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**ACHIEVEMENTS IN THE DEHYDRATION OF FRUITS AND VEGETABLES AND THE ADVANTAGES OF THE METHODS USED****ДОСТИЖЕНИЯ В ОБЕЗВОЖИВАНИИ ФРУКТОВ И ОВОЩЕЙ И ПРЕИМУЩЕСТВА ПРИМЕНЯЕМЫХ МЕТОДОВ****MEVA VA SABZAVOTLARNI SUVSIZLANISHIDAGI YUTUQLAR VA QO'LLANILGAN USULLARNING AFZALLIKLARI****Kholdorov Mukhammadkarim<sup>1</sup>**<sup>1</sup>Fergana state university basic doctoral student**Mamirjonova Gulnoza<sup>2</sup>**<sup>2</sup>Master of Fergana state university**Abstract**

The samples that were obtained by experimental means are the subject of this paper. Information was supplied regarding their composition, drying processes, and technologies that were investigated. In our country, there is a steady demand for dried fruits, vegetables, and medicinal plants. In order to meet this demand, the biological ingredients that are useful in dried items, as well as the methods that are used to package them, were investigated.

**Аннотация**

Предметом данной работы являются образцы, полученные экспериментальным путем. Была предоставлена информация об их составе, процессах сушки и технологиях, которые были исследованы. В нашей стране наблюдается устойчивый спрос на сухофрукты, овощи, лекарственные растения. Чтобы удовлетворить этот спрос, были исследованы биологические ингредиенты, которые полезны в сушеных продуктах, а также методы, которые используются для их упаковки.

**Annotatsiya**

Bu ishning mavzusi tajriba tariqasida olingan namunalardir. Ularning tarkibi, quritish jarayonlari va o'rganilgan texnologiyalari haqida ma'lumot berildi. Mamlakatimizda quritilgan mevalar, sabzavotlar, dorivor o'simliklarga bo'lgan talab barqaror. Ushbu talabni qondirish uchun quritilgan oziq-ovqat mahsulotlarida foydali bo'lgan biologik moddalar, shuningdek ularni paketlash usullari o'rganildi.

**Key words:** dryers that use convection, contact drying, radiation drying, infrared heat rays, dielectric drying, sublimation drying, heat capacity, heat transfer, and convection are all examples of drying methods.

**Ключевые слова:** Сушилки, использующие конвекцию, контактную сушку, радиационную сушку, инфракрасные тепловые лучи, диэлектрическую сушку, сублимационную сушку, теплоемкость, теплопередачу и конвекцию, являются примерами методов сушки.

**Kalit so'zlar:** konveksiya, kontakt quritish, radiatsiya quritish, infraqizil issiqlik nurlari, dielektrik quritish, sublimatsiya quritish, issiqlik quvvati, issiqlik uzatish va konveksiyani qo'llaydigan quritgichlar quritish usullariga barcha misol bo'ladi.

**INTRODUCTION**

As of this moment, dried items are available all over the world, particularly greens. Numerous researchers are currently engaged in the process of drying vegetables and medicinal herbs, and the recommendations that they have made constitute the methodological framework that is currently being utilized in this field. Village Farm products, including fruits and vegetables, are the primary components of the necessities of daily life. Extensive reforms have been made in our nation in order to consistently satisfy the growing demands that have recently been placed upon us. The implementation of policies, decrees, and programs that are geared toward the growth of this industry is currently taking place. Important milestones and accomplishments are being

reached as a direct result of the implementation of these extensive and long-term changes in the agriculture sector.

Uzbekistan is known for its cultivation of top-notch fruits. The chemical composition of these fruits, specifically the quantity of sugar and the number of vitamins that they contain, is higher than that of the fruits that are native to northern regions. Consuming fruits is beneficial to the human body. The fact that they include sugars that are simple to digest and organic demonstrates that the reserves of vitamins and chemicals in plants are in dire need of replenishment.

While we constantly store the fruits at a temperature for an extended period of time, we also retain them for an extended period of time that we will not be able to transfer to other locations. The maximum amount of time that fruits can be kept in warehouses is between five and six months, if it is practicable to do so. As the quality of these fruits that have been preserved declines, their physical weight also diminishes. Consequently, the techniques of drying them are really crucial. Dry materials are very easy to load, transport, and store, and one may do all of these things with ease. On the other hand, these items are thought to be convenient to carry with you on a variety of journeys. The republic has a climate that is characterized by high temperatures, low levels of air humidity, and favorable circumstances for drying fruits that are exposed to the sun. items that have been sun-dried are highly regarded in terms of quality when compared to items that have been artificially dried.

When it comes to the importance of drying fruits and vegetables, the importance is really great. First and foremost, horticulture, which includes the organization of high-quality drying of fruits and vegetables, with the goal of increasing the production profitability of farms that specialize in the cultivation of vegetables, so enhancing their competitiveness and contributing to the advancement of economic growth. It is one of the most economical, straightforward, and widely used methods in the business. This is due to the fact that the organization of drying fruits and vegetables is considered to be the processing of agricultural products.

In the second place, dried fruits and vegetables are sold at significantly higher rates in the domestic market compared to their fresh counterparts, and when they are exported, the prices are even higher. Thirdly, by drying fruits and vegetables, they are able to extend their shelf life and fully satisfy the populations' desire for these items throughout the off-season, which presents an opportunity.

Fourthly, during the summer months in the country, a great number of fruits, such as apricots, plums, and other similar fruits, are lost or destroyed due to spillage. The rapid drying of these items makes it possible to avoid accidents involving spills and deaths caused by drying. To summarize, it would appear that drying fruits and vegetables is a potentially fruitful avenue for farms to delve into.

There is a significant amount of significance placed on the organization of the process of drying fruits and vegetables in the industry. The transportation of dried items becomes more affordable, the qualities of the products themselves improve, the products are rarely harmed by germs, the products have a large storage capacity, and the amount of space that is required is sufficient. Mechanical drying, physical-chemical drying, and thermal drying are the three methods that can be used to dry items.

For the purpose of drying out materials that contain a significant amount of water, mechanical dehydration is utilized. This technique for dehydration involves the removal of moisture through the use of centrifuges that are either centrifuged or squeezed. Dehydrating the product is typically the initial stage in the process of mechanically separating the moisture from the product. Following the completion of mechanical dehydration, an additional portion of moisture is left behind, which is then removed by the process of drying.

Under controlled laboratory circumstances, the process of physicochemical dehydration of goods is utilized. This technique involves the utilization of substances that are capable of absorbing water, such as sulfuric acid and calcium chloride. According to It, a wet product can be dehydrated by placing it on top of a vacuum cleaner that is contained within a container that is sealed.

The red industry makes extensive use of heat from the outside, often known as drying. When it comes to drying, many people work on the final stage of the output processes, which is the

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phase that comes before obtaining the finalized product. In certain manufacturing, the items are first dewatered by the use of a mechanical approach, which is a process that is regarded to be inexpensive. After that, the residual water is removed through the process of drying. The method of water separation from the composition of products is strengthened by the process of water separation in this type of procedure.

In the process of drying, there are two methods: natural and artificial. Goods that are exposed to the sky Dehydration, often known as natural drying, is a process that takes a significant amount of time. In the food sector, artificial methods are also employed to dry products; this procedure is a specialized sort of drying that is carried out using equipment. Products intended for drying are divided into three types: solid (granular, fragmented, particle); pasty; liquid (solutions, suspensions).

According to the way the heat carrier interacts with the materials being dried drying is divided into the following types:

- 1) convective drying - wet product and drying agent directly with each other mixed;
- 2) contact drying - between the heat carrier and the wet product, which separates them there is a wall;
- 3) radiation drying - heat is spread through infrared rays;
- 4) dielectric drying - the product is heated in a high-frequency current field;
- 5) sublimation drying the product is dehydrated under high vacuum while being frozen. The last three methods are relatively rarely used in industry and are usually special drying methods is considered

## CONCLUSION

In conclusion, we are able to state that in recent years, a significant amount of attention has been paid to drying fruits and vegetables on the market in our nation. Containing fruits, vegetables, and plants used for therapeutic purposes Due to the fact that drying helps to preserve vitamins, it is a very bioactive food modification that is used. Changes should also be made to the technologies that are used for the quality storage of dried products, as well as the value and relevance of these technologies. As a result, it is essential to use a practical rather than a scientific approach in order to enhance the quality of products, as well as to maximize energy efficiency, cut down on the amount of time and labor required, and improve fundamental technological processes and equipment.

## REFERENCES

1. Саидов, Р. М., Рахимов, Р. Х., Юсупов, Б. Д. У., & Холдоров, М. К. Б. У. (2020). Эффективность сушки и прокали сварочных электродов в печах с использованием излучения наноструктурированной функциональной керамики (НФК). *Computational nanotechnology*, (2), 64-70.
2. Холдоров, М.Б.Ў. (2022). Основные физико-химические принципы получения высокочастотной конденсаторной керамики. *Scientific progress*, 3(1), 412-418.
3. Саидов, Р. М., Рахимов, Р. Х., Юсупов, Б. Д. У., & Холдоров, М. К. Б. У. (2020). Новый метод сушки и прокали сварочных электродов с использованием излучателей из функциональной керамики1. *Computational Nanotechnology*, (1), 44-51.
4. Egamberdiyevich, O. K., Malikovna, Z. S. X. M. B. Ugli, & Abdusattor-Ugli, E. E. (2021). Used for effect interpretation abnormal photo voltage. *Academicia: an international multidisciplinary research journal*, 11(2), 783-786.
5. Onarkulov, Karimberdi Egamberdiyevich, Raxmatov, G'ulomjon Raxmonberdiyevich, & Xoldorov, Muxammadkarim Botirali o'g'li (2023). qishloq xo'jaligi mahsulotlarini infraqizil qurutish va sifatli saqlashdagi ayrim tahlillar. *Oriental renaissance: Innovative, educational, natural and social sciences*, 3 (4-2), 295-300.
6. Onarkulov, Karimberdi, & Kholdorov, Muhammadkarim (2023). study of processes of fruit and vegetable drying in infrared light drying device. *Oriental renaissance: Innovative, educational, natural and social sciences*, 3 (4), 932-937.
7. Muhammadkarim Botirali O'gli Kholdorov (2022). Basic physical and chemical the principle of obtaining high-frequency condenser ceramics. *Scientific progress*, 3 (1), 412-418.
8. Nabiev, M. B., Kholdorov, M. B., Tillaboeva, OB, & Gulomjonova, D. D. (2023, November). Renewable thermoelectric energy converters checking thermal and electrical specifications. In *Fergana state university conference*(pp. 109-109).
9. Mamatova, Mahliyo Adhamovna, & Mamirjonova, Gulnoza Shokirjon Qizi (2024). EXTENSION AND APPLICATION OF NEWTON'S METHOD IN NONLINEAR OSCILLATION THEORY. *Oriental renaissance: Innovative, educational, natural and social sciences*, 4 (3), 607-613.
10. Хайдаров, З., Мухаммадаминов, С. Х., Гуфронова, Д. Ш., & Эргашева, Г. Ш. (2023, November). ИССЛЕДОВАНИЕ ФИЗИЧЕСКИЕ СВОЙСТВА КОНТАКТА ПОЛУПРОВОДНИК-ПЛАЗМА ГАЗОВОГО РАЗРЯДА. In *Fergana state university conference* (pp. 54-54).