INFLUENCE OF PUMPKIN FLOUR ON SENSORY AND PHYSICAL-CHEMICAL PROPERTIES OF WHEAT BREAD

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Nowadays in people's nutrition there is a shortage of the main nutrients - dietary fibers, complete proteins and minerals. One of the ways to effectively replenish their insufficient amount is the use of raw materials with their high content in the formulation of mass consumption products, in particular bread [1].

A well-known technological technique for this purpose is the replacement of a part of wheat flour with other raw materials - various types of flour, bran, etc., which are not traditional for the bakery industry. Pumpkin processing products are a promising raw material with high content of protein and dietary fiber [2].

Pumpkin flour contains 3.8 times more protein than wheat flour of high grade and 3.2 times more dietary fiber. However, despite the ability to significantly increase the nutritional value of products, this raw material has an impact on the sensory and physical-chemical indicators of bread. To determine the rational amount of its introduction, pumpkin flour was dosed in the amount of 5%, 10%, 15%, 20% to replace wheat flour. Different amounts of additives have different effects on quality indicators of bread. Therefore, it was advisable to conduct an analysis of manufactured products with pumpkin flour, taking into account the importance of each quality indicator (Table 1).

Table 1.

Sensory assessment of the bread prepared with the partial replacement of wheat flour with pumpkin flour on a 100-point scale taking into account the weighting factor of quality indicators

Indicators	Weighting factor	Control sample	Pumpkin flour to replace wheat flour, %			
			5	10	15	20
1	2	3	4	5	6	7
Specific volume of bread, cm^3 /100 g	0.15	5.0±0.3	4.7±0.3	4.0±0.3	3.3±0.3	3.0±0.3
Shape stability of bread, baked without form	0.15	convex upper crust	convex upper crust	convex upper crust	upper crust with depressions	upper crust with depressions
		5.0±0.3	5.0±0.3	4.7±0.3	3.5±0.3	3.0±0.3

Continuation of Table 1.

1	2	3	4	5	6	7
Color of the crust	0.05	light yellow	golden	with a greenish tint	with green tint	with green tint
		5.0±0.3	5.0±0.3	5.0±0.3	5.0±0.3	5.0±0.3
Surface condition	0.05	smooth, without cracks	smooth, without cracks	smooth, without cracks	smooth, without cracks, uneven	smooth, without cracks, uneven
		5.0±0.1	5.0±0.1	4.5±0.1	4.0±0.1	3.0±0.1
Color of the crumb	0.05	light	with darkening shade	with greenish shade	with green shade	with green shade
		5.0±0.1	5.0±0.1	4.7±0.1	4.5±0.1	4.5±0.1
Porosity structure	0.09	even, small thin-walled	even, small thin-walled	even, small thin-walled	even, small thick-walled	even, small thick-walled
		4.8±0.3	4.8±0.3	4.6±0.3	3.5±0.3	3.0±0.3
Elasticity of the crumb	0.12	elastic	elastic	elastic	elastic	elastic
		4.8±0.1	5.0±0.1	5.0±0.1	5.0±0.1	5.0±0.1
Aroma	0.11	inherent in the product	inherent in the product	expressed, with pumpkin aroma	expressed, with pumpkin aroma	brightly expressed, with pumpkin aroma
		4.6±0.3	4.6±0.3	4.8±0.3	5.0±0.3	5.0±0.3
Taste	0.13	inherent in the product	with pumpkin taste	with pumpkin taste	with brightly expressed pumpkin taste	with brightly expressed pumpkin taste
		4.8±0.3	5.0±0.3	5.0±0.3	5.0±0.3	5.0±0.3
Chewiness of the crumb	0.10	good chewiness	good chewiness	good chewiness	good chewiness	good chewiness
		5.0±0.1	5.0±0.1	5.0±0.1	5.0±0.1	5.0±0.1
Score (out of 100 points)		97.2± 0.2	98.2±0.2	94.6±0.2	87.6±0.2	83.0±0.2

* Results given as: M ± SD (mean ± standard deviation) of triplicate trials.

With an increase in the percentage of replacement of wheat flour with pumpkin flour, the initial and final acidity increased, which is caused by the higher acidity of the

studied raw material. The dimensional stability of bread almost did not change. The specific volume decreased by 1.8-34.8% and the porosity of bread - by 8.2-26.0% due to the swelling specificity of pumpkin fiber.

Taking into account the obtained results, in order to maximize the enrichment of bread with important nutrients, in particular dietary fibers, and in order to obtain high-quality bakery products, it is worth replacing no more than 10% of wheat flour with pumpkin flour.

References:

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