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Evaluation of the Biological Value of Pumpkin Powder When Used in Production

B. N. Amanov, Sh. Sh. Baqoyeva
Bukhara Engineering and Technology Institute, Bukhara, Uzbekistan

Annotation: The value of pumpkin lies in the fact that some of its varieties contain a large amount of carotenoids, as well as sugars, dietary fiber, vitamins, macro- and microelements. They are added to salads, soups, cereals, drinks in natural or crushed form. Pumpkin juice has such medicinal properties.

An insufficient amount of micro- and macroelements negatively affects the state of various parts of the body and such major phenomena as growth.

Keywords: Pumpkin, β-carotene, pumpkin seeds.

Pumpkin (*Cucurbita*) is the type of raw material that, firstly, grows in the internal territories of the state, and secondly, does not lose consumer qualities for a long time. At the moment, this melon plant is not widely used, but its therapeutic and prophylactic properties.

The most widespread are 3 types of pumpkin: large-fruited, nutmeg, hard-barked. The value of pumpkin lies in the fact that some of its varieties contain a large amount of carotenoids, as well as sugars, dietary fiber, vitamins, macro- and microelements. The content of provitamin A in pumpkin exceeds its amount by 5 times compared to carrots and 3 times - beef liver [1,2].

Pumpkin is baked, boiled, stuffed, added to pies and cereals, casseroles and pancakes. Due to the fact that pumpkin has low calorie content, it is often used in dietary and preventive nutrition. Also, the fruits are considered hypoallergenic, which allows them to be used in baby food. Along with this, one of the most valuable components of pumpkin are its seeds, rich in essential oils, proteins, phytosterols, phytin and salicylic acid. They are added to salads, soups, cereals, drinks in natural or crushed form. Pumpkin juice has such medicinal properties as: anti-inflammatory; antipyretic; contributes to the improvement of vision; diuretic; improves blood circulation. But the developed range of functional products is extremely limited.

To study the biological value of pumpkin to create a functional flour product.

The benefits of pectins and β-carotene have been proven by research in the field of dietetics [3,4]. Pumpkin and products of its processing complexly combine both of these components, thereby filling the human body with pectin, which has an excellent absorbent effect, and β-carotene, which is a source of unsaturated hydrocarbon, a fat-soluble vitamin. β-carotene, entering the body, is synthesized into retinol (vitamin A), having a beneficial effect on the human body [3, 4]. Another of the advantages of vegetables and fruits is a beneficial effect on the processes of assimilation of proteins, fats and minerals. According to some scientists, the assimilation of nutrients increases when proteins and fats are consumed together with vegetables [5,6]. Pumpkin seeds also contain a large amount of fat, but the pulp of pumpkin fruits contains less fat than wheat flour.

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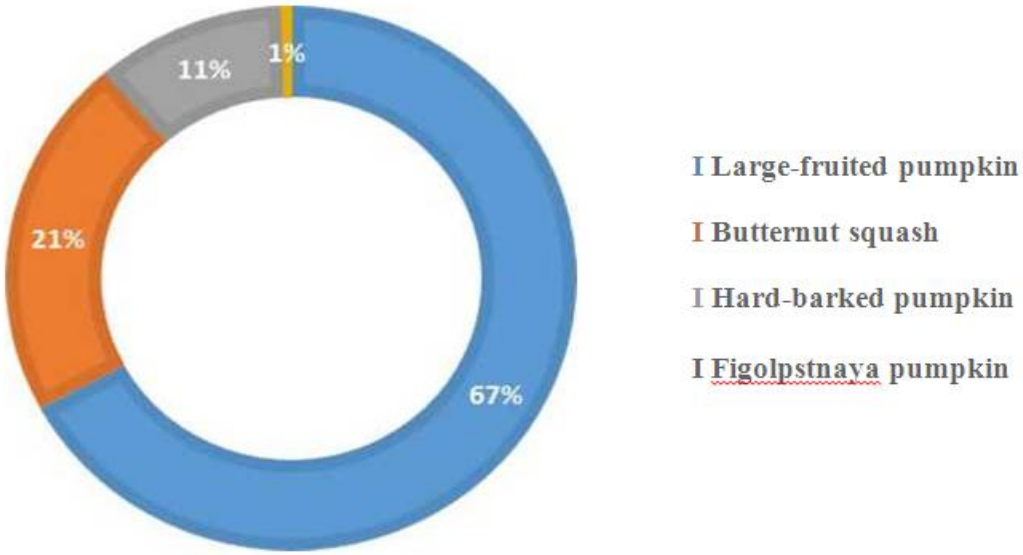
Pumpkin has long proven its positive effect on the human body. Pumpkin fruits contain from 4 to 7 grams of carbohydrates, 1 gram of protein, about 0.1 grams of fat. The calorie content of this melon culture ranges from 22 to 28 kcal per 100 grams, depending on the variety [7,8,9].

Along with natural vegetables, fruits and berries, natural powders are used. They are produced by drying fruits at a temperature of 40°C, which makes it possible to leave the properties of raw materials unchanged [10].

Currently, dozens of botanical pumpkin species are distinguished, from which more than 200 varieties are obtained. In our country, 3 species of the genus Cucurbita are in the greatest demand: nutmeg pumpkin - C. moschata, large-fruited - C. maxima and hard-barked (ordinary) - C. pepo. The State Register of Breeding Achievements includes a total of 167 pumpkin varieties that have access to use [11,12].

Figure 1 shows the percentage distribution of varieties.



Rice. 1. Percentage distribution of pumpkin varieties

For research, standardized methods for determining the chemical and vitamin composition of pumpkin fruits, powder from pumpkin seeds were taken.

Previously, the variety of species and varieties of pumpkin has been described. Muscat pumpkin was used for the study. This variety has a delicate pleasant aroma, it is oily, dense and contains up to 11.5% sugar.

Powder from pumpkin seeds - a source of protein, phosphorus, magnesium, zinc, iron.

The objectives of the study are defined as follows:

1. Study of the qualitative and quantitative composition of pumpkin.
2. To identify and analyze the possibility of introducing pumpkin as a functional additive in the production of semi-finished biscuit.

They indicate the potential use of Muscat pumpkin, pumpkin seed powder in the production of functional flour products.

Vitamins are a set of basic combinations of different molecular weights of various chemical genesis. They are important for the orderly and well-coordinated work of absolutely the whole organism, its maturation as a whole. Separate systems, including humans, are not evolutionarily

adapted for the autonomous production of vitamins. In this regard, they must be extracted from other sources in finished form, for example, from vegetables and fruits, and they can also be consumed in a concentrated form to replenish the daily daily allowance.

Vitamins smooth out or eliminate the negative impact on the individual of many pharmaceuticals, including antibiotics. An insufficient amount of micro- and macroelements negatively affects the state of various parts of the body and such major phenomena as growth, mental and physical development, reproduction, and immunity.

Pumpkin contains the most vitamin C - 8 mg / 100 g, vitamin B4 - 8.2 mg /100 g. At the same time, the fruits are able to satisfy the daily requirement (when using 100 g of pumpkin) in vitamin A - by 27.8% , in beta-carotene - by 30%, in vitamin Wb - by 28.5%, silicon - by 100%, copper - not less than 18% [13,14].

The vitamin composition of Muscat pumpkin is presented in table 1.

Table 1. Average composition of pumpkin fruits

Name of substances, mg	Number of substances	Norm	Percentage of the norm
Vitamin A	249	900	28
beta carotene	1,6	5	29
Vitamin *PP*	0,6	19	3.2
Vitamin *C*	9	89,9	8,8
Vitamin *E*	0,3	14	2,7
Vitamin *Bi*	0,04	1,5	3,2
Vitamin *B 2*	0,05	1.5	3,3
Vitamin *B4*	8,0	500	1,5
Riboflavin	13	400	3,4

Pumpkin seeds are a rich source of amino acids, especially tryptophan. The study of the properties of powder from pumpkin seeds gave such indications that there are more proteins and fats also relative to the internal contents of the pumpkin, and also wins in terms of the amount of Na, K, Ca and other macro- and microelements [15,16].

For the production of biscuits, the proportion of starch in pumpkin seed and the level of protein are important. Studies have shown that in pumpkin seed powder, the total amount of protein was almost 30% per 100 g of dry matter, as can be seen from table 2.

Table 2. Chemical composition of pumpkin powder, % per 100 g of dry

Index	Quantity %
Squirrels	28,5
Carbohydrates	10,9
Fats	52,0
Alimentary fiber	28,2
Reducing sugars	1,5
Raw ash	5,0

Serotonin produces the amino acid tryptophan, which is why pumpkin protein is considered a natural antidepressant. Table 2 shows that pumpkin seed powder has a high content of dietary fiber (fiber) - 28%. This product is considered hypoallergenic. Protein from pumpkin seeds is also used to cleanse the body of dangerous microbes, fungi, parasites due to anthelmintic properties.

The total content of carotenoids in the manufactured product is shown in table 3.

Table 3. Biscuit by carotene content

Carotenoids	Weight fraction per 100 g of product, mcg	Weight fraction per 30 g of the product, mcg	daily rate,%
β - carotene	3000	900	18
a- carotene	500	154	3
Lutein	1450	440	8
Total	4950	1494	31

Currently, one of the priority areas for the development of production is the use of fruit and vegetable raw materials growing in local areas. Pumpkin and pumpkin products can be considered such a fruit.

Pumpkin is rich in minerals such as fluorine, magnesium, copper, calcium, zinc, manganese, phosphorus, iodine. In addition, it has good keeping quality and can be stored at room temperature and not lose its beneficial properties for a long time [17, 18].

Pumpkin seeds are a rich source of amino acids, especially tryptophan. The study of the composition of pumpkin seed powder showed that it includes a significantly larger amount of such basic components as proteins and fats, as well as some macro- and microelements in comparison with pumpkin pulp [19].

Based on the above, we can conclude that the creation of a flour confectionery product using pumpkin processing products can be considered an actual direction. The rich chemical composition of pumpkin fruits will enrich such a product with vitamins, minerals, macro- and microelements.

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