Study on the production of various dried products from apricot varieties

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Abstract. This article is devoted to obtaining various methods of drying a zoned apricot cultivar in Uzbekistan. Before laying for drying, the sugar content of fresh fruits was 17-21.5%. The output of dried products was 15.3-19%, a relatively high yield is allocated when dried for dried apricots, kaisa (19-22%). A relatively good organoleptic assessment (4.4-4.5points) distinguishes the varieties from the apricot Yubileiny Navoi, Gulyungilyuchak, when dried for dried apricots.

1. Introduction

Currently, imports of dried fruits and vegetables on a global scale for 2016-2020 increased to 7.94-8.73 million tons [1]. The world leaders in imports of dried fruits and vegetables are China - 1479.3 thousand tons (16.9% of world imports), India - 899.6 thousand tons (10.3%), the USA - 445.0 thousand tons (5.1%), Japan - 355.8 thousand tons (4.1%), Pakistan - 335.8 thousand tons (3.8%), Great Britain - 222.7 thousand tons (2.6%) and Germany - 207.0 thousand tons (2.4%).

Scientific research is being carried out in the world in the areas of production for the daily human diet of fruits and vegetables, including dried fruits and vegetables, as well as products of their processing, rich in vitamins, micro- and macroelements [2-7]. All of these experimental investigations were carried out with the help of modern technologies, while preserving natural components as much as possible, as well as in the direction of improving the consumer qualities of products, increasing their food safety and biological value, developing technologies for obtaining quality dried fruits and vegetables [8-13].

In the decree of the President of the Republic of Uzbekistan dated January 28, 2022, UP-60 “On the development strategy of New Uzbekistan for 2022-2026”, special attention is paid to “Increasing the incomes of peasants and farmers by at least two times through the intensive development of agriculture on a scientific basis, bringing the annual growth of agriculture to at least 5 percent, especially to bring the volume of food products to 7.4 million tons by 2026, the level of processing for fruit and vegetable growing to 28 percent.” In this regard, conducting scientific research on drying stone fruits and seed fruits is an important task in Uzbekistan [7].

In Uzbekistan, there is not enough research work on the influence of varieties of stone and seed fruits on the yield of various dried fruits and their quality. Based on this, issues such as selecting suitable stone and seed fruit varieties for drying, determining their impact on product yield and quality when dried using various methods, and putting them into practice remain actual tasks [14]. And the solution to these problems, in turn, allows us to solve several problematic issues that arise when exporting dried fruits in the Republic.

2. Methods

The climate in Uzbekistan is exceptionally favorable for the air-solar drying of fruits. Long hot summer, low relative humidity, excellent assortment of fruits, and traditional experience, as well as the achievements of science, make it possible to widely use air-solar, shade, and stackable stem drying to obtain high-quality dried products. Therefore, the main objective of the study is to scientifically substantiate the influence of various varietal samples on product yield and quality. In this regard, the development and implementation of the production of more advanced fruit technologies allow the consumer to receive products at the level of the international standard. Uzbekistan has unsurpassed quality, dried fruit varieties. The republic has all opportunities to provide the population with high-quality dried products and also for sale to the foreign market.

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Table1. Technological characteristics of dried apricot

Varieties and hybrids	type of product fruit pulp	Sugar content of fresh fruit, stone%	Drying time, days	output, %	Pulp to stone ratio	
					pulp	stone
Yubileiny Navoi	kuraga	19.5	9	17.0	91.8	8.2
	kaisa	19.5	12	19.0	-	-
	ashtak	19.5	15	21.0	-	-
Kursadyk	kuraga	20.5	8	17.5	91.0	9.0
	kaisa	20.5	12	19.5	-	-
	ashtak	20.5	16	21.5	-	-
Arzami	kuraga	17.3	6	15.5	93.3	6.7
	kaisa	17.3	13	18.0	-	-
	ashtak	17.3	15	20.5	-	-
Avicena	kuraga	19.5	10	17.5	91.0	9.0
	kaisa	19.5	13	19.0	-	-
Bodomi	kuraga	18.0	10	15.0	90.5	9.5
	kaisa	18.0	12	16.5	-	-
Burevestnik	kuraga	16.5	8	14.0	93.0	7.0
	ashtak	16.5	14	15.5	-	-
Nowruz	kuraga	20.0	9	18.5	91.2	8.8
	kaisa	20.0	11	19.6	-	-
	ashtak	20.0	13	20.5	-	-
Subhoni	kuraga	22.5	7	19.8	91.5	8.5
	ashtak	22.5	12	21.5	-	-
Sovietskaya	kuraga	17.5	10	16.5	91.7	8.3
	kaisa	17.5	15	19.5	-	-
	ashtak	17.5	17	21.5	-	-
Gulyungilyuchak	kuraga	19.0	10	18.0	89.3	10.7
	kaisa	19.0	17	20.5	-	-

Kuraga*- dried apricot halves without pits; Ashtak*- a whole dried fruit, from which the stone was removed before drying and put back into the apricot; Kaisa*- a whole dried fruit without a stone, which is removed through a recess at the point of attachment of the stalk.

Table 2. Organoleptic evaluation of dried apricot products (on a 5-point scale)

Varieties and hybrids	type of product	Appearance	Size	Color	Taste	Fleshiness	Average rating
Yubileiny Navoi	Kuraga (dried apricot)	4.35	4.65	4.35	4.55	4.45	4.5
	kaisa	4.1	4.75	4.15	4.4	4.45	4.4
	ashtak	3.9	4.7	3.9	4.2	4.4	4.2
Kursadyk	kuraga	4.2	4.5	4.2	4.3	4.6	4.4
	kaisa	4.2	4.6	4.2	4.4	4.7	4.4
	ashtak	4.1	4.8	4.0	4.4	4.7	4.4
Arzami	kuraga	4.3	4.0	4.3	4.0	4.0	4.1
	kaisa	3.8	4.0	3.8	4.0	4.0	3.9
	ashtak	3.8	4.0	3.8	4.0	4.0	3.9
Avicena	kuraga	4.4	4.5	4.4	4.4	4.4	4.4
	kaisa	4.3	4.6	4.3	4.4	4.5	4.4
Bodomi	kuraga	4.2	4.3	4.3	4.2	4.3	4.3
	kaisa	4.0	4.4	4.2	4.3	4.4	4.3
Burevestnik	kuraga	3.8	3.5	3.9	3.9	3.8	3.8
	kaisa	3.8	3.5	3.9	4.0	3.9	3.8
Nowruz	kuraga	4.3	4.5	4.5	4.6	4.5	4.5
	kaisa	4.3	4.6	4.5	4.6	4.6	4.5
	ashtak	4.2	4.6	4.5	4.5	4.6	4.5
Subhoni	kuraga	4.3	4.4	4.4	4.5	4.5	4.4
	kaisa	4.2	4.5	4.4	4.5	4.5	4.4
Sovietskaya	kuraga	4.0	4.1	4.0	4.3	4.2	4.1
	kaisa	4.0	4.1	4.0	4.3	4.4	4.2
	ashtak	4.0	4.1	4.0	4.3	4.4	4.2
Gulyungilyuchak	kuraga	4.2	4.5	4.2	4.4	4.5	4.4
	kaisa	3.8	4.5	3.8	4.4	4.6	4.2

Depending on the nature of the coolant, there are two methods of drying fruits: natural and artificial. Natural drying is carried out both in the sun and in the shade, in a limited space, and with natural air convection in an open space. According to the method of heat supply, the following types of artificial drying are distinguished:

- Convective - by direct contact of the product with a drying agent, most often air;
- Contact - heat transfer from the coolant to the product through the wall separating them;
- Radiation - heat transfer by infrared rays;
- Dielectric - by currents of high and ultrahigh frequency;
- Vacuum and its variety - sublimation.

Currently widely used mixed heat drying (combined drying). The article considers different variants of combinations of heat carriers, and the possibility of simultaneous.

3. Results and Discussion

The studies examined the most common drying methods used in manufacturing enterprises and recommended by research and educational organizations and institutions. In experiments, dried products were prepared from apricots: kuraga, kaisy, and ashtak. For research, the following varieties—Yubileiny Navoi, Arzami, Sovetskaya, Gulyungilyuchaki, and others—were laid out for drying. During the investigation, it was discovered that some apricot fruits had been damaged by the disease, affecting the quality indicators of dried apricot products. In this regard, the drying period for varieties was 6–10 days for dried apricots, 10–20 days for Kaisa, and 13–17 days for Ashtak. The shortest drying time was noted for dried apricots (kuraga) (6-7 days) in the Arzami variety and hybrids 4313 and 4332. While for kaisy in hybrids 4307, Yuleiny Navoi, and Arzami the shortest drying period was 13 days (see table1).

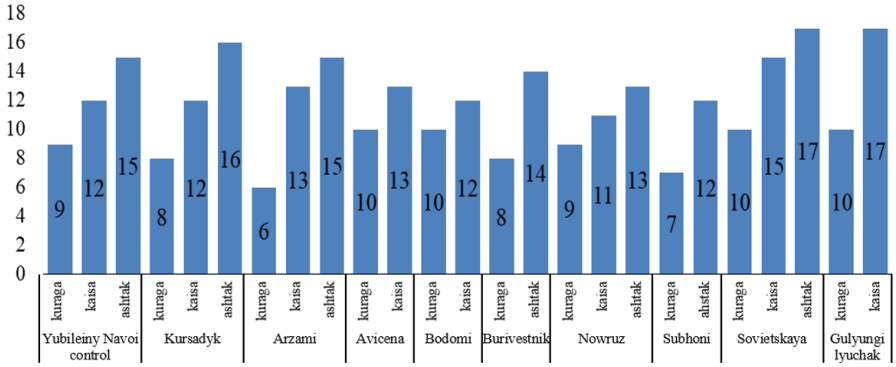

Fig. 1. Duration of drying of different types of apricots, days

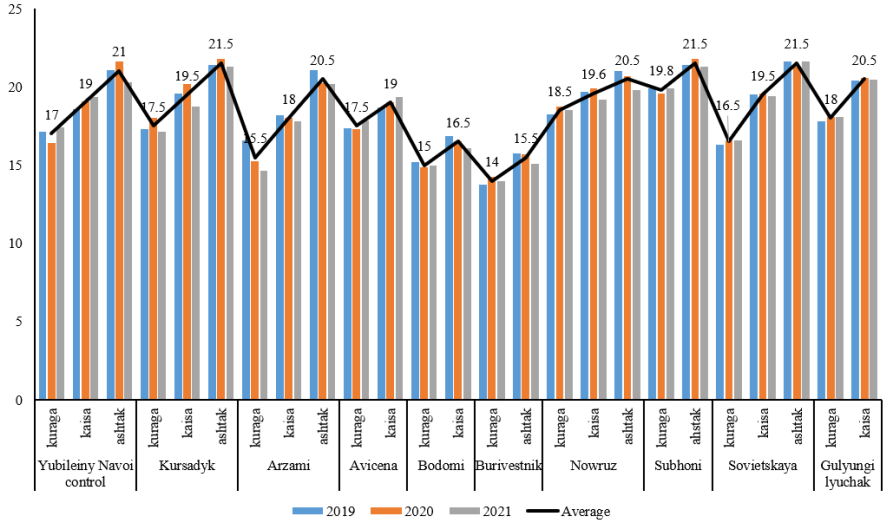

Fig. 2. Production of various dried products from apricot varieties, kg

The sugar content of the primary products of the studied varieties of apricots was different; for example, in the variety Yubileiny Navoiy it was 19.5%, whereas in the varieties Kursadyk, Nowruz, and Subkhoni it was higher by 2%–2.5% compared to the control variety Yubileiny Navoiy. However, it was found that in the varieties Arzami, Bodomi, Burevestnik, Sovetskaya, and Gulyungilyuchak, compared to the control variety Yubileiny Navoiy, it was lower by 2.0-0.5% (Figure 2).

The yield of various dried products from the varieties of apricots was different. If the apricot variety Yubileyny Navoiy (control variant) had an output of ashtak of 21.0%, the varieties Kursadyk, Subkhoni, and Sovetskaya had a higher output of 0.5% compared to the former variety. The yield of ashtak in other varieties was discovered to be less than that of the apricot variety Yubileiny Navoiy. Furthermore, the pulp-to-stone ratio in dried apricot varieties ranged from 89.3 to 93.3%, with the stones ranging from 6.7 to 10.7%. Yubileiny Navoiy and Arzami (91.7-0.3%) were the most fleshy varieties, according to the results.

Before laying for drying, the sugar content in fresh fruits was 17-21.5%. The yield of dried products was 15.3-19%, with a relatively high outcome when dried for dried apricots and kaisa (19-22%). While relatively low produce was obtained from the Arzami variety (dried apricots 15.5%, kaisa 18%, and ashtak 20.5%) and the hybrid 4307 had a low yield of 17% when dried for dried apricots. Additionally, the pulp-to-seed ratio in dried products was determined during drying. Depending on the variety and hybrids, fresh apricots have a pulp content ranging from 89.3 to 93.3% and pits from 6.7 to 10.7%. The fleshiest sort was Yubilny Navoi and Arzami (pulp 91.7-0.3%), also a hybrid 4313 in which the pulp was 91%, corresponding to a smaller percentage of stones 9.0-6.7%. The organoleptic evaluation of dried apricot products showed the following varieties and hybrids, namely Yubileiny Navoi, Arzami, Sovetskaya, and Gulyungilyuchak apricots, were selected for drying tests. The organoleptic evaluation of dried products of apricot varieties is in the range of 3.9-4.5 points for kuraga (see Table 2). A relatively low score (3.9 points) was received by the Arzami variety when dried for kaisa, and when dried for ashtak, a low score (3.7 points).

4. Conclusions

In conclusion, it was revealed that the drying period of apricot varieties for dried apricots was 6-10 days, for kaisa - 10-20 days, and for ashtak - 13-17 days. The standard variety “Jubilee Navoi” was 9; 12 and 15 days, for the Arzami variety - 6; 13, and 15 days, and for the variety “Kursadyk” - 8; 12, and 16 days respectively. The highest yield of dried apricots was observed in the variety Subkhoni (19.8%), kaisa - in the variety Gulyungilyuchak (20.5%), and ashtak - in the varieties Kursadyk, Subkhoni, and Sovetskaya (21.5%). In dried apricot products, the ratio between pulp and bones was 89.3-93.3% and 6.7-10.7%, and the Arzami variety turned out to be the fleshiest variety (91.7-10.3%).

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