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Improving Pumpkin Seed Processing Technology

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Abstract:
It is known that unsaturated fats are important for the normal functioning of the human body. Pumpkin seed oil is a source of unsaturated fats and has a rich amino acid content. The article shows the improvement of the technology of extracting oil from pumpkin seeds. Pumpkin oil obtained in this way has a rich lipid composition.

Keywords: pumpkin, pumpkin oil, cold pressing, chemical composition, carotenoids, pumpkin varieties, phospholipid composition.

Introduction

Pumpkin fruits are very useful. They contain easily digestible carbohydrates, trace elements, and vitamins. Pumpkin fruits are valuable dietary products. They are intended for children's nutrition and are a mandatory component of dietary products. They are eaten raw, fried, boiled and dried. More than 200 different dishes can be prepared using pumpkin. Three cultural types of pumpkin are known: hard-skinned or gourd, nutmeg, and large-fruited pumpkin.

The main morphological characteristics of pumpkin are given in Table 1.

Pumpkin fruits are mainly processed in three directions:

- for technical purposes: fruits are crushed and used as feed for animals. The seeds separated from the first are sent for further processing.
- to obtain seed material: the main task here is to extract the seeds as much as possible with minimal damage. Fruit pulp and juice are disposed of or used for animal feed production.
- complex processing: in which pumpkin seeds, flesh and juice are processed for technical or food use.

Plant parts Large-fruited and turban gourds Hard-skinned gourds Nutmeg gourds
The stem is cylindrical. The edges are less pronounced
hairiness hairy Slightly hairy Fine hairy
leaf Bean-shaped, unsegmented (split into short sharp segments in the turban-shaped gourd) Five-lobed, acute, segmented Bean-shaped, five-seven-toothed claw.
lower paws reach to the leaf band
The fruit band is cylindrical, with pronounced edges, prismatic edges, widened near the fruit
The skin of the unripe fruit is soft, firm, and soft
Seeds Large, smooth, with an indistinct line on the edge Small, yellowish-white, with a line on the edge Medium-sized, dull white, with a dark line on the edge

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One of the most valuable components of pumpkin is its seeds. They are a complex of functional food ingredients

is a valuable resource. Nutrient fibers, vitamin C, vitamin PP, group B vitamins, tocopherols, phospholipids, carotenoids, flavonoids, unsaturated fatty acids (w-3 and w-6) contained in pumpkin seeds, as well as mineral substances are immunocorrective, radioprotective, bactericidal, atherosclerotic, lipotropic, antiallergic, antimicrobial, fungicidal and other effects.

As shown in the conducted studies, the use of extruded pumpkin seeds in the technology of semi-finished products made from sand dough produced in the food industry and public catering establishments allows to expand their assortment.

Nutrient fibers contained in pumpkin seeds are excellent sorbents and remove various toxins, carcinogens, and cholesterol from the body. The amount of protein in pumpkin seeds is half of the daily norm and is a building material for cells, and unsaturated fats are involved in metabolism, the work of brain cells and energy metabolism in general. It is forbidden to eat pumpkin seeds in large quantities, because the saturated fats contained in them are not well absorbed by the body and lead to the accumulation of cholesterol in the arteries. Unlike saturated fats, for example, unsaturated oleic acid lowers cholesterol, strengthens blood vessels and increases immunity. Due to the oleic acid content, regular consumption of pumpkin seeds preserves youth and prevents diseases such as diabetes and cancer.

Pumpkin seeds contain a large amount of linoleic acid, which is useful in the prevention of diabetes, skin diseases, and prevents arthritis and atherosclerosis. The importance of arachidonic acid in seeds is immeasurable - it helps in the fight against Alzheimer's disease. Linolenic acid thins the blood, helps inflammation of internal organs and joints. Omega 6 and Omega 3 acids restore the hormonal balance of the body, strengthen the skin and hair. Pumpkin seeds also contain all the essential amino acids in an amount that can fully satisfy the body's needs.

Pumpkin seeds are added naturally or ground to salads, soups, porridges, drinks.

In addition, they are a rich source of amino acids, including tryptophan. The study of the properties of the powder obtained from pumpkin seeds showed that the content of proteins and fats, as well as Na, K, Ca and other macro- and microelements in the seeds is more than pumpkin flesh.

The total amount of protein in the powder obtained from pumpkin seeds is almost 30% in 100 g of dry matter.

Pumpkin seed powder is a very popular product in Russia and abroad. This product is in high demand among nutritionists. This powder is characterized by the presence of easily digestible proteins rich in lysine, an amino acid that limits the assimilation and biological value of wheat flour proteins. This powder contains zinc, carotenoids and other valuable components, which are found in a complex form with proteins and carbohydrates or in a lipid phase rich in easily oxidizable polyunsaturated fatty acids, and its nutritional value increases even more.

Research object and methods: The purpose of the research was to determine effective ways of processing pumpkin fruits grown in Fergana region.

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The researches were carried out on peasant farms located in the territory of Fergana region and in the department of technology of storage and preliminary processing of agricultural products of Fergana Polytechnic Institute. Studied varieties of pumpkin: Batternat, Gribovskaya winter, Oranjevaya bushy, Michurinskaya, Mozoleevskaya 49, Marmar. All of them grew in the territory of Fergana region.

Research results: The produced pumpkin oil can be used as a food product as well as a pharmacological agent

Pumpkin seed extraction technology includes drying, sorting, grinding, moisture-heat treatment and pressing after the seeds are extracted from the fruit. Seed drying is carried out in two stages: in the first stage, the seeds in a layer of 6 - 7 cm are actively ventilated at a temperature of 25 - 30 ° C, with air at a speed of 0.2 - 0.3 m until the humidity of the seeds reaches 20 - 22%, and in the second stage, 60 - Drying is carried out at an air temperature of 80 ° C. Further technological processing of seeds dried at 60 ° C is carried out after three weeks of storage and immediately after drying at 80 ° C. Method oil yield allows to maximize and at the same time the increase of biologically active substances in it.

This method allows to significantly increase oil productivity compared to cold pressing methods.

However, the oil obtained by this method does not contain enough biologically active substances. This is because pumpkin seeds, after being separated from the fruit, are spread in a thin layer after drying in atmospheric conditions. As a result of the technological processing of dried seeds in this way, tocopherols and phospholipids, which are natural inhibitors of lipid oxidation, are transferred to the required amount of oil only at certain stages of the technological process.

This is due to the fact that the content of inhibitors in oil during seed processing increases during the technological process at the same time as the effect of heat increases and reaches the maximum value in the last stages of production. The peculiarity of such oil protection leads to a significant increase in the rate of degradation of lipid oxidation products (hydroperoxides) with the formation of secondary oxidation products at the final stages of seed processing. Therefore, the number of peroxides in freshly obtained oils can be very small, but at the same time it is rich in enriched content, that is, epoxides, hydroxy acids and other compounds with toxic properties. Compared to the oil obtained by this method, the number of peroxides (blind of the composition of primary oxidation products) in the oil obtained by this method seller) 0.43%, benzidine number (indicator of secondary oxidation content) is 5.3 mg%.

The amount of tocopherols and phospholipids in the oil obtained in this way is high, and, accordingly, it can be stored for up to 5 months in the refrigerator and up to 3 months at room temperature, provided that their amount does not decrease.

As a result, pumpkin seed processing according to this technology maximizes the yield of oil and at the same time increases biologically active substances in it.

Conclusion: The study of the changes in the composition of the lipid complex during the storage of pumpkin seeds showed that the processes in the lipid complex of the seeds stored after drying are mainly a continuation of the processes characteristic of the period of

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thermal exposure of the seeds. At the same time, the best indicators in the content of densely bound lipids (polar lipids) and fat triglycerides are observed in the third week of storage of seeds with a drying temperature of 60 o C, and in the first week of storage for seeds with a drying temperature of 70 o C.

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