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1. FOOD SCIENCE AND TECHNOLOGIES

RECEIVING DESSERTS WITHOUT SUGAR ON THE BASIS OF VEGETABLE RAW MATERIALS

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Abstract. *Desserts form an important and integral part of South East Asian cuisines and are often associated with festive eating and celebrations. Since most desserts are high in caloric content and contain refined carbohydrates and saturated or trans-fats, their consumption poses obvious challenges in diabetic individuals. Meals should not only meet the biological needs of an individual but should also be palatable, appealing and retain their hedonistic aspects of taste, smell and visual appeal. While remaining within the principles of medical nutrition therapy, desserts can be incorporated into meals with use of whole grains, low fat dairy or yoghurt, fruits, vegetables and pulses as their primary ingredients. Intake of free sugars can be minimized by using non-nutritive sweeteners, soluble fiber, condiments and spices. In this article, we focus on ways to encourage healthy eating among diabetics while still retaining pleasurable foods such as desserts.*

Key words: *dessert, biological value, energy value, microbiological indicators, pectin, carbohydrates.*

I. Introduction

The problem of quality and food safety is one of the most important in the modern world. Food is necessary not only as a nutrient and energy, but also for physiological value. Specialists in the food industry pay great attention to the creation of technology for the production of therapeutic and preventive products, improving their quality and safety in order to prevent various diseases and strengthen the body's protective functions. The problem can be solved by developing innovative food technologies aimed at increasing the efficiency of using various ingredients as the most important and biologically active sources [1].

The aim of the work is to obtain sugar-free desserts based on vegetable raw materials, namely pumpkin, beetroot, and carrot, and to study their value.

To achieve this goal, the following tasks are set:

1. improving the technology of making pastilles from vegetable raw materials
2. research of physical and chemical properties of products
3. Evaluation of microbiological safety of products

II. Analytical review of the literature

Currently, confectionery products are popular all over the world. However, their excessive use leads not only to irreversible consequences in the body, but also to the acceleration of existing diseases. The result of a mixture of fast carbohydrates and fats is a metabolic disorder that leads to obesity and diabetes. Therefore, the problem of developing new types of dessert products based on the principles of functional nutrition is currently very urgent [2].

There is a growing demand of consumers who lead a healthy lifestyle for low-calorie desserts with a pleasant taste, aromatic and refreshing properties. For the

development of these products, vegetables and fruits are used as the main raw materials.

Desserts on a vegetable and fruit-berry basis are rich in high biological and nutritional properties, abundant vitamin composition, minerals and simple carbohydrates.

Hearing the word "Dessert", first of all, in our opinion, comes a delicious and sweet dish. But in fact, dessert is a very broad concept that originated from the ancient French word desservir. As desserts, all light products that are issued after the main course can be used. For example: cheese, fruit, berries, nuts, juices, confectionery. The history of the origin of desserts appeared several thousand years ago. Traditionally, desserts include cakes, pies, cookies, jam, candy, chocolate, and many Oriental sweets. The name and period of the main dessert originated in the 19th century with the development of sugar production in Europe. Until this time, sweet desserts were only on the table of rich families and on the table of ordinary families on a holiday. Sweet fruits and honey are the main available type of desserts. Many sweet dishes are made on the basis of natural sweeteners, and later they are replaced with sugar. The taste of desserts that are currently consumed by our original dishes, the taste, nutritional value and vitamin composition were far away [3].

Currently, many desserts are rich in glucose sources. They are good at fighting glucose deficiency with hunger to increase strength and improve mood and brain stimulation. If a person follows an active lifestyle, you do not need to use this product anymore [4].

III. Object, subject and research methods

The object of the study was a pastille developed on the basis of vegetable raw materials (pumpkin, carrots, beets).

Production technology for sugar-free dessert products

Pastille-light and voluminous confectionery products. During the experiment, the pastille was made from three different vegetables-carrots, pumpkins, and beets. The main difference between cooking this pastille is not the use of sugar. For the production of pastilles, add vegetable purees, a lot of orange juice and orange pulp to sweeten the taste [5].

First of all, 500g of vegetables were cooked in steam (water) at a temperature of 100ºC and pureed through blenders. The resulting puree in the 1st case is 200g of orange juice, in the 2nd case with the pulp, and in the third case, the orange juice is well mixed with the pulp and peel. Hot pastille coating

dry. After the Pastille has slightly hardened the mass, the orange applies the pulp to the surface. It will take 2-3 days for the paste to dry completely. Pastille is stored in clean, well-ventilated areas at a temperature of 20 ° C and a relative humidity of 75% [6].

Determination of the quality of pastilles by organoleptic method

The study of the quality of the obtained products was carried out by the method of organoleptics.

The organoleptic method is a method for determining product quality indicators based on vision, sniffing, sensation, hearing, and taste. The accuracy and accuracy of

such an assessment depends on the employee's qualifications and competence, as well as on the conditions for conducting the analysis [7-8].

Methods for determining the physical and chemical properties of products

In the course of determining the physical and chemical properties of products, the total protein, total fat content, total amount of sugar, humidity, acidity, and ash content are determined. The content of fructose and glucose in sugars and the amount of pectin were also studied [9-10].

IV. Result of work

The results of organoleptic evaluation of pastille samples are shown in tables 1

Indicators	According to GOST standards	Pumpkin pastilla	Beets pastilla	Carrot pastille
Surface layer	It is characteristic that there is no solid solidification and release of syrup on the side faces.	According to the recipe, the orange pulp is filled in, without hardening and completely dried.	According to the recipe, the orange is sprinkled with pulp, slightly stiff, the syrup is not released.	According to the recipe, the orange pulp is filled in, without solidification, the syrup is not released.
Color	Different product names that are specific to this product.	beige brown	vinous	Orange
Smell	the flavorings of products taken for research should not contain any other substance. If there is a sharp taste and smell, research is not allowed	There is a pleasant smell of dry pumpkin and orange	The smell of dry, pleasant beets prevails.	A pleasant aroma, the aroma of orange prevails in contrast to carrots
Taste	The flavorings of products taken for research should not contain any other substance. If there is a sharp taste and smell, research is not allowed	Pleasant, sweet and sour taste, without foreign taste	Pleasant, sweet and sour taste, without foreign taste	Pleasant, sweet and sour taste, without foreign taste
Structure and consistency	homogeneous small porous, soft, light, characteristic of this product name	Evenly, finely porous, soft, light.	The surface and middle are inho-mogeneous, and small porosities are observed. Soft, light.	Evenly, finely porous, soft, light.

The use of orange pulp and orange seeds with juice made it possible to obtain raw materials of the necessary consistency that meets the requirements of the technology. The resulting products meet the requirements of GOST.

Determination of physical and chemical properties of vegetable pastilles

To assess the quality and properties of dietary pastes, studies were conducted to determine the total proteins, fats, carbohydrates, acidity, humidity, and ash content in the product (table 2).

Table 2 physical and chemical properties of pastilles

	Total protein, g/100г	Fats, g/100г	Carbohydrates, g/100г	Acidity, ° T (norm-not less than 5,0)	Humidity, % (according to the TU norm no more than 9128-001-61664-456 14-25)	Ash content (According to the norm of TU no more than 9128-001-61664-456, 1)
Pumpkin pastilla	2,2	0,3	31,71±0,6	7,5	15,5	0,08
Beets pastilla	4,5	0,1	24,96±0,5	6,9	18,2	0,09
Carrot pastilla	2,5	0,09	19,3±0,04	7,2	16,3	0,075

When calculating the energy value, the amount of energy of pumpkin pastille was 289 kcal, beet paste-113 kcal, carrot paste-83.4 kcal. Thus, from these indicators, you can see that the pastille has a high calorie content.

More detailed studies have been carried out to determine the biological value and vitamin C contained in the raw material and the finished product (Table 3).

Table-3 vitamin C content, mg / 100g

	Source material	Final product
Pumpkin pastilla	8,7	185,3
Beets pastilla	4,5	168,3
Carrot pastilla	4,8	170,5
Orange juice	47,3	-
Orange pulp	52,1	-
orange peel	130,3	-

In the analysis, the orange cheese showed a significant part of vitamin C. If you are using juicy and cortical mixtures increases the vitamin content in the finished product, which is an indicator of biological value of products with a low energy content, which is crucial for a healthy diet.

Many people suffer from obesity and endocrine diseases, and people are forced to take sugar from their diets and replace it with fructose. The difference between sucrose (sugar) and fructose is due to different absorption of the body. The structure of fructose is very important, especially for people with diabetes. Unlike other fructose carbohydrates, they can function without the participation of insulin in internal cellular metabolism. For a short period of time, it is absorbed into the blood, so the increase in blood sugar is very reduced, compared to taking glucose. Fructose does not cause intestinal hormones that stimulate insulin production, so it is widely used in dietary products for people with diabetes [11-12]

Useful properties of glucose occur only when it is used in its own quantity. In our studies, the content of glucose and fructose in the pastille was established [13].

Qualitative indicators of carbohydrates are presented in table-4 .

Table-4 analysis of vegetable pastille carbohydrates

	Glucose,%	Fructose, %
Pumpkin pastilla	31,71	10,98
Beets pastilla	3,93	2,64
Carrot pastilla	24,96	7,13

As a result of table 4, the glucose content in pumpkin is 60% higher than fructose. Glucose 10.98 %, fructose 3.87 %. The composition of beet paste contains fructose four times more than glucose. Fructose 4,05 %, glucose of 0.64 %. Carrot paste contains a glucose content of more than 40%. Glucose 7.13 %, fructose 4.68 %. Therefore, we noticed that the amount of carbohydrates in the composition of pumpkin is much higher compared to three different pastilles.

Pectin is a medicinal food fiber that can form a gel-forming mass that collects toxic substances from the intestinal walls and removes them naturally. The use of pectin-containing products normalizes metabolism by restoring intestinal motility. The uniqueness of natural pectin is the ability to preserve the bacteriological balance of the human body [14-15].

In the course of the study, an analysis was carried out on vegetable raw materials and pectin composition in pastilles. The results are shown in table 5.

Table-5 pectin composition, %

	Raw material composition	Final product
Pumpkin pastilla	2,1	3,87
Beets pastilla	1,3	4,05
Carrot pastilla	0,9	4,68
Orange juice, pulp, shell	1,2	

Determination of the probability of growth and reproduction of microorganisms, including pathogens and microorganisms that cause harm to the product (for example, mold), is indicated in the following table. The results of the study are presented in table 6.

Table 6 microbiological indicators of pastilles

Microbiological indicators	Standards	Pumpkin pastilla	Beets pastilla	Carrot pastilla	Compliance with regulatory documents for test methods
Kmafanm, CFU / g (cm3)	$10^3 \div 10^4, \leq 10^5$ - Storage graphs, benign $> 10^5 \div 10^{6-}$ - Manufactured or stored in violation of technological or sanitary conditions $> 10^6 \div 10^{7-}$ Potentially dangerous as a source of pathogenic microorganisms and their toxins $> 10^7 \div 10^8$ – Damaged, which is confirmed visually (color, change in smell, appearance of mold)	$3*10^3$	$2*10^3$	$3*10^3$	Respond
Molds	No more than 100 CFU / g of product	0	0	0	Respond
Yeast	No more than 50 CFU / g of product	0	0	0	Respond

Studies have shown that the resulting paste samples are microbiologically safe and meet quality indicators.

V. Conclusions

The study resulted in sugar-free desserts based on vegetable raw materials, namely pumpkin, beetroot, carrot, and studied their composition, identified organoleptic, physical and chemical indicators of products and vitamin C content. The "research laboratory for assessing the quality and safety of food products" was also sent to determine the content and pectin composition of carbohydrates and indicators of mold and yeast.

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