

USING VEGETAL ADDITIVES IN THE FIELD OF BAKERY

***Boeștean O.**

Ghendov–Moșanu A.

Technical University of Moldova–Chișinău, Moldova

***Boeștean O., e-mail: olexia69@list.ru**

Abstract: the researches has followed to obtain high quality products by using non-traditional vegetal material – fresh carrot and carrot powder. Surveys were effectuated in order to establish the technological characteristics and the physico-chemical properties of the samples with the addition of carrot, the optimal dose for improving the quality of finished products. Researches have shown the nutritional value and food additives of fresh carrot and carrot powder, their use in the manufacture of new products with the organoleptic and physical-chemical characteristics superior to other bakery products.

Keywords: wheat flour, bread, improvement, carrot, drying.

Introduction

Currently it needs to create new technologies for people who are in natural and technological catastrophic conditions, in critical and damaged situations; it is also necessary to increase the assortment of food items for prophylactic food in order to decrease the risk of illness with the most common cardiovascular disease, hypothermia, the body's immunity and to protect the environment. Therefore it is necessary to enrich the assortment of bakery products, using various additives: radio-protective (β -carotene, compounds containing Ca), cereals, preparations containing iodine [1]. In the bakery industry, in order to contribute to the improvement of product quality, the conditions are complied with: the use of breeder in minimum quantities, but with a great influence on the intensity and quality of the finished product; widening the base of raw material (use of non-traditional raw materials that will provide increased nutritional value and biological properties of bread, but also decrease cost price). Such food may be the carrot, so, as the subject of research in bakery presents a particular interest. Carrot contains β -carotene, vitamins of the group B (B₁, B₂, B₆, C, E, PP), salts of Ca, P, minerals (Na, Cu, Cl, Al, Br, I, Mn, Cr, Zn) [2, 3].

Materials and methods

To perform analyses the wheat flour of superior quality were used (GOST 26574–85) [4] with the following characteristics: moisture – $14.0 \pm 0.10\%$; acidity – 2.70 ± 0.10 degrees; wet gluten – $26.40 \pm 0.12\%$; dry gluten – $11.20 \pm 0.11\%$; hydration capacity of gluten – $58.0 \pm 0.14\%$; index of gluten extantion – 15cm; "Power" of flour – 38mm; hydration capacity of flour – $50.00 \pm 0.11\%$. To the research were used the most widespread variety of carrot Nantscaia Nantscaia 4 (per 100g of product) (table 1):

To obtain carrot powder (fine, homogeneous, intense orange color, with a sweet taste, strong flavor of carrot) used the combined method of drying with drying agent temperature of 105°C [5]. To prepare dough used mono phase process. Raw carrot, before being added to the dough, it was shredded, and then introduced into the amount of water used for kneading. The dough fermented under thermostat for 2.5 h at a temperature of

32.0°C, and relative humidity 80–85%. To assess the quality of the product with the addition of vegetal material samples of baking were made. Bread Baking took place in the laboratory oven at 220 – 240°C for 45 min.

Table 1. Physico–chemical characteristics

	Fresh carrot	Carrot Powder
Humidity, %	86.00 ±0.10	7.80±0.11
Ash content, %	0.74±0.11	0.74±0.11
Pro–vitamin A, mg – %	9.57±0.13	8.29±0.11
Total sugar, %	5.80±0.11	5.80±0.10

Results and discussions

Experiments were carried out with the addition of fresh carrot and carrot powder, using proportions of 5, 10, 20 and 30 (% total flour). We studied the influence of the carrot addition on the physical–chemical indices of the dough. Analyzing the obtained results it was found that with increasing the amount of the addition of fresh carrot and carrot powder, which is added to the dough, it is observed an increase of moisture dough compared to the blank. It changes the acidity, but increasing the amount of the addition does not influence upon them, being constant. This fact can be explained by the content of sugars in the vegetal product. High content of nutrients, that it has carrot, ensures power and activity of yeast in the fermentation process of the dough and as a result, getting bread with large volume.

After examining the samples obtained were as follows: compared to the blank, physical–chemical indices of bread samples had the following variations (table 2).

Table 2. Variation of main indices of bread with added fresh carrot and carrot powder.

Blank		Indices			
		Humidity, %	Acidity, grade	Porosity, %	Specific volume, cm ³ /g
		43.20±0.10	2.10±0.11	71.30±0.11	3.4±0.08
The addition of fresh carrot, % of flour mass	5	43.60±0.10	2.40±0.12	71.90±0.10	3.5±0.07
	10	43.70±0.15	2.40±0.11	73.50±0.10	3.7±0.10
	20	43.70±0.12	2.40±0.10	73.00±0.10	3.6±0.11
	30	43.80±0.15	2.40±0.15	71.50±0.07	3.4±0.15
The addition of carrot powder, % of flour mass	5	43.40±0.11	2.40±0.11	72.10±0.09	3.7±0.14
	10	43.50±0.11	2.60±0.10	74.00±0.10	3.8±0.12
	20	43.60±0.13	2.60±0.13	74.50±0.11	3.7±0.10
	30	43.70±0.11	2.80±0.10	72.80±0.13	3.6±0.11

The capacity of flour to form gas increases with the amount added of carrot, respectively: 1330 ml CO₂, 1380 ml CO₂, 1410 ml CO₂, 1490 ml CO₂ for bread with fresh carrot; that is, the value rose 1.12 times. Analyzing the sample data obtained with the addition of carrot powder, respectively, the following data were obtained: 1310 ml of CO₂, the 1435 ml CO₂, 1510 ml CO₂, 1610 ml CO₂ he ability to form gas is 1.23 or higher. Making bread comparing of the results obtained with the addition of vegetal and the blank, fermentation capacity increases 1.16 times for bread with added fresh carrots, 1.26 times – adding carrot powder.

Analyzing the results, we obtained products with quality indices which fall into the higher professional standards, among them remarking the sample with the addition of 10% and 20% fresh carrot added carrot powder.

Sensory analysis of bread was carried out by a group of 5 tasters, who have caused such features as: the shape and volume of the product; the color and appearance of the shell; the degree of ripeness, condition and layout of the kernel; core porosity and pore structure; the aroma; the taste. Evaluation of sensory quality of bread was made by the method of scale of 30 points [6].

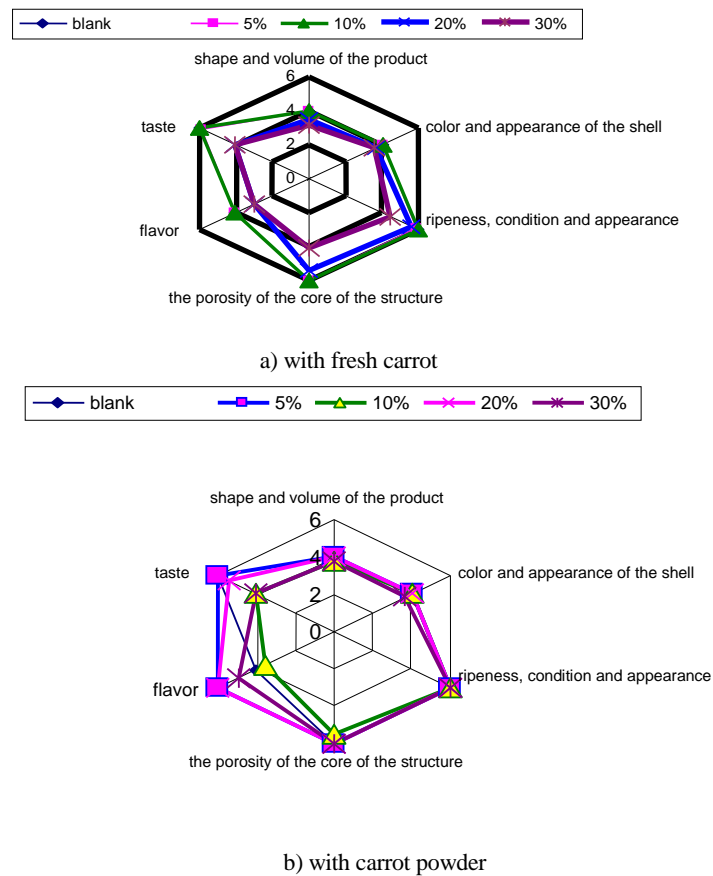


Fig. 2. Comparative characteristics of samples taken in accordance with the score obtained after tasting.

The addition of carrot brings a significant contribution of carotene. Pro vitamin A content in bread increases with the increase of the quantity of addition, brings bread intake of sugars. The bread obtained as a result of the use of carrot, both fresh and the powder form, has pleasant, tasteful and pleasant smell, high nutritional value and longer duration of keeping fresh.

Conclusions

The work aimed to research and analyze the influence of the addition of fresh carrot and carrot powder on the quality indices of semi-finished and finished products.

At the addition of fresh carrot were obtained products with pleasant taste and aroma, palatability and physico-chemical being higher in the samples with the addition of carrot powder is the same.

Making physico-chemical analysis of finished products has been found that with the addition of carrot besides the intake of sugars and β -carotene, which shows benefits on the cardiovascular system, immune, digestive, improves the nutritional value of the product, it reduces the calorific value, it enhances the colour of core (the egg yolk can be substituted in cake products that will contribute to the reduction of production cost) and the shell, prolongs the product conservation.

The addition of carrot powder contributed beneficial on physico-chemical characteristics of bread. All samples were obtained with a well-developed volume, with high porosity compared to the blank. As a result it was determined the optimal proportion of added carrot: sample with added 10% fresh carrot and 20% added carrot powder.

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