



THE IMPORTANCE OF MECHANIZATION WORK IN THE PROCESSING OF FRUITS AND VEGETABLES.

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ABSTRACT

The article expresses the essence, as well as the technological stages of the processes of mechanization of the processing of fruits and vegetables. The issues of cleaning, cutting, separating from seeds, drying and packaging of fruits and vegetables are covered by increasing productivity, improving quality and reducing the cost of products using modern technologies. Mechanized processing systems serve the efficient production of fruit or vegetable products.

Introduction.

Uzbekistan's climatic and agroecological conditions provide favorable opportunities for high-yield cultivation of agricultural products, particularly fruits and vegetables. However, significant losses are observed during the delivery of these products to consumers, particularly during the storage stage. According to global experience, 20–40% of fruits and vegetables become unfit for consumption during the postharvest period due to various factors.

Mechanization and automation processes in agricultural product processing systems constitute a vital component of modern production. In the context of a growing demand for food products, enhancing the efficiency of processing technologies is considered one of the pressing issues.

Fruits and vegetables are raw materials that are widely grown in agriculture and used in the production of various processed products. Its economic value can be increased through drying, canning, juice production, and preparation of semi-finished products. However, traditional, labor-intensive processing methods present challenges such as high time consumption, significant labor requirements, and inconsistent product quality.

Therefore, by mechanizing processes such as preserving apples or processing cucumbers, there is a need to increase production capacity, reduce product loss and create technological systems that meet sanitary and hygienic requirements. The main purpose of this article is to scientifically analyze mechanized technological solutions in processes such as preserving apples or processing cucumbers and evaluate their effectiveness.

Discussion and Results.

Therefore, a thorough study of the factors affecting quality during the storage of these products is of both scientific and practical importance. Agricultural products, particularly fruits

and vegetables, serve as a source of biologically active compounds, vitamins, and minerals essential for the human body. In addition to cultivation, the storage process plays a crucial role in preserving product quality, reducing losses, and enhancing economic efficiency. Therefore, studying the factors affecting the storage of fruits and vegetables remains one of the pressing issues. Fruits and vegetables, as living organisms, continue physiological processes such as respiration, ethylene production, transpiration, and enzymatic changes. The high water content (85–95%) and richness in nutrients make them highly susceptible to microbiological spoilage [2].

Systematic analysis and comparative assessment methods were used in the research process. Scientific and technical literature was analyzed and studied the work activity of mechanized devices used for storing apples or processing cucumbers.

The technological process of storing and processing fruits and vegetables was divided into the following stages:

- Reception and preliminary sorting of raw materials;
- Washing and disinfection;
- Peeling and cutting;
- Seed removal;
- Drying or other processing operations;
- Packaging and storage.

For each stage, appropriate mechanical equipment was selected, and their technical parameters—productivity (kg/h), energy consumption (kWh), and labor intensity—were studied. Based on the obtained data, the efficiency of mechanized methods was compared with that of traditional manual approaches.

The study results demonstrated that mechanized processing systems possess several advantages. In particular, the use of automated lines in sorting and washing processes significantly increased the volume of product processed per hour.

During the cutting and seed removal stages, the use of specialized mechanical devices resulted in:

- A 60–70% reduction in manual labor;
- A threefold increase in production speed;
- A decrease in product damage.

Through the use of modern storage technologies in the storage process, the moisture content of apples was reduced to a normative level, and the physicochemical properties of the product were preserved. With the introduction of mechanization in the packaging process, there was a decrease in cost by up to 20%.

The results obtained show that the application of mechanized technologies to vegetable processing processes is economically and technically justified. In traditional labor-intensive methods, the predominance of human involvement leads to uneven product quality. The use of mechanical devices ensures the stability and consistency of technological processes.

Additionally, during the implementation of mechanized systems, it is important to enhance energy efficiency and improve the maintenance system. The use of modern sensors and automated control systems to monitor the drying and packaging stages further improves product quality.

In the future, the integration of digital monitoring and automated control systems into the processes of storage and processing of fruits and vegetables can take production efficiency to a new level. Using sensor technologies, moisture levels, temperature, and processing speed can be monitored automatically. This reduces human-related errors and ensures continuity in the production process.

In addition, designing universal mechanized lines suitable for small and medium enterprises facilitates the regional development of agricultural processing. This enables melons to be marketed not only as raw materials but also as processed, ready-to-sell products.

As a result, mechanized processing technologies not only enhance technical efficiency but also contribute to strengthening the country's food security.

Conclusion.

Mechanization of the processes of storage and processing of fruits and vegetables is one of the important scientific and practical directions within the framework of technical sciences. Based on the study results, the following conclusions were drawn:

- Mechanization significantly increases labor productivity;
- Product quality becomes more consistent and meets sanitary standards;
- Production costs are reduced;
- Continuity of technological processes is ensured.

Thus, the introduction of modern mechanical devices makes it possible to achieve high efficiency in the field of storage and processing of fruits and vegetables, and in the future it can be further developed on the basis of automation.

References:

1. Shaumarov, X. B., & Islamov, S. Y. (2020). Technology of storage and primary processing of agricultural products: Textbook. Tashkent: Innovatsiya-Ziyo.
2. Islamov, S. Y., & Shaumarov, X. B. (2011). Technology of storage and primary processing of agricultural products: Textbook for practical and laboratory training. Tashkent, 192 pages.
3. Xodiyev U. E., Toshmaxammatov S. T. & Xayrullayev D. I. (2026). QOVUNNI QAYTA ISHLASHDA MEXANIZATSIYALASHTIRISH ISHLARINING AHAMIYATI.. Development Of Science, 2(4), pp. 134-137. <https://doi.org/0>
4. O'g, U. A. A. M., Eshdavlatovich, X. U. B., o'g, J. R. I. M., Veychjou, Z., & Xueji, Y. (2025). PAXTA XOM ASHYOSINI SAQLASH VAQTIDA HARORAT O'ZGARISHINING TOLA SIFATIGA TA'SIRI. Markaziy Osiyo ko'p tarmoqli tadqiqotlar va Menejment tadqiqotlari jurnali, 2(4), 112-115.
5. Negmatulloev, Z., Kholboev, B., Rakhmatullaev, R., Kuziyev, B., Khodiyev, U., & Saidkosimov, U. (2025). Effect of High-Pressure Flow Parameters from Hydrotechnical Facilities on the Environmental Reclamation Status of Agricultural Soil and its Productivity. In E3S Web of Conferences (Vol. 673, p. 01005). EDP Sciences.