

VACUUM DRYING OF VITAMIN-ENRICHED NUTRITIONAL MIX

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Sublimated slices or segments of vegetables and fruits are widely used in a variety of food products such as pastries, breakfast cereals, soups, baked goods, and food boxes. Kazakh national dish "zhent" is considered an environmentally friendly product that has a beneficial effect on the human body, enriching it with various vitamin and nutrient blends. Zhent is prepared from pre-cleaned, dried, and roasted wheat (barley, oats) groats (talgan), with the addition of butter and sugar. Honey, raisins, and nuts are also added to give the fruits a special flavor, nutritional value, and enrichment with various vitamins.

The main component of zhent is talgan, prepared from pre-dried, cleaned, and roasted wheat (barley, oat flakes) grains, ground on millstones.

Wheat talgan contains proteins (glutenin, leucozip), fiber, phosphorus, magnesium, calcium, vitamin E, and B-group vitamins. Additionally, wheat grains are rich in chromium, potassium, and lithium. These micronutrients help fight atherosclerosis, diabetes, ischemia, and cardiovascular diseases. Vitamin C and iron are necessary for protection against anemia and overall strengthening of the body. The calorie content is 320 kcal.

Thus, zhent is a complex food product with various beneficial properties. Valuable food products are used in its preparation, which increase the cost of the final product. To reduce the cost of "zhent" and increase the content of beneficial vitamins and micronutrients in the product, we propose replacing sugar with melon. At the same time, the moisture introduced with the melon is removed by vacuum drying.



Figure 1. Lyophilization process Figure 2. Zhent after freeze drying

Melon contains proteins, fats, carbohydrates, and sugars and has unique healing properties. Melon is a low-calorie fruit, with only 33 calories per 100 grams. The beneficial and healing properties of melon are widely used to strengthen the nervous system. Melon contains serotonin, known as the "happiness hormone." If you feel unwell but not depressed, your mood will improve if you eat a few pieces of melon. Due to its diuretic properties, melon can be considered a plant-based remedy for reducing high blood pressure. Melon is sometimes included in the complex dietary regimen for patients with anemia and hemorrhoids.

For the preparation of zhent, melon imported from Tajikistan, locally produced wheat talgan, and butter are used. The melon pulp is pre-crushed in a blender until smooth. Then talgan and butter are added to it. After that, the mixture is thoroughly mixed by hand until a homogeneous viscous mixture is obtained. The resulting mixture is divided into glass cups and dried in a sublimation dryer HARVEST. The results of preparing a cake with the addition of melon instead of sugar are presented. The mass ratio of zhent components with melon is as follows: Talgan: Butter: 1:0:0; 0.6:0.4:0; 0.6:0.3:0.1; 0.5:0.4:0.1; 0.4:0.6:0.1. The drying time is 24 hours. The mixture of melon with a large amount of talgan and butter was dried. The resulting slab swells, has a sweet taste, and a light brown color.

Microstructure studies of zhent with the addition of melon were conducted at the testing regional laboratory of engineering profile "Structural and Biochemical Materials" of M. Auezov South Kazakhstan University. The analysis was carried out using a JEOL JSM-6490LV scanning electron microscope with a guaranteed resolution of 3 nm, which allows studying objects with a diameter of up to 8 inches.

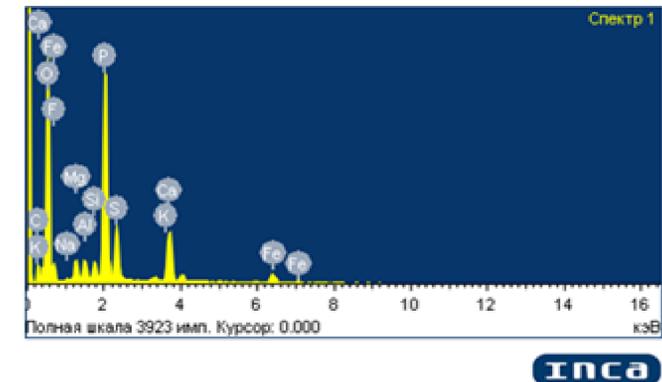


Figure 1. Chemical composition of jent with addition of melon

Based on the analysis of the objective drying of zhent with the addition of melon instead of sugar and its sublimation drying in a harvest dryer, the following conclusions can be drawn:

- for the preparation of zhent with the addition of melon instead of sugar, mixture No. 4 can be used, with mass ratios of zhent components with melon: Talgan: Butter 0.5:0.4:0.1;
- the dried slab is dense, sweet-tasting, and light brown in color;
- by giving the slab a certain shape, it can be cut into smaller pieces of the desired shape and wrapped in wrappers. Thus, the introduction of melon contributes to increasing the nutritional value and improving the consumer properties of the new products.

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