

## BREADS WITH PUMPKIN, POTATOES AND ONIONS

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**Annotation:** This article discusses the technology of production of three types of bakery products based on natural vegetables such as pumpkin, potatoes and onions. Each product is prepared according to a separate recipe, and their organoleptic, physicochemical and biological properties are analyzed. The results of the study showed that these vegetable breads can be recommended to consumers as functional food products.

**Keywords:** pumpkin, potatoes, onions, production, functional, organoleptic, biological, dietary, porous, acidity, beta-carotene, starch, flavonoids;

Today, one of the main directions of the food industry is the production of functional products that strengthen human health. In particular, there is an opportunity to increase their nutritional value by introducing additional biologically active substances into bakery products. For this purpose, a number of studies have been conducted, and vegetable-based bread products are becoming popular. Pumpkin, potatoes, and onions are vegetables that are distinguished by their nutritional and biologically active properties. When added to bread products, they not only improve the taste and texture, but also make the product more useful, dietary, and resistant to storage [1].

During the research, a separate recipe and technological process were developed for each type of bread. In the preparation of pumpkin bread, 10% of pumpkin puree was added to the main dough. Pumpkin is first steamed and turned into a smooth puree. It increases the biological value of bread due to the beta-carotene and vitamin C it contains. Pumpkin bread has a light yellow color, a pleasant sweet taste, and a soft, porous structure. In the production of potato bread, 8% of mashed potatoes are used. Potatoes are first peeled, boiled, and mashed. When added to the dough, the elasticity of the bread increases, its softness is maintained for a longer time, and the energy value increases due to the starch. Such breads are considered useful for children and the elderly, as well as for those on a diet. In the production of onion bread, 5% of fried onions are used. The onion is fried in vegetable oil and mixed into the dough. Onion bread is distinguished by its unique aroma, taste, and most importantly, natural antibacterial properties. This product can have a positive effect on strengthening immunity. It has a brownish appearance and forms a smooth and slightly crispy layer when baked [2].

The analyses showed that the moisture content of these loaves was in the range of 34–39%, and the acidity level was 2.3–2.7 degrees. According to the results of the organoleptic evaluation, all three types of bread were positively evaluated in terms of appearance, taste, smell, color and texture. Zucchini bread was distinguished by its richness in vitamins, potato bread by its moisture-retaining properties, and onion bread by its strong aroma and antibacterial properties. During this study, the technological and nutritional value of adding vegetables to the composition of bread was analyzed in depth. Using special tests, the effect of vegetables in bread on the body, shelf life and texture indicators were evaluated. In addition, parameters such as fermentation duration, dough rise rate, baking temperature and time were selected individually for each product. Microbiologically, onion bread had a longer shelf life than other breads due to the presence of substances with natural preservative properties. The results of these experiments showed that breads with vegetables are more beneficial to the body, easier to digest and more resistant to storage than regular breads. Also, based on consumer organoleptic assessments, pumpkin bread received high scores for taste and appearance, while potato bread was distinguished by its structural integrity and elasticity [3].

In recent years, due to the growing interest in healthy eating, the demand for bakery products containing natural and biologically active components has been increasing. Vegetable breads are especially rich in vitamins and minerals, and they are recommended for children, the elderly, pregnant women and people on a diet. Vegetables such as pumpkin, potatoes and onions are easily grown in different regions, relatively inexpensive and nutritious products, and their inclusion in bakery products is also economically beneficial for manufacturers. At the same time, consumer tastes were also studied, and their attitude to tasty, healthy and new types of bread was positively assessed. When making vegetable bread, the properties of each component should be taken into account. For example, due to the high moisture content of pumpkin, the amount of water added to the dough should be reduced. Potatoes are rich in starch and increase the elasticity of the dough, but if used excessively, the structure of the bread can become dense. Onions, with their essential oils and strong aroma, give the product an individual character, but when fried, attention should also be paid to the fat content. All this requires technological discipline and experience from the manufacturer [4]. Breads with the addition of vegetables can often be wetter, which reduces the shelf life. Therefore, the technology must strictly follow the heat treatment stages and hygiene rules. Special packaging methods - vacuum or controlled atmosphere packages - extend the shelf life of vegetable breads. Also, strengthening microbiological safety measures and controlling the quality of raw materials are important factors. Also, among the advantages of vegetable bread products, one can highlight their functional properties. For example, the beta-carotene contained in

pumpkin bread helps to strengthen eyesight by converting it into vitamin A in the body. Potato bread is characterized by easy digestion, which is important for people with gastrointestinal problems. Onions are known for their antiseptic and immune-boosting properties, and eating onion bread is useful in protecting against seasonal viral diseases [5].

The addition of vegetables enriches the sensory properties of breads (taste, color, aroma, and texture). Onion products give bread a savory, slightly spicy taste, while potatoes give it softness and density. Zucchini, on the other hand, not only increases the visual appeal of the product by being rich in nutrients, but also by giving the dough an orange color. This also helps the product to be recognized in the market. It should also be noted that vegetable breads are also seen as import substitutes, since they are made using local raw materials. This increases economic efficiency, provides employment, and strengthens food security. At the same time, it opens up new opportunities for small and medium-sized businesses [6].

Zucchini, potato, and onion-based breads outperform regular breads with their high biological value, taste, and functional benefits. Each product meets the different needs of consumers and is especially useful for groups that adhere to the principles of healthy eating. Mass production of these vegetable breads and their wide promotion among the population can become an important component of modern nutrition culture [7].

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