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DETERMINING THE EFFECTIVENESS OF SOAKING ALMOND KERNELS BEFORE PROCESSING

ESHONTO'RAYEV ABDULAZIZ

Doctoral student of Namangan Institute of Engineering and Technology
E-mail.: nammti.oot@gmail.com, Phone.: (+99890) 223-0093

SAGDULLAYEVA DILAFRUZ

Leading Researcher of Academy of Sciences of Uzbekistan Institute of Bioorganic Chemistry
E-mail: dilya15@ mail.ru

SALIHANOVA DILNOZA

Professor of Academy of Sciences of Uzbekistan Institute of General and Inorganic Chemistry
E-mail: salihanova79@mail.ru, Phone.: (+99891) 798-1979

Abstract:

Objective. As the object of this research work, samples of almonds soaked at different times were selected, and the influence of the time of thawing of kernels on the nutritional value, quality, product characteristics, shelf life and organoleptic characteristics of plant milk was studied.

Method. Plant milks were obtained in laboratory conditions from selected and thawed samples with a difference of 2 hours. The received milks were compared with Lactoscan S analytical equipment and organoleptic characteristics based on GOST requirements.

Results. The results of the experiment were compared with the differences in the cooling times between the samples. The results are presented in the relevant tables and discussed.

Conclusion. According to the results of the research work, it was proved that unsoaked almond kernels are superior to frozen samples. In addition, taking into account that freezing cores requires excessive resources and technological processes, it is recommended not to freeze cores before technological processing.

Keywords: almond kernel, soaking, alternative milk, vegetarian lifestyle, cholesterol, almond shell, lactoscan S.

Introduction. Almond milk is the oldest and widely consumed alternative milk among plant milks. Almonds have become an important food for a modern healthy lifestyle because they contain many useful components [1]. The first patented (USA 5656321A) technology for the industrial production of almond milk proposes the slow treatment at 90 °C of an aqueous dispersion of partially processed defatted ground almonds with a ratio of 8 ± 1% and about 0.1% stabilizing hydrocolloid. This process serves to ensure the solubility of compounds in the emulsion. It is then ground in water and spun in a centrifuge. Then the product is sterilized at high temperature using "UHT" and the homogenized product is aseptically packaged during cooling. [2].

In the above studies, roasting or not roasting raw almonds in the production of almond milk has an effect on the amount of phytosterols in almond milk. For example, it can be seen that the amount of β-sitosterol-β-D-glucoside in roasted almond milk is 78 mg/100 ml, and in unroasted almond milk it is 13 mg/100 ml. Another aspect is that the stigmasterol concentration in roasted almond kernel milk is less than 0.03 mg/100 ml, while unroasted almond kernel milk contains 1.9 mg/100 ml of stigmasterol. Such differences of bioactive compounds in one type of plant milk represent the effect of

processing and technological processes of raw materials of plant milk.

Almond milk is a protein-rich type of nut-based raw material. Almonds contain an average of 25% protein and contain unique amino acids. Compared to other vegetable milk raw materials, milk made from almonds is very rich in vitamins. It is rich in vitamin E and is found in the form of manganese and alpha-tocopherol. Alpha-tocopherol is also considered a very powerful antioxidant. In addition, almonds are rich in important trace elements such as calcium, potassium, magnesium, selenium, zinc, copper and phosphorus. [3].

Almonds are a rich source of calcium and healthy fatty acids, while being lower in calories, making them nutritionally healthier than other plant-based milks. Because almonds are a nut, they can cause allergies in some people and their high price limits their popularity as a drink.

The yield of almonds is on average 0.7-1.2 t/ha, and the productivity is 2-2.5 t/hectare in highly irrigated lands. Almonds begin to harvest from the age of 3-4 and give a good harvest from the age of 12-18 to 35-40 years. With good care, it can produce 60-100 years. The yield of one bush is from 3-4 kg to 10-20 kg, even 30-40 kg. It is possible to establish almond orchards on very large areas in mountainous and semi-arid areas of our republic. The following varieties are included in the State Register for planting in the territory of Uzbekistan: "Bostonliq kechpishari", "Konsoy", "Qilichnuskha", "Tong'ich" (Pervenes), "Tian-Shan", "Guzal" (Krasivy). , local varieties such as "Ertapishar" (Ranni), "Ugom" and imported "Krim", "Nikita kechpishari", "Primer", "Nikita-62", "Yalta" (Russia), "Turkman excellence" (Turkmenistan), "Nonparel" (France), "Drake" (USA) and others are among them [4]

Nuts such as almonds, walnuts and some cereals contain more unsaturated fatty acids than saturated fatty acids. Naturally, these fatty acids are preserved in all plant-based milks, except for coconut and johori cereal. The main saturated fatty acids found in plant-based milk alternatives are stearic, oleic and linoleic acids [5],[6],[7].

Methods. A local variety of sweet almond growing in natural conditions created by selection on the basis of ancient (Amygdalus communis L.) ancestors in Uzbekistan was selected as a research object. 5 samples of the same amount were taken from the selected almond kernels, and each one was soaked in filtered water with a difference of 2 hours. Milk was taken from the samples in laboratory conditions, homogenized with the addition of an emulsifier, and comparative analyzes were carried out on the Lactoscan S analytical equipment.

Analyzes were carried out on the basis of the concentrate standards of the equipment. Also, the obtained samples were kept for 10 days to study the storability and changes in organoleptic properties over time. In the organoleptic assessment, the appearance, taste, smell and general consistency of almond milk were studied based on the recommendations required by the GOST 29245-91 standard. According to the recommendations of this standard, the organoleptic parameters of milk should be evaluated depending on the consumption method of this product. The temperature of the analyzed milk samples is required to be around 20°C.[1]

To assess the appearance or color of plant milk, it was determined by pouring it into a transparent container in natural light; in order to evaluate its smell, plant milk is cooled in a cleaned closed container, shaken again and smelled from the mouth

[1] ГОСТ 29245-91 Консервы молочные. Методы определения физических и органолептических показателей.

of the container; when determining the taste, milk in a cleaned container is evaluated by shaking it well and drinking it; consistency of plant milk is determined by pouring milk from one transparent container to another. Attention is also paid to how much milk is divided into phases during storage.

Results. Almond milk of all sample types was subjected to the same technological process under the same conditions and quantities. Before technological processing, they consisted of one sample that was not frozen and samples that were frozen for 2, 4, 6, 8 hours. Tajriba ishi yakunlangach namunalar sut tarkibini aniqlovchi Lactoscan S qurilmasida qiyosiy tahlil qilindi. Ushbu tahlillarning natijasi bilan 1-jadvalda tanishish mumkin.

Table 1

Results of the comparative analysis conducted in Lactoscan S

№	Soaking time, h	Fats, %	Carbohydrates, %	Proteins %	Density	Dry Matter, %
1	0	06.59	01.89	01.21	05.52	03.46
2	2	06.28	01.78	01.13	05.10	03.25
3	4	06.37	01.53	00.98	03.34	02.82
4	6	07.06	01.65	01.05	03.34	03.04
5	8	07.72	01.85	01.18	03.99	03.41

The samples were stored for 10 days to conduct organoleptic analyzes of the experiment, the purpose of which was to analyze the variability of the phase composition and other organoleptic properties of the sample during storage. These analyzes were studied on the basis of criteria corresponding to the organoleptic evaluation of milk and milk products specified in GOST requirements. To determine the orgonoleptic evaluations of the tested samples, the samples were taken out of the freezer and studied after they were brought to the required temperature for 30 minutes. Comparative results of organoleptic analyzes are presented in Table 2.

Table 2

Organoleptic indicators of almond-based milk samples after 10 days of storage

Samples	Soaking time, h	Taste	Smell	Colour	Consistency
1	0	Like almond, pleasant	Typical almond	Creamy	Homogeneous, without sedimentation
2	2	Wooden	Typical almond	Creamy	Homogeneous, more liquid, without precipitation
3	4	Wooden	Typical nut	White	Two-phase, thick
4	6	Rusty	Typical nut, Pungent smell	Yellowish white	Three-phase, has sedimentation
5	**8**	Like humid	Pungent smell	Yellowish	Divided into three phases

Discussions. If we compare the results, it can be said that the milk sample made from unheated almond kernel of the 1st sample is more effective than the others. In the analyzes determined by the Lactoscan S device, it can be observed that the amount of fat in the 8th sample was more. It can be said that this is due to the swelling of the fat globules in the endosperm when the kernels are cooled for a long time and they release more mass during crushing. Dry matter also had a greater contribution in the 8th sample. This also indicates a preference for sample 8, but the protein, carbohydrate, and density increases disproportionately toward the unheated sample.

In addition, taking into account that the heating of kernels requires excessive resources and time in the technological process, and considering that there is almost no significant difference between the fat content of sample 8 and the fat content of sample 1, the non-heated sample can be said to be more important. In our previous experiments, it was proved that there are technologically unfavorable features in the skin of almond kernels that can spoil the quality of milk. The more the almond kernels are frozen, the more substances in the kernel skin are released into the milk mass.

It can also be seen from the organoleptic evaluations that the 8th sample was divided into more phases during the storage process, and its color, smell and taste underwent more changes. The consistency of the milk made from crushed almond kernels without cooling is well preserved, the characteristic color of milk, the characteristic taste and smell of almond milk are more preserved. More importantly, negative changes in organoleptic characteristics were noted with increasing freezing time. Samples taken from unheated almond kernels have maintained a homogeneous consistency for a long time, there have been no changes in color, and they can be an alternative to dairy milk in terms of smell and taste.

Conclusion. Alternative milks based on almond kernels can compete with cow's milk in terms of organoleptic indicators and shelf life if properly processed.

In addition, almond milk does not contain lactose, and various vitamins and useful components are more common. According to the general conclusion of two types of analysis, unfrozen almond kernels proved to be a priority sample with quality, nutrition, marketability, less time required in the technological process and less resource consumption.

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