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Abstract

The results of studies on the use of polished and buckwheat flour, corn and sesame oil in the formulation of cupcakes and their effect on the nutritional and antioxidant activity of products are presented. that the introduction of non-traditional raw materials is appropriate, as the amount of antioxidant activity increases by an average of 28% compared to the control sample. R counting Food content nutrients in the cupcakes on offer showed that the introduction of enrichers allows you to increase their nutritional value that's why cupcakes "Crepe" and "Sesame" can be recommended for preventive nutrition.

Keywords: *Muffins; Antioxidants; Flour Confectionery; Nutritional Value*

Introduction

The main part of the bakery market is characterized by low nutritional and biological value, and in the diet of Russians there is a shortage of polyunsaturated fatty acids, proteins, vitamins. In this regard, the production of high-value food estates with specified quality characteristics, such as increased antioxidant activity, is relevant. Since flour confectionery is a mass-consumption product among all groups of the population of our country, the introduction to the recipe of these products of natural ingredients rich in vitamins and minerals, is considered the most relevant [1].

The development of foods with high antioxidant activity is an important area of healthy eating. Antioxidants prevent the coziness of dangerous chain reactions, which are triggered by free radicals. To provide preventive action, natural antioxidants should be consumed regularly along with food, which makes the enrichment of flour confectionery very appropriate It's [2].

Aim of the Study

The aim of the work was to study the effect of half-flour and corn oil, buckwheat flour and sesame oil on the antioxidant activity of muffins.

Objects and Methods of Research

Non-traditional raw materials containing vitamins, micro and macronutrients in an easily digestible form were selected as enrichers.

Half-thin flour is rich in proteins and dietary fibers. In the flour of the half a half-baked flour there is an increased content of general sugar and reducing substances - this indicates its high sugar-forming ability, which allows to keep the products fresh for longer and to increase the shelf life of their products.

In addition to flour, corn oil was used as a muffin for muffins. It features vitamins E, A, S, F, K, B. Group by Number vitamin E corn oil is significantly ahead of sunflower and olive oil It's as noon.

Buckwheat flour is also used for the enrichment of flour confectionery with useful substances. In the composition of buckwheat flour - almost a full group of vitamins B, fatty acids, ash, vitamin E, minerals such as sulfur, phosphorus, calcium, iron, magnesium, cobalt, copper, zinc and fluoride. have the properties of a powerful antioxidant.

Sesame oil is rich in phytoestrogens, calcium, zinc, phosphorus, iron, magnesium, vitamin E and B. According to doctors, sesame oil should be included in the diet if there are diseases such as atherosclerosis and other diseases of blood vessels and heart, disruption of exchange processes. The product normalizes acidity, which is successfully used in the case of increased acidity in the gastric juice.

Results and Discussion

Laboratory baking cupcakes were held at the Department of Echnology of Bakery, Confectionery, Pasta and Grain Processing Productions of Voronezh State University of Engineering Technology. The Capital cupcake was used as a control sample (GOST 15052-2014). When preparing the test of the samples studied, compared to the control, part of the flour of the highest grade, namely in the amount of 10, 15, 20, 25, 30, 35% to the total mass of flour, replaced with half-flour (TU 9293-014-89751414-11) for richer mineral and vitamin composition, creamy the oil has been replaced corn oil (first sample) and 5, 10, 15, 20% wheat flour replaced buckwheat flour Butter was replaced with sesame oil (second sample). After kneading the dough was formed 45g, them in cupcake shapes and baked 305 min at 2003 Oh with 8, 9.

The quality of cupcakes was determined by organoleptic and physical-chemical indicators (Table 1 and 2).

Scorecards	Score in samples with the inclusion of half-flour to the mass of flour, %						
	0	10	15	20	25	30	35
Organoleptic indicators							
Taste and smell	Sweet taste, characteristic aroma, without foreign taste and smell	Sweet taste, characteristic aroma and pleasant taste of corn oil	Sweet taste, characteristic aroma and pronounced taste of corn oil				
Surface	Convex, with characteristic cracks						
View in the kink	Baked product, without lumps and traces of non-promes, with uniform porosity, without voids						
Structure	Porous, without voids and seals						
Form	Correct, with a convex top surface. Lower and side surfaces are flat						
Physical and chemical indicators							
Massive moisture share, %	20,35	19,27	19,35	19,26	18,72	18,79	19,21
Density, g/cm^3	0,39	0,40	0,45	0,45	0,48	0,50	0,64
Specific volume cm^3/g	2,56	2,55	2,24	2,24	2,20	2,15	1,57
Sheliostal, City	1,8	1,8	1,8	1,8	1,8	1,8	1,6

Table 1: *Muffin quality indicators with half-flour and corn oil.*

Scorecards	Score in samples with buckwheat flour to the mass of flour, %				
	0	5	10	15	20
Surface	Convex, with characteristic cracks				
View in the kink	Baked product, without lumps and traces of non-promes, with uniform porosity, without voids				
Structure	Porous, without voids and seals				
Form	Correct, with a convex top surface. Lower and side surfaces are flat				
Physical and chemical indicators					
Massive moisture share, %	20,0	20,0	20,0	20,0	20
Density, g/cm^3	0,8	0,76	0,53	0,53	0,7
Specific volume cm^3/g	1,25	1,31	1,9	1,9	1,8
Sheliostal, City	0,8	1,0	1,4	1,8	1,8

Table 2: *Quality indicators of muffins with the addition of buckwheat flour and sesame oil.*

Dosage and half and buck wheat flour the color of the meat in the samples became darker due to the inflections of flour, and the taste and aroma more pronounced. significant cracks and bloating.

The mass moisture in the samples was within the requirements of the standard. Analysis of the density of finished products revealed that when the rich were introduced, the value of the test parameter increased compared to the control sample. dosages of non-traditional raw materials decreased.

According to the results, we concluded that the most incendiary dosage is the introduction of 30% of half-flour in exchange for wheat flour and the highest grade for the first sample and the replacement of 15% wheat flour on buckwheat for the second sample, as the physical and chemical indicators changed slightly and the analeptic only improved.

Recipes for cupcakes "Krepishis" (TU 9136-446-02068108-2018) with the addition of forehead flour and corn oil, cupcake "Sesame" (TU 9136-445-02068108-2018) with chronic flour and sesame oil. Each sample is calculated the content of food nutrients and the degree of their satisfaction by consuming 100 grams of cupcake (Table 3).

The name of food substances	Physiological daily requirement, g/day	Content in the samples cupcakes			Satisfaction with cupcake consumption, %		
		"Capital"	"Krebysh"	"Sesame"	"Capital"	"Creps"	"Sesame"
Squirrels, d	82,0	5,40	7,18	6,64	6,60	8,76	8,02
Fat, r	96,5	15,60	21,54	22,38	16,20	22,32	24,70
Carbohydrates. mr.	422	38,40	50,67	52,76	9,10	12,01	14,25
Dietary fiber, g	20	1,0	2,06	3,09	5,10	10,30	16,31
Sodium, mg	1300	59,60	60,3	60,5	4,60	4,63	4,65
Potassium, mg	2500	42,50	45,63	44,20	1,70	1,83	1,77
Calcium, mg	1200	18,90	24,14	36,02	1,60	2,0	2,36
Magnesium, mg	400	6,80	10,08	7,20	1,70	2,52	2,08

Phosphorus, mg	800	85,50	101,35	135,18	10,7	12,67	14,62
Iron, mg	1,8	0,80	0,86	2,30	44,4	47,78	85,20
Vitamin B1, mg	1,5	0,10	0,25	0,37	3,3	16,67	17,32
Vitamin B2, mg	1,8	0,10	0,27	0,26	5,6	15,0	14,83
Vitamin PP, mg	20	0,40	0,57	1,63	2,0	2,85	3,64

Table 3: *Information on the food and energy value of cupcakes 100g.*

The calculation of the nutritional value showed that 100 grams of the product with the researched and enriched me and due to their rich chemical composition will provide a degree of satisfaction the daily intake of the average protein is8.76%, fat - 22.32%, dietary fiber - 10.30%. Thus, studies have shown that the introduction of half-flour in the amount of 30% to the total weight of flour and 15% buckwheat flour allows to increase the nutritional value of muffins, which allows to recommend proposed products for preventive nutrition.

According to the tasks, the developed cupcakes determined antioxidant activity on the analyzer "The Color of Yausa-01-AA". The device allows direct quantitative measurements of antioxidant activity of the samples studied, containing biologically active compounds. It was found that the total antioxidant content of 100g of sesame muffin was 3.8 mg/100g, which is 16% higher than the value of this indicator in control, the cupcake "Krepis" - 5.3 mg/100g, which is more than 40% compared to control (Figure 1).

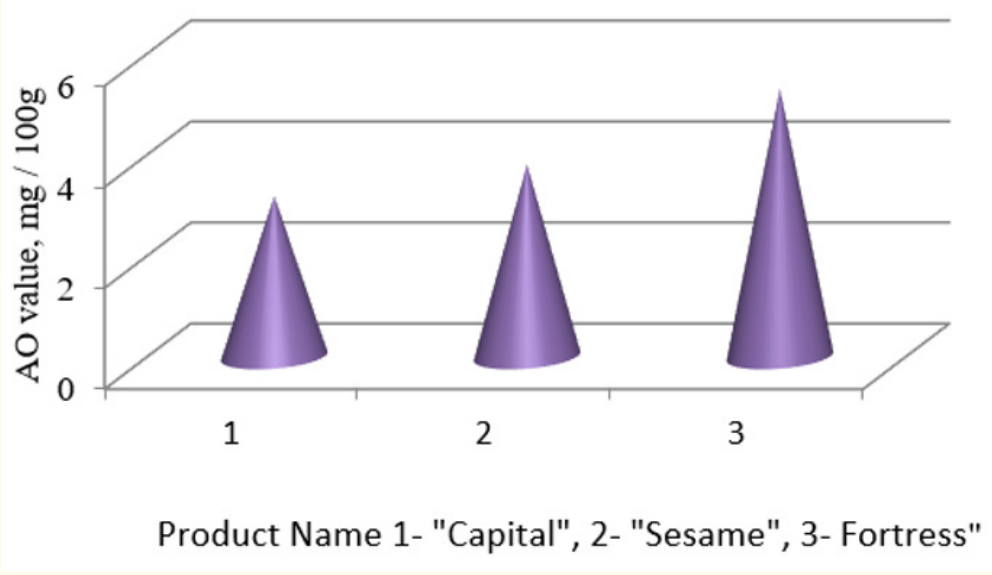

Figure 1: *The antioxidant activity of cupcakes.*

Conclusion

The results of the study showed that the introduction of non-traditional raw materials such as half-baked and buckwheat flour, sesame and corn oil in recipes in flour confectionery contributes to the production of products of increased nutritional value with high antioxidant activity. Cupcakes "Sesame" and "Crepe" I can't be recommended for preventive nutrition.

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