphthalein indicator (GOST 3624-92).

The number of mesophilic aerobic facultative anaerobic microorganisms (NMAFAnM) and *E. coli* bacteria were carried out using nutrient media according to GOST 9225-84 and GOST 32901-2014, and pathogenic flora, including *Salmonella* according to GOST 31659-2012, amount of lactic acid micro-organisms - according to GOST 10444.11-2013.

Results and their discussion

To obtain new curd dessert, cow's milk and vegetable components (hawthorn, apricot, carrot juice) were used. From cow's milk got curd mass. Curd mass was mixed with vegetable components in specific ratio (5%, 10%, 15%, 20%, 25%, 30% fruit and vegetable raw materials and 95%, 90%, 85%, 80%, 75%, 70% of cottage cheese masses, respectively).

The technological process of production of curd dessert with vegetable ingredients consists of following stages: acceptance of raw materials (milk, hawthorn, apricot, carrot), purification of milk, separation, pasteurization of milk (at temperature 78-80 ° C with an exposure of 20 s), fermentation by CHN 22 "CHR.HANSEN" in the amount of 3-5% of total volume is added and mixed). Than ripening, clot processing, whey separation, coolingto stop lactic acid fermentation, adding cream, adding and mixing vegetable ingredients (previously prepared vegetable raw material (hawthorn,apricot puree, carrot juice) according traditional technology added to curd mass and mixed, packaging, storage.

Adding vegetable ingredients reduces viscosity of curd mass and improves its plasticity (table 1). In course of organoleptic evaluation of finished product with different mass fractions of fruit and vegetable raw materials, it was found that with an increase in concentration of vegetable ingredient over 20%, color saturation is observed, consistency is sticky, loose, watery, poorly shaped, and does not keep shape.

Table 1 - Organoleptic indicators of cottage cheese dessert

Finished products, %	Organoleptic characteristics		
	Taste and smell	Colour	Appearance and consistency
Control (0)	Pure, sour-milk, sweet, with touch of the applied components	White, white with cream shade or due to color of the applied components	Homogeneous, moderately dense, with visible or tangible presence of introduced components
75÷25	Sour-milk, sweet-tart taste	Orange, uniform throughout the mass	Homogeneous, with palpable presence of herbal ingredients, tender

The optimal sample was N 4 with content of 75% ÷ 25% of curd mass and fruit and vegetable raw materials, respectively.

The main physico-chemical indicators of cottage cheese dessert based on fruit and vegetable raw materials in ratio of 75% ÷ 25% are respectively shown in Table 2.

Table 2 - Physico-chemical indicators of cottage cheese dessert

Indicators	Standard sample (GOST 33927-2016)	Curd dessert with herbal ingredients
Acidity, ^{0}T	160-220	166
Fat content, %	5-26	12
Mass fraction of protein, % not less	7	11
Mass fraction of sucrose, %	22-30	26
Moisturecontent, %	33-55	39
Phosphatase	absence	absence
Product temperature at release from the enterprise, ^{0}C	4 ±2	4 ±2

As can be seen, physicochemical parameters of the finished product did not exceed the ND values.

The results of microbiological indicators of finished products are also consistent with state standards, are presented in table 3.

Table 3 - Microbiological indicators of finished products

Microbiological indicators	Research results	Normalized indicator	ND designation for test methods
*E. coli*bacteria	Not detected	Not allowed in 1.0 cm^3 (g)	GOST 9225-84 GOST 32901-2014
St.aureus	Not detected	Not allowed in 1.0 cm^3 (g)	GOST 30347-97
Mold	Not detected	No more50 CFU/cm^3 (g)	GOST10444.12-2013
Yeast	Not detected	No more50 CFU/cm^3 (g)	GOST 10444.12- 2013
Pathogens, including*Salmonella*	Not detected	Not allowed in 25,0 cm^3 (g)	GOST 31659-2012
L.monocytogenes	Not detected	Not allowed in 25,0 cm^3 (g)	GOST 32031-2012

The next step was studying shelf life of curd dessert. Selected samples were stored at temperature of 4±2 °C and monitored changes in organoleptic, microbiological, and physicochemical parameters. The results of changes in microbiological indicators during storage are presented in table 4.

Table 4 - Changes in microbiological indicators during storage of curd dessert with vegetable ingredients

Indicator	The number of microorganisms					
	Storagetime, days					
	Norm	1	3	5	7	9
The total number of lactic acid microorganisms, CFU/g	No less1×10^5	6.7×10^5	5.9×10^5	5.0×10^5	3.0×10^5	1.2×10^5
Mold, CFU/g	No more10	-	-	-	-	1

As can be seen from table 3 microbiological indicators during storage of cottage cheese dessert with vegetable ingredients correspond to ND.

From the physico-chemical parameters, acidity was determined during storage of cottage cheese dessert with vegetable ingredients. The analysis showed that in all samples there is an increase in acidity in range of 165-215^{0}T throughout entire storage period. On the ninth

day,titratable acidity reached 232^0T, which exceeds requirements of ND.

Research results of organoleptic indicators suggested that optimal amount of vegetable ingredients introduced into curd mass is 15% ÷ 25%.

Organoleptic indicators for seven days were quite high. The consistency was homogeneous, with slight palpable presence of vegetable ingredients, delicate. Taste, color and aroma corresponded todairy product, without any taste, even little fragrant. It can be concluded that organoleptic characteristics have improved due to addition of vegetable ingredients.

Conclusion

The proposed curd masses are moderately plastic, well molded and retain their shape, which is important condition in design and production of new molded products. As result of research conducted, shelf life of curd dessert with addition vegetable raw materials was established, which is seven days at temperature of (4±2) ^{0}C. At same time, organoleptic and physico-chemical indicators do not change, and microbiological indicators correspond to regulatory documents.

It is known that many manufacturers add various preservatives to increase shelf life, or they perform repeated heat treatment, as result of which amount of biologically active substances is reduced, which can negatively affect nutritional value. Therefore, production of natural food products is an undoubted advantage, rich in micro-and macro-elements, which is so necessary at present for human health.

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ІРІМШІК ӨҢДЕУ САЛАСЫНДАҒЫ ЧЕДДЕРИЗАЦИЯ ПРОЦЕСІ

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Бұл мақалада ірімішік өңдеу саласының және технологиялық көзқарасынан чеддеризация процесі туралы мәлеметтер келтірілген. Чеддеризация ірімшік массасының құрылымның қайта құрылуы процесі ретінде жазылған сүттің полимолекулярлық ассоциаттары арасындағы байланыстардың қайта қалыптасуының арқасында (казеиндік мицеллалар мен майлы глобулалар). Чеддеризация процестің алгоритмикасы сүтті кезеңдік бұзаулардың ас қазанындағы сүттің компонентерінің қайта қалыптасуы циклмен байланысты. Қышқылды - сілті диапазоны (pH 5,3 - 5,1) сүттің ақуызды, майлы, минералды және сулыфазаларының бір бірімен нақты байланыс динамикасы бар бағдарламасы. Ірімшік массасының құрылымының қайта құрылуында сүттің карбонаттік сыймдылығының рөлі корсетілген. Чеддеризация процессі бар табиғи мәйекті ірімішіктерді өндіру кезінде ірімшік массасы өз бетімен қалыптасады, яғни қабатты - талшықты құрылымы пайда болады (қышқылдығының тез жоғарлауы), «тауық төс еті» құрылымына тектес, себебі процестің жоғары жылдамдығы болып табылады.