

## Development of Technology for Functional Confectionery Products

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**Abstract:** The questions about the special role in the rational health food of the population are given to the creation of fundamentally new, balanced in the composition of products, enriched functional ingredients. Taking into account the chemical composition and technological properties of vegetables and vegetable pastes, vegetables that help to increase the nutritional value of finished products can be promising enhancers of the quality of flour confectionery products.

**Keywords:** rational nutrition, balance, functional, ingredients, vegetable paste, quality, nutritional value.

### INTRODUCTION

A special role in the rational healthy nutrition of the population is assigned to the creation of fundamentally new products, balanced in composition, enriched with functional ingredients.

The concept of state policy in the field of healthy nutrition is aimed at creating a range of natural food products for functional purposes.

The health and life expectancy of each individual and the nation as a whole depend on many factors, the most important of which is the quality of people's nutrition. Vegetables are irreplaceable food products and are the most important source of a number of vitamins and amino acids, macro- and microelements, carbohydrates, proteins, phytohormones, enzymes, phytoncides, aromatic, spicy and other biologically active substances.

It is known that modern society is developing under the conditions of a global environmental crisis, which manifests itself in the condition of environmental pollution not only in large metropolitan areas, but also in the most remote

places from industrial regions. As a result of human habitation in these conditions, the load of negative effects on the body, caused by the formation of free radicals, increases. Vegetable crops play an important role in the prevention of diseases caused by such exposure. Their action is due to the composition of biologically active compounds contained in vegetables, including pectin substances, hemicelluloses, cellulose and low molecular weight antioxidants [1, 2].

Considering the chemical composition and technological properties of vegetables, fruits, berries, vegetables, fruits and berries can be promising improvers for the quality of flour and confectionery products. In addition, their introduction into the composition of flour and confectionery products contributes to an increase in the nutritional value of the finished product.

Vegetables have found widespread use as stabilizers of the emulsion and foam structure of products, including sweet dishes, to improve the technology and increase the nutritional value of flour confectionery products [3].

The work shows the feasibility of the production of flour confectionery products without yeast dough with vegetable additives. Vegetables make it possible to intensify the technological process without reducing the taste of the product, improve its balance in the main food components and reduce the excess calorie content. Slowdown staling during storage.

In accordance with the goal, it is planned to solve the following tasks:

- to develop a recipe and technology for a biscuit semi-finished product with sweet vegetable pastes.

- the participation in the formation of the structure of biscuit dough and baked semi-finished product of sweet vegetable pastes was studied [4].

The processing of vegetables into vegetable pastes and their use in the preparation of culinary products made it possible to expand the range,

improve the quality of finished products, and reduce the amount of eggs and sugar in biscuit semi-finished products. Table 1 shows these characteristics of sweet vegetable pastes from beets and pumpkin.

**Table 1 Characteristics of Sweet Beet and Pumpkin Vegetable Pastes**

Indicators	Beetpaste	Pumpkinpaste
Drymatter, notless,%	40,0±2,0	40,0±2,0
Sugar, notless,%	19,0±2,0	22,0±2,0
pH Wednesday, nomore	3,2±3,5	3,2±3,5

Sweet vegetable pastes make it possible to intensify the technological process of the production of flour products, without reducing the taste of flour products, improve their balance in the main food components, reduce excess calorie content, and slow down staling during storage.

Table 2 shows the quality indicators of the whipped egg-sugar mass for biscuit with different amounts of vegetable pastes.

The data obtained reflect the difference in the properties of sweet vegetable pastes from the properties of mashed potatoes from boiled mashed vegetables. Higher solids content, increased structural viscosity of vegetable pastes have a positive effect on the stability of the whipped mixture during storage and, at the same time, contribute to foaming to a lesser extent. The acidic environment of vegetable pastes also has a positive effect on the performance of whipped egg-sugar masses [5].

**Table 2 Quality indicators of whipped egg-sugar mass for biscuit with various amounts of vegetable pastes**

Vegetableegg-sugarmasses	Quality indicators			
		Heat generating capacity,%	Density, kg / m <sup>3</sup>	Stability ...
Control (novegetablepastes)		341,1±5,2	389,6 ± 5,4	76,3±0,62
With pastes,% by weight of beet flour	10	364,7±6,6	373,1±4,3	81,9±0,61
	20	375,3±7,3	370,5±4,7	82,4±0,52
	30	379,8±8,7	361,8 ± 3,9	83,1±0,49
Pumpkin	10	349,3±5,1	377,1±5,4	81,4±0,32
	20	363,7±6,2	370,1±4,8	82,1±0,64
	30	379,1±8,2	359,0 ± 4,6	83,2±0,21

We associate an increase in the foaming ability of the systems with a certain increase in moisture and, therefore, a decrease in the viscosity of the dough, which contributes to its whipping during kneading, as well as the formation of protein-polysaccharide complexes between flour proteins and acidic polysaccharides of vegetables, which have a high foaming ability.

At the same time, protein-polysaccharide complexes, concentrating in the interfacial adsorption layers of the foam system, increase their mechanical strength and the stability of the entire system during storage.

Table 3 shows the quality indicators of biscuit semi-finished product with vegetable pastes.

As for other indicators of the quality of semi-finished products with pastes, they practically do not differ from the quality indicators of the control sample of semi-finished products, except for moisture, which is 1-2% higher for semi-finished products with vegetable pastes.

The results obtained served as the basis for the development of recipes for a biscuit semi-finished product with a partial decrease in sugar and melange and an increase in the proportion of flour, in order to prevent an undesirable increase in the moisture content of the baked semi-finished product [6].

**Table 3 Quality indicators of biscuit semi-finished product with vegetable pastes**

Sample semi-finished product	Semi-finished product quality indicators				
	Crumb moisture, %	Specific volume, 10 <sup>-5</sup> m <sup>3</sup> /kg	Porosity, %	Crumb compressibility, units pr.AP-4/2	Organoleptic assessment, score
Control (no vegetable pastes)	27,7±0,3	349±6,8	73,2±2,8	175,4±4,8	41
With beet paste, 10%	28,5±0,2	369±8,6	77,1±2,1	184,4±4,7	43
With beet paste, 20%	29,0±0,2	358±7,1	75,4±3,4	180,1±3,1	42
With pumpkin paste, 10%	28,3±0,19	372±7,3	78,3±3,3	187,5±4,9	43
With pumpkin paste, 20%	29,0±0,2	370±8,4	76,6±2,9	180,2±5,2	42

Based on the data provided, we can say that a biscuit with sweet vegetable pastes is not inferior in quality to the control sample, it provides for the replacement of up to 10-15% of the egg-sugar mass with vegetable paste.

A recipe and technology for the production of a biscuit semi-finished product with sweet vegetable pastes based on beets and pumpkin have been developed. The technological scheme for preparing a biscuit semi-finished product with sweet vegetable pastes is shown in Fig. 1.

Quality indicators of baked biscuits prepared according to the developed recipes are shown in Table 4.

**Table 4 Quality indicators of baked biscuit semi-finished products prepared according to the developed recipes**

Quality indicators	Name of biscuit semi-finished product		
	Basic№1	Sponge cake according to the developed recipes	
		Withbeetpaste	Withpumpkinpaste
Humidity, %	25,7±3,0	28,2±3,0	28,4±3,0
Specific volume, m3 / kg	358,2±6,0	362,0±6,2	360,4±7,0
Porosity, %	75,8±1,4	77,7±1,6	76,8±1,8
Total compressibility of the crumb, unit apt. AP -4/2	178,2±4,8	186,0 ± 5,0	184,6±6,0
Crumb plasticity, units pr.AP-4/2	144,4±4,4	148,0±5,2	146,8±4,8
Crumb elasticity, unit pr.AP-4/2	33,8±2,8	38,0±1,6	37,8±1,4

Table 5 shows the data of changes in the structural and mechanical characteristics of the crumb of biscuit semi-finished products with the addition of fruit and vegetable pastes during storage.

**Technological scheme for the production of biscuit semi-finished product with sweet vegetable pastes**



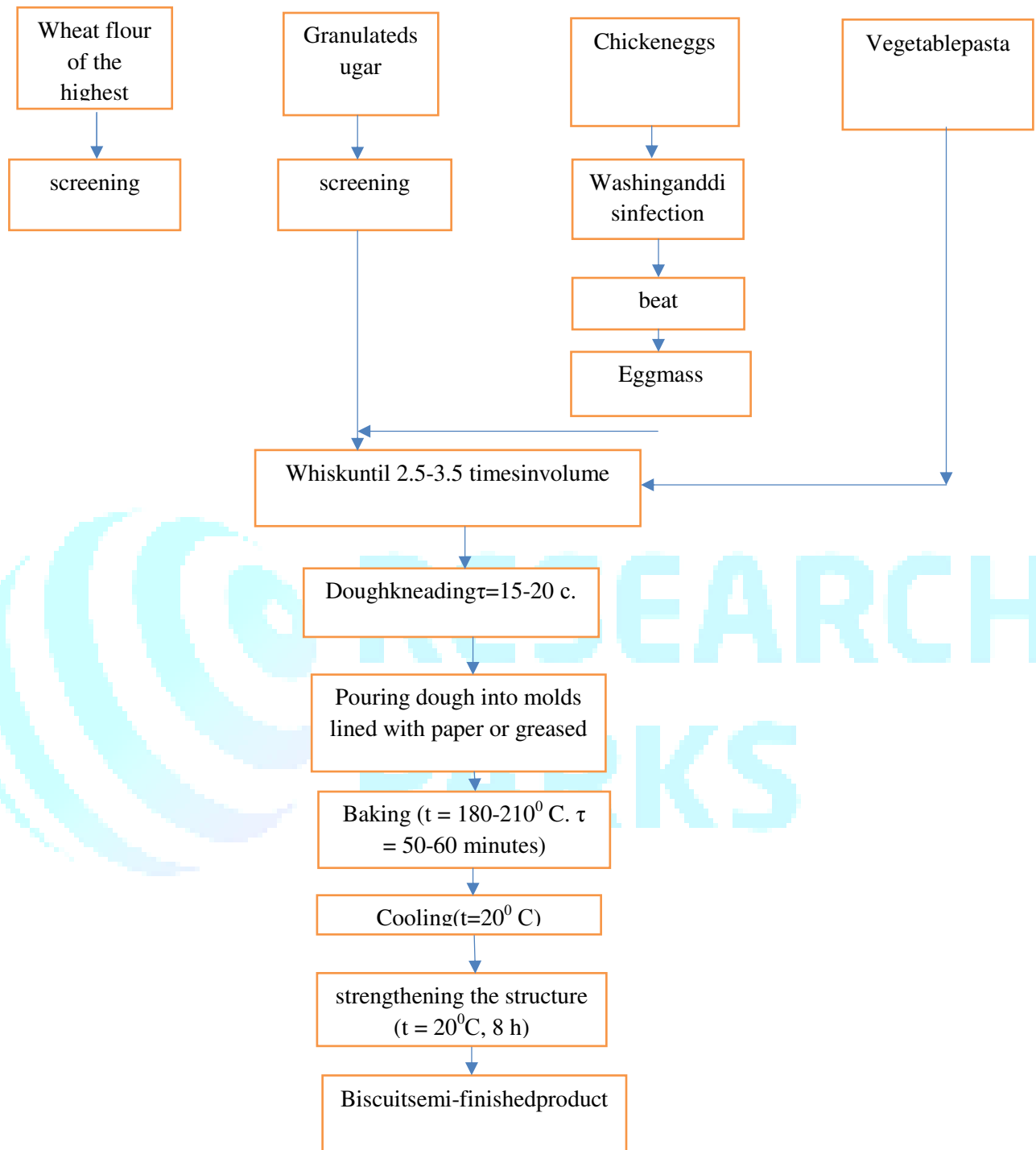


Fig. 1. Technological scheme for the production of biscuit semi-finished product with sweet vegetable pastes

**Table 5 Structural and mechanical characteristics of the crumb of biscuit semi-finished products with the addition of vegetable pastes**

Samples of semi-finished products	Storage duration, hour.	Structural and mechanical characteristics			
		H <sub>bsch</sub>	H <sub>pl</sub>	H <sub>upr</sub>	D
		units save. AP -4/2			
Basic №1	8	178,2	144,4	36,2	100,00
	24	142,4	112,6	31,5	78,75
	48	101,7	82,8	23,8	56,65
	72	71,1	56,3	18,6	37,39
Sponge cake with beetroot paste	8	186,0	148,0	38,6	100,00
	24	163,4	116,8	33,9	86,45
	48	114,7	86,1	26,2	61,15
	72	81,4	59,9	20,7	50,01
Sponge cake with pumpkin paste	8	184,6	146,8	37,8	100,00
	24	151,1	113,4	32,5	85,21
	48	110,3	83,5	25,7	59,85
	72	76,5	58,5	20,1	49,65

Analyzing the data obtained, it can be noted that the introduction of vegetable pastes into the biscuit dough recipe instead of part of the sugar eggs does not impair the quality of the biscuits during storage. The slowing down of the staling process is obviously associated with the water-holding ability of polysaccharides in the cell walls of vegetables [7].

Thus, a gelatinous structure was established in sweet vegetable pastes from beets and pumpkin with a dry matter content of 30%, sugar 5-10%, pH 3.2-3.5, which limits the mobility of moisture in the system. The general binding of moisture and its reduced mobility in structured sweet vegetable pastes determine their microbial well-being when stored for 30 days at 4-6<sup>0</sup> C and 5 days at 18-20<sup>0</sup> C. Sweet vegetable pastes introduced into an egg-sugar mixture for biscuit in an amount 10-20% by weight of flour, contribute to exceeding the foaming ability and stability of the whipped mass.

Biscuit semi-finished product with the replacement of 20% sugar in the recipe, 14% eggs with sweet vegetable pastes are not inferior in quality to the

traditional one, the output of the semi-finished product is preserved [8].

Formulations and technology of sweet vegetable pastes have been developed and scientifically substantiated, the use of which in the production of confectionery products from flour (biscuit semi-finished product) contributes to the improvement of technology and food balance of products.

Formulations and technology for the production of biscuit semi-finished products with the introduction of vegetable pastes instead of a part of eggs and sugar have been developed.

The introduction of products prepared on the basis of a biscuit semi-finished product with sweet vegetable pastes allows to obtain a certain effect: it expands the range of products, which is enriched with components necessary for a person: ballast and mineral substances, vitamins, etc.

**References:**

1. Бунин М.С. Новые овощные культуры России. М.: ФЖУ «Росинформагротекс», 2002. 408с.

2. Технология функциональных продуктов питания: Учебное пособие для вузов под общей ред. Л.В. Донченко. - М.: издательство ЮРАЙТ, 2018. - 176 с.
3. Ашурова М.З., Махмадалиев Б.Д. Методы исследования форм и энергии связи влаги в продуктах растительного происхождения // Вопросы технологии производства продуктов общественного питания, - Москва, 1989. // Деп. в ЦНИИТЭИ торговли. - 13.01.89. - №1. - С 11.
4. Ашурова М.З. Жердев Ю.В. Сорбционная способность овощей и их клеточных стенок в зависимости тепловой обработки // Вопросы технологии производства продуктов общественного питания. - М., 1989. Москва, 1989. // Деп. в ЦНИИТЭИ торговли. - 13.01.89. - №1. - С 13.
5. Пивоваров В.Ф., Пышная О.Н., Гуркина Л.К. - Овощи продукты и сырье для функционального питания // Вопросы питания 2017. Т.86. №3 С.121-127.
6. Старостенко И.Э., Белорукова Е.С. Продукты переработки плодов и овощей-источники функциональных ингредиентов в детском питании. // Техничко-технологические проблемы сервиса №3-2015 // . №3 (33). С 24-27.
7. Тутельян В.А., Разумов А.Н., Вялков А.И. и др. Научные основы здорового питания. М.: Издательский дом «Панорама», 2010 г. 816 с.
8. Старостенко И.Э., Белорукова Е.С. Обогащенное плодовоовощное пюре-продукты функционального питания для детей раннего возраста. - Сб. Новое в технологии и технике функциональных продуктов питания на основе медико-биологических воззрений: матер. IV Международная научно-техническая конференция-Воронеж: ВГУИТ, 2014 г, с. 316-319
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