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# Improving the Technology of Pomegranate Processing

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**ANNOTATION:** In recent years, farmers in Uzbekistan have been actively increasing the area of pomegranate plantations. At the same time, the cultivation of pomegranate in Uzbekistan seems to be considered promising by both gardeners and officials of the country.

Perhaps Uzbekistan should think about the industrial processing of pomegranate if production continues to grow so rapidly, and traditional local varieties continue to be used for cultivation. After all, as we will tell below, pomegranate is a very interesting crop not only for the fresh fruit market, but also for the processing market, both puffy and cosmetic and even pharmaceutical.

**KEYWORDS:** pomegranate, phytoncides, juice, syrup, antioxidant, punicic acid, fermentation, peel, membrane.

In recent years, special attention has been paid to the cultivation of pomegranate in Uzbekistan. In the near future, an increase in the annual production volume by at least 600 thousand tons is predicted in the republic. Also, in 2026, the demand for pomegranates in the global market may reach \$23.14 billion.

The area of pomegranate plantations in Uzbekistan is actively expanding. In September last year, we reported on plans to increase the total area of pomegranate orchards in the Fergana region to 20,000 hectares by 2025. It is planned to harvest more than 200 thousand tons per year. In particular, new pomegranate orchards were created in the Rishtan and Altyaryk regions on the territory of 1400 hectares. Also, the Ministry of Agriculture announced an increase in pomegranate plantations in the Kashkadarya region by 2,000 hectares.

In addition, according to UzA, in 2021-2022, it is planned to create pomegranate orchards on 9,432 hectares in Surkhandarya, and bring the annual harvest to 300,000 tons in the near future.

Despite the fact that the pomegranate occupies a very small share in the total turnover of fruits and vegetables in the world, the consumption of these fruits is growing rapidly. The total volume of world imports of pomegranate from 2014 to 2018 increased by 24%. At the same time, many market experts expect that the global pomegranate market will grow at almost the same rate as the avocado market. Especially against the backdrop of the coronavirus pandemic, pomegranate, which contains a large amount of antioxidants, is at the center of attention of the world's population, concerned about immunity and the search for fruits and vegetables with the properties of "superfoods".

Pomegranate has two unique plant components that are considered to be very beneficial for health. Punicalagin, a powerful antioxidant found in pomegranate seeds and peel, has antioxidant activity nearly 3 times higher than red wine or green tea. And Punicid Acids, derived from pomegranate seed oil, has powerful biological effects. Due to its unique properties, pomegranate is in constant high demand on the world market, and world prices for fresh pomegranate continue to grow, despite the growth in areas under pomegranate orchards in many countries of the world.

According to research by the Special Agency for the Development of Exports of Agricultural and Processed Food Products, the total volume of the world market for pomegranate and pomegranate seeds in 2018 was estimated at \$8.2 billion, and by 2026 it is projected to increase to \$23.14 billion, i.e. almost 3 times. The main factor underlying this forecast is the growing demand for products made from pomegranate raw materials. And there are many of them: this is pomegranate fruit extract (pomegranate powder), and pomegranate juice and various drinks from it.



If production continues to grow so rapidly, and the cultivation of traditional local varieties continues, it would be wise for Uzbekistan to consider industrial processing of pomegranate. Despite the small share of pomegranate in the total turnover of fruits and vegetables in the world, its consumption is growing rapidly. From 2014 to 2018, total global pomegranate imports increased by 24 percent. Many market experts note that the global pomegranate market is growing very rapidly. During the pandemic, the demand for pomegranate has increased due to its immune-boosting properties.

The main factor underlying this forecast is the growth in demand for products made from garnet raw materials. During the processing of pomegranate, various products are obtained from it: pomegranate juice, pomegranate concentrate, pomegranate wine, pomegranate acid, pomegranate wine, lemonade, compote, pomegranate oil, etc. To obtain 1 liter of pomegranate juice, 2.20 kg of pomegranate is needed. Closed technological schemes of production prevent oxidative processes. At modern canning factories, the product is subjected to a special, mild, complete treatment, without the addition of preservatives for long-term storage of the product. Boiling different amounts of pomegranate juice produces a soft and tasty drink used in the production of lemonade.

Usually you can get 1 liter of pomegranate juice from 15 kg and 250-300 ml of pomegranate seeds from about 1 kg. The technological line for the production of pomegranate juice is a complex of equipment consisting of several sections: acceptance of raw materials, extraction of natural juice, pasteurization, hot filling and labeling equipment. But first, in order. When harvesting, most often pomegranate fruits are placed in wooden boxes for ease of transportation and more careful handling of the fruit. After the harvest, the filled boxes are sent to the factory where our juice will be produced. The contents of the boxes are sent to a receiving plastic or wooden container weighing up to half a ton. The container turner, made entirely of stainless steel and equipped with a hydraulic drive, overturns the container into the receiving hopper of the loading conveyor-elevator. On the conveyor belt, the pomegranate goes to the fruit washing machine.

Washing is a mandatory stage in the preparation of raw materials for processing. The task of the washer is to remove all the dust, as well as leaves and impurities that could get into the container along with the grenades, which it easily copes with. The washing machine is completely made of anti-corrosion materials, and the cleaning brushes made of non-toxic material can be easily removed for cleaning after use. Further, whole fruits are transferred by a screw conveyor to a special grenade crusher.

The crusher is designed for crushing pomegranates before peeling. The smaller the pomegranate pieces at the exit of the crusher, the more pulp will separate from the seeds, and, consequently, the more juice we will get. After crushing the grenade, you need to inspect. Inspection is an integral stage in the preparation of raw materials. The sorting inspection table is waiting for our grenades.

No device can replace the human eye and the careful selection of grenades during inspection. Only manual labor makes it possible to accurately select high-quality pomegranates suitable for squeezing juice and drinking. The highest quality pomegranates that pass the inspection are passed on to the cleaning and peeling machine. On this automatic apparatus, completely made of stainless steel, the peel is separated from the pulp and stones.

Simply separating the peel from the pulp is not enough, because there are still pieces of pulp on the peel itself, therefore, in order to achieve minimal product losses in production, a crusher for peeling and other waste is installed after the peeling machine at the food industry. It is designed to separate the remaining pulp from the peel and obtain the maximum amount of suitable raw materials for the production of juice. The resulting pulp, or better to say, puree, is pumped by a pump for thick masses with an elliptical rotor into pneumatic presses.

Today there are many presses. And screw, and tape, and drum and hydraulic and many others. We recommend using pneumatic presses with a horizontal cylindrical discharge diaphragm. In it, the membrane presses the mass of the fruit with the help of perforated channels and drainage elements.

The use of such a press allows you to get the maximum amount of juice in comparison with other technologies for the production of juice. It's no secret that production technologies do not stand still. And today, to increase the yield of juice from raw materials before pressing, enzymes are used. They are added before the press. They are safe for humans and are used in production in minimal quantities. There are several milligrams of enzyme per ton of juice.

The resulting clarified juice should be filtered. Filtration takes place in self-cleaning filters equipped with pumps. The filter removes particles that remain in the juice after pressing. A feature of such a filter is self-cleaning: the filter is cleaned during operation and does not clog, which means that manual cleaning when the filter is in operation is not required.



The filtered juice is distilled by a pump into closed tanks designed for storage, ripening and bringing the juice to its final consistency before heat treatment. Pasteurization is the final stage of juice processing before filling into packaging. The pasteurizer is a container with water and pipes, passing through which the life of harmful microflora and bacteria is destroyed in the juice. Thanks to this heat treatment, the juice can be stored for a longer time before consumption. It remains only to package the resulting natural juice in the right container. There is a large number of different containers: from plastic and glass bottles to large-format bag-in-box bags. The first impression of the product depends on the appearance and attractiveness, so it is important that it be memorable.

#### REFERENCES

1. R.M.Nazirova, M.X.Xamrakulova, N.B.Usmonov. Moyli ekin urug'larini saqlash va qayta ishlash texnologiyasi. O'quv qo'llanma. Fergana-Vinnitsa: OO «Европейская научная платформа», 2021. – 236 с. <https://doi.org/10.36074/naz-xam-usm.monograph>
2. Nazirova R. M., Sulaymonov O. N., Usmonov N. B.//Qishloq xo'jalik mahsulotlarini saqlash omborlari va texnologiyalari//O'quv qo'llanma. Premier Publishing s.r.o. Vienna - 2020. 128 bet.
3. Nazirova R. M., Qahorov F.A., Usmonov N. B.//Complex processing of pomegranate fruits.Asian Journal Of Multidimensional Research. 2021, Volume: 10, Issue: 5. pp. 144-149.<https://www.indianjournals.com/ijor.aspx?target=ijor:ajmr&volume=10&issue=5&article=020>
4. Мухтаровна, Н. Р., Ботиралиевич, У. Н., & ўгли, М. А. М. (2021). Особенности обработки озонem некоторых видов плодов и овощей для их долгосрочного хранения. Central Asian Journal Of Theoretical & Applied Sciences, 2(12), 384-388. Retrieved from <https://cajotas.centralasianstudies.org/index.php/CAJOTAS/article/view/367>
5. Mukhtarovna, Nazirova R., et al. "Study of the Influence of Processing on the Safety of Fruit and Vegetable Raw Materials." *European Journal of Agricultural and Rural Education*, vol. 2, no. 6, 2021, pp. 43-45.<https://www.neliti.com/publications/378976/study-of-the-influence-of-processing-on-the-safety-of-fruit-and-vegetable-raw-ma#cite>
6. Nazirova Rakhnamokhon Mukhtarovna, Qahorova Shohsanam Akram kizi, Usmonov Nodirjon Botiraliyevich//Biological Protection Of Plants. International Journal of Progressive Sciences and Technologies. Vol 27, No 1 (2021). <http://ijpsat.es/index.php/ijpsat/article/view/3168>
7. Nazirova Rakhnamokhon Mukhtarovna, Tursunov Saidumar Islomjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Solar drying of agricultural raw materials and types of solar dryers. *European Journal of Research Development and Sustainability*, 2(5), 128-131. Retrieved from <https://scholarzest.com/index.php/ejrd/article/view/824>
8. Nazirova Rakhnamohon Mukhtarovna, Sulaymonov Rustam Ismoilovich, Usmonov Nodirjon Botiraliyevich, Qosimova Komila Muhammadsoli kizi, & Abdullayev Dilmurod Dilshodjon ugli. (2021). Influence of storage conditions on preservation of potato. *European Scholar Journal*, 2(2), 68-70. Retrieved from <https://scholarzest.com/index.php/esj/article/view/265>
9. Nazirova Rahnamokhon Mukhtarovna, Akramov Shokhrux Shukhratjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Role of sugar production waste in increasing the productivity of cattle. *Euro-Asia Conferences*, 1(1), 346–349. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/110>
10. Nazirova Rahnamokhon Mukhtarovna, Akhmadjonova Marhabo Makhmudjonovna, & Usmonov Nodirjon Botiraliyevich. (2021). Analysis of factors determining the export potential of vine and wine growing in the republic of uzbekistan. *Euro-Asia Conferences*, 1(1), 313–315. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/99>
11. Nazirova Rakhnamokhon Mukhtarovna, Holikov Muhridin Bahromjon ogli, & Usmonov Nodirjon Botiraliyevich. (2021). Innovative grain reception technologies change in grain quality during storage. *Euro-Asia Conferences*, 1(1), 255–257. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/79>
12. Nazirova Rakhnamokhon Mukhtarovna, Tojimatov Dilyor Dilmurod ogli, Kamolov Ziyodullo Valijon ogli, & Usmonov Nodirjon Botiraliyevich. (2021). Change in grain quality during storage. *Euro-Asia Conferences*, 1(1), 242–244. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/75>
13. Nazirova Rakhnamokhon Mukhtarovna, Rahmonaliyeva Nilufar Nodirovna, & Usmonov Nodirjon Botiraliyevich. (2021). Influence of seedling storage methods on cotton yield. *Euro-Asia Conferences*, 1(1), 252–254. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/78>



14. Nazirova Rakhsamokhon Mukhtarovna, Otajonova Baxtigul Bakhtiyor qizi, & Usmonov Nodirjon Botiralievich. (2021). Change of grape quality parameters during long-term storage. Euro-Asia Conferences, 1(1), 245–247. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/76>
15. Nazirova Rakhsamokhon Mukhtarovna, Mahmudova Muhtasar Akhmadjon qizi, & Usmonov Nodirjon Botiralievich. (2021). Energy saving stone fruit drying technology. Euro-Asia Conferences, 1(1), 248–251. Retrieved from <http://papers.euroasiaconference.com/index.php/eac/article/view/77>
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