

# TECHNOLOGY OF BAKERY PRODUCTS WITH CAROTENE-CONTAINING PLANT RAW MATERIALS

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**Introduction.** By-products of fruits and vegetables are promising raw materials for the production of fortified bakery products. In particular, it is advisable to use carotene-containing products containing a significant amount of dietary fiber, pectin, and minerals. Scientists have proved the expediency of using vegetable juice and puree in the technology of flour confectionery and bakery products.

However, the research results show that the content of valuable components in the pomace is much higher than their content in the juice. In addition, pomace has a significantly longer shelf life compared to juice and puree. The pomace is obtained in large quantities in the juice production technology. In the technology of organic juices, only fresh fruits and vegetables are used, so that the pomace can be used for the production of other products. In order to extend the shelf life of the pomace, they are dried and can be additionally crushed. It is such pomace that is a valuable raw material and a source of dietary fiber, minerals and vitamins. In carrot and pumpkin pomace, a valuable component - beta-carotene, works as an antioxidant, which helps the human body fight cell damage, slows down their aging and helps to reduce various negative effects associated with aging [1, 2, 3].

**Materials and methods.** The work investigated dried carrot and pumpkin pomace, bread from first grade wheat flour. Dough for laboratory baking was prepared by the straight dough procedure. The influence of pomace on bread quality indicators, specific dough volume and shape stability of products was determined.

**Results.** Based on the results of laboratory test vials, it was found that carrot and pumpkin pomace affects the quality of bread in different ways. An increase in the dosage of pumpkin pomace leads to a significant darkening of the crumb and the appearance of a too pronounced smell of dried pomace. This is due to the fact that the color of the pumpkin pomace is light brown, and the pomace itself has a specific smell. Investigated the structural and mechanical properties of yeast dough with pomace. Dried pomace was added to the mass of second grade flour in the amount of 5, 10 and 15%. It was found that after 3 hours of proofing, the spreading of the dough balls decreases with an increase in the dosage of pomace. The specific volume of the dough with pomace is less in comparison with the control (Table 1). However, gas formation in the pomace dough increases, this is due to the presence of monosaccharides in the pomace composition, which are available for yeast.

**Table 1** - Structural and mechanical properties of wheat dough with carrot pomace and the specific volume of bread.

Indicator	Control	Carrot pomace, % to the mass of flour			Pumpkin pomace, % to the mass of flour		
		5	10	15	5	10	15
Specific volume of dough, cm <sup>3</sup> / 100 g	310	280	200	190	270	195	180
Blurring of the dough ball, cm	11,0	9,5	9,0	7,5	9,0	8,3	7,5
Specific volume of bread, cm <sup>3</sup> / 100 g	220	200	180	160	195	175	115

Despite the increase in gas formation, the specific volume of dough and products decreases. This is caused by an increase in the water absorption capacity of the dough and a decrease in its moisture content, which causes a decrease in the specific volume and porosity of the bread. Despite the organoleptic characteristics of products (taste, smell, crumb color), it is recommended to add carrot pomace up to 10%, and pumpkin pomace - up to 5% to the mass of flour in the recipe.

**Conclusions.** Dried pumpkin and carrot pomace increases the water absorption capacity of the dough, as a result of which its viscosity increases. The water absorption capacity of the dough is increased due to the high content of pectin and dietary fiber in the dried powder. During the proving, the pomace products have less volume and less loosened crumb. Therefore, research should be continued towards finding ways to improve the quality of products.

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