

Conference Paper

Justification of the Recipe Composition of Biscuit Using Functional Additives

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Abstract

Increased production of processed foods, rapid urbanization and changing lifestyles have led to a shift in dietary patterns. Nowadays, people consume more foods high in calories, fat, free sugars, and salt/sodium, and many do not consume enough fruits, vegetables, and other types of fiber such as whole grains. The article describes the principles of healthy nutrition, which are justified by the World Health Organization (WHO). The recipe composition of the biscuit using a mixture of potato and corn starches, oat bran replace part of the sugar on stevioside with the addition of functional additives in the Arctic region, namely black currant juice, grown in Lovozero.

It is known that black currant contains vitamins, organic acids, sugars (fructose and glucose), flavonoids, pectin, minerals and adding it to the formulation can increase nutritional and functional value.

The article shows the results of the study of biscuit quality using functional additives of the Arctic region. The composition of the biscuit: the ratio of the added vegetable raw materials is scientifically proved.

A point scale of quality of functional biscuit products with the use of additives from the raw materials of the Arctic region was developed. The composition of the finished product was investigated.

Keywords: health, biscuit, functional additives, Arctic region.

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1. Introduction

A healthy diet throughout life helps to prevent malnutrition in all its forms, as well as a range of non-communicable diseases (NCDs) and health conditions. The exact composition of a varied, balanced and healthy diet depends on individual characteristics (such as age, gender, lifestyle and degree of physical activity), cultural context, available local products and dietary customs. A healthy diet provides protection against malnutrition in all its forms, as well as non-communicable diseases (NCDs), including diabetes, heart disease, stroke and cancer. Unhealthy diets and physical inactivity are major health risks worldwide.

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Healthy eating practices are shaped early in life --- breastfeeding promotes healthy growth and improves cognitive development and can have beneficial long-term health effects, such as reducing the likelihood of overweight or obesity and developing NCDS later in life.

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Energy consumption (calories) should be balanced with its consumption. To avoid unhealthy weight gain, total fat intake should not exceed 30% of total energy consumption [1--3]. Saturated fats (a group of triglycerides (fats) containing only saturated fatty acids, such acids (sometimes called alkanes)) do not have double or triple bonds, the carbon atoms in their composition have only single bonds, thus the carbon chain is completely "saturated" with hydrogen atoms should be less than 10%. Trans fats (trans-isomers of fatty acids) are less than 1% of the total energy consumed, and when consuming fats, it is necessary to replace saturated fats and trans fats with unsaturated fats [3] and strive to exclude industrial trans fats from the diet [4--6].

Trans fats are a kind of unsaturated fats that are in a TRANS-configuration, that is, having the location of hydrocarbon substituents on different sides of the carbon-carbon double bond. In small quantities, trans fats are present in natural meat and dairy products, as well as in high-temperature vegetable oils, in particular deodorized. In large quantities, they are formed by a side effect in the hydrogenation of unsaturated fats, for example, in the production of margarine.

Trans fat consumption has been shown to be associated with increased likelihood of cardiovascular disease and mortality. In this regard, the world health organization (WHO) and other health organizations recommend to abandon the consumption of trans fats [2].

Reducing the intake of free sugars to less than 10% of total energy consumption [2, 7] is part of a healthy diet, and reducing their intake to less than 5% is believed to provide additional health benefits [7]. According to WHO, the term "free sugars" refers to all monosaccharides and disaccharides added to food by the manufacturer, cook or consumer, in addition to sugars that are naturally present in honey, syrups and fruit juices. Monosaccharides have a single sugar molecule and include glucose, galactose and fructose. Disaccharides consist of two molecules. The most widely consumed disaccharide is sucrose or table sugar.

Salt intake of less than 5 g per day (equivalent to sodium intake of less than 2 g per day) contributes to the prevention of hypertension and reduces the risk of heart disease and stroke in the adult population [8].

WHO member states have set a goal to reduce global salt intake by 30% by 2025, and to stop the increase in diabetes and obesity in adults and adolescents and overweight in children by 2025 [9, 10].

The main directions for the creation of functional products using additives from raw materials of the Arctic region:

- creation of products containing additives of the region of residence;
- taking into account the recommendations of the world health organization;
- reducing morbidity;
- reducing the risk of cardiovascular disease and obesity.

Flour confectionery products have taken a firm position in the production of the food industry and the human diet. Given WHO recommendations, the statistics of the growth of human patients with obesity and the habit of people to "eat the muffin", as well as the growth of restaurants and fast food marketing and advertising, will not the refusal from pastry, it is therefore advisable to replace the ingredients on functional supplements reducing calories and amount of carbohydrate [11, 12].

Introduction to the standard formulation of mixtures and functional additives, which are natural antioxidants, has improved not only technological and commodity characteristics, but also functional.

The production technology involves the addition to the formulation of wheat and oat flour, potato and corn starches, sugar and steviod, black currant of the Arctic region, which includes ascorbic acid (vitamin C), flavonoids, pectin, organic acids, sugars (glucose and fructose).

When products are mixed, an original product with increased organoleptic evaluation and functional properties is obtained and remains for consumers with a familiar taste. The technological scheme is slightly different from the standard scheme; therefore, there will be no additional economic costs [13, 14].

The aim of the work was to develop a biscuit recipe with the addition of functional additives of the Arctic region.

2. Methods and Equipment

2.1. Methods

2.1.1. Diagrammatic representation

The experiments were carried out in the experimental laboratory at the Department of food production technology. In the development of technology, the biscuit functional purpose, with the use of additives from raw materials of the Arctic region, determined the physical and chemical parameters of standard methods.

3. Results

To assess the quality of biscuit products, we used a point scale presented in table 1 [15].

The effect of the addition of black currant should be noted: the color of the outer surface of the biscuit product changes, which will be attractive to consumers, on the cut the biscuit becomes a pleasant color with a pink tinge.

In the development of the formulation of the product from the biscuit dough functional purpose with the use of additives from the raw materials of the Arctic region, used in the juice of wild black currant, which was pre-frozen.

Black currant sampling was carried out in autumn 2017 on the basis of the agricultural cooperative "Tundra", Lovozero village, Murmansk region.

4. Discussion

One of the objectives of the research was to obtain a saturated color of the finished products. The formation of organoleptic characteristics of biscuit products was analyzed. The results of organoleptic studies using tasting showed that the samples had good organoleptic characteristics. The score is shown in Figure 1 [15].

The analysis of preliminary experimental data allows drawing a conclusion that from a greater number of data, the quantity of the added juice of a black currant has the greatest influence on organoleptic indicators.

A mixture of starches was used to thicken the dough (the dough does not spread). Starch has an increased viscosity due to the high molecular weight; therefore, the product is light, airy, and less dry. When partially replacing sugar with stevia (glycoside of plant origin used as a sweetener), the caloric content decreases, and corn starch does

TABLE 1: Point scale of quality of products from a biscuit of functional purpose with application of additives from raw materials of the Arctic region.

Weight ratio of quality indicators	Quality level			
	Perfectly	Nicely	Satisfactorily	Unsatisfactorily
	1,50 - 2,0	1,00 - 1,49	0,50 -- 0,99	0,01 - 0,49
Flavor				
4	No unpleasant aftertaste	The taste of the biscuit, no unpleasant aftertaste	The taste of biscuit, but barely catch	The taste of the biscuit is determined, but interrupted by rancidity
Smell				
4	At a distance	Weaker is determined	Weak is determined	Is determined by very loosely
Appearance				
3	Surface without damage, fracture, dents	Surface without damage, fracture, dents	Shortcomings are expressed more markedly. Acceptable: deformation and small cracks	Disadvantages are more pronounced: scorch, fractures, dents, cracks
Form				
3	Correct form	Correct form	Wrong shape	Wrong shape
Consistency				
2	Soft Biscuit, after pressing restores. Biscuit is baked		Soft Biscuit, after pressing does not restore.	The consistency is too loose, tightened, rubbery. Crumb does not take shape after pressing
Structure				
2	Finely porous	Pores are different in diameter, not evenly distributed	Pores are unevenly distributed and have unequal diameter	Pores are absent or unevenly distributed
Cut				
1	Color and thickness are uniform	Color and thickness are slightly uneven	Color and thickness are uneven significantly	Color and thickness are uneven
Color				
1	Color uniform	Color is unevenly distributed		Color grey
Total points				
20	From 40 to 30	From 20 to 29.8	From 0 to 19.8	Less than 10 points

not contain gluten. Therefore, it is advisable to use for dietary nutrition. According to the results of the tasting we chose product number 3. The results are presented in figures.

From the diagram in Fig. 3 it can be seen that the content of vitamin C increases with the addition of black currant juice [15]. The analysis of the content of the vitamin composition of the control and the sample made with the addition of functional additives

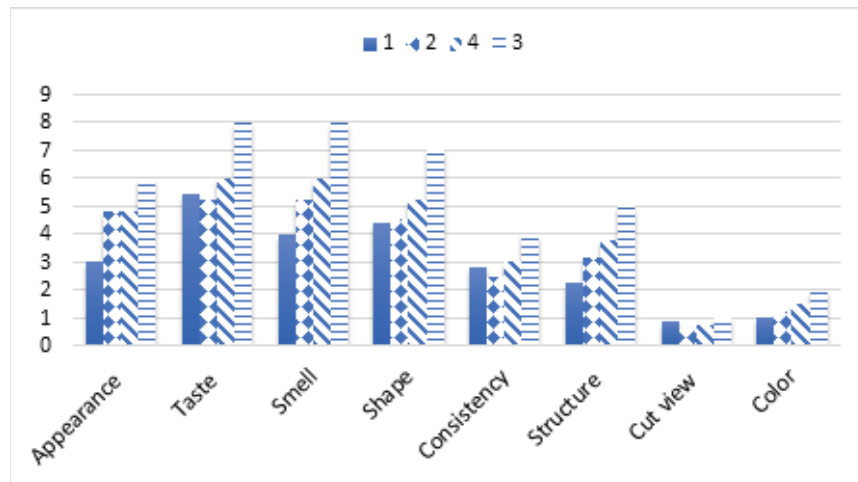


Figure 1: Organoleptic evaluation of the quality of the studied biscuits: samples N° 2, N° 3 and N° 4 with traditional sample N° 1.



Figure 2: Samples of manufactured products.

of the Far North shows that vitamins in the traditional biscuit contain much less than in the developed products. Sample number 3 has functional properties as it contains more vitamin C and has a reduced caloric content compared to the traditional product of biscuit dough.

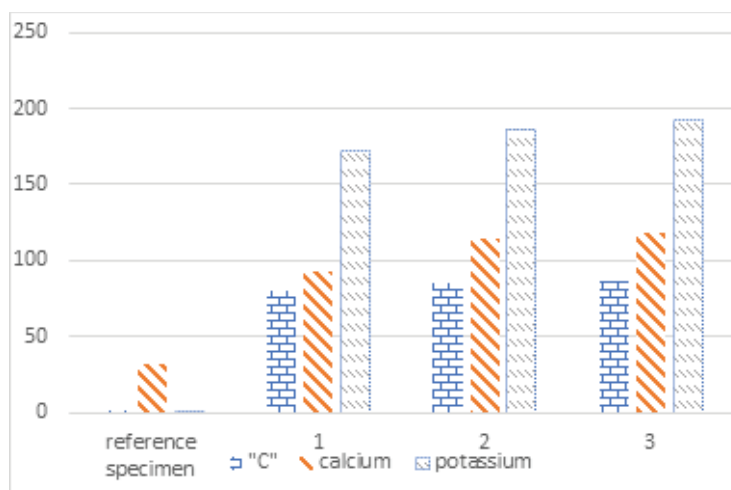


Figure 3: Samples of manufactured products.

5. Conclusion

The paper presents the score scale of the quality of functional biscuit products, using additives from the raw materials of the Arctic region. There are the results of the content of vitamin C, calcium, potassium in samples of manufactured products with Lovozero Murmansk region, harvest of 2017. The introduction of a mixture of corn and potato starches into the formulation increases the viscosity; therefore, the product turns out to be lighter, airy, less dry, with a reduced content of gluten. The developed formulation of new types of biscuit with high organoleptic characteristics, with reduced energy and increased nutritional value, allows expanding and diversifying the range of this group of confectionery products, taking into account the recommendations of WHO.

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Conflict of Interest

The author have no conflict of interest to declare.

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