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THE IMPORTANCE OF SYSTEMATIC ANALYSIS IN THE DRYING PROCESS OF FRUIT AND VEGETABLE PASTILLA

KHALIKOV MUHRIDDIN

Navoi State Pedagogical Institute, Navoi, Uzbekistan

E-mail: muxri0770@gmail.com

*Corresponding author

DJURAEV KHAYRULLO

Bukhara Engineering Technological Institute, Bukhara, Uzbekistan

Email: xayrullo.djurayev@mail.ru

Abstract: This article provides information on the significance of systematic analysis in the drying process of fruit and vegetable paste, as well as recommendations for the development of high-quality products for the food industry. It emphasizes the importance of using advanced production technologies and modern methods of processing and storing products in order to achieve sustainable development in the fruit and vegetable industry. The article discusses the benefits of scientific analysis in improving the quality of agricultural products and emphasizes the need for systematic analysis in the production process. It also presents an algorithm for using systematic analysis in drying fruit and vegetable pastes, as well as the main features of the processing process. By following these recommendations, producers can ensure the production of high-quality semi-finished products enriched with biological additives, which are essential for the food industry. Furthermore, the use of effective methods of drying fruits and vegetables can help preserve their nutritional value and extend their shelf life. Justifying the optimal drying parameters for fruit and vegetable pastilles in an innovative way, we have determined a highly efficient and energy-saving drying process, as well as technical and economic indicators for producing various dried pastille compositions based on the high moisture content of fruits and vegetables. This process helps to reduce the waste of raw materials during processing.

Keywords: fruit, vegetable, pastille, drying, process, system, analysis, product, technology, farm, village, method.

Introduction. Thanks to the reforms implemented in recent years in our country, significant changes have occurred in the agricultural sector. If previously the main fruit and vegetable products were produced on large collective farms and centrally sold outside the country, now the leading place in the production of fruit and vegetable products is occupied by farmers and farm enterprises.

Uzbekistan occupies one of the leading places in the world in the production of raisins and dried fruits with high taste characteristics. Our government pays great attention to the production of fruits and vegetables in the republic. A striking example of this is the acquisition and repair of new technological equipment, the annual increase in the production of canned fruits and dried products, and the extensive work carried out on the export of fruits and vegetables.

The climatic conditions of our republic are considered favorable for drying grapes in the sun, at high temperatures and low air humidity. Sun-dried products are of higher quality compared to artificially dried products.

Literature review. D.J.Yellot, S.Srivastava, M.R.Spotts, A.D.Singh, P.F.Waltrich, A.V.Lykov, A.S.Ginzburg, among foreign scientists on solving problems of engineering and technology in the processes of processing and drying fruits and vegetables, as well as on the study of the laws of substance exchange B.M. Azarov, B.S. Sazhin, G.I. Auerman, V.V. Kafarov, P.A. Rebinder, V.A. Lashkov, V.V. Safin, G.K. Mikhailova, S.G. Ilyasov, M.P. Volarovich, N.A. Voskresensky, I.N. Vladavets, A.N. Vyshelessky, A. Golovkin,

N.A. Panfilov, A.V. Gorbatov, V.S. Baranov, E.A. Guigo, A.I. Zharinov, Y.S. M. Plaksin, I.A. Rogov made their contributions. Also from Uzbek scientists N.R.Yusupbekov, A.Artikov, D.N.Mukhitdinov, H.S.Nurmukhamedov, J.P.Mukhiddinov, J.M.Dadaev, R.A.Khaitov, H.F.Joraev and other scientists.

Theoretical foundations of the drying process and practical recommendations for the use of drying technologies for fruits and vegetables have been developed. At the same time, a number of research projects on drying fruits and vegetables are being carried out at the world level - convection, ultra-high frequency, infrared light field, vacuum drying.

The development of an effective drying system based on a stepwise processing system for fruits and vegetables that accelerates the movement of moisture in the layers of the product to the surface, scientific research work on systematic analysis in the drying process of fruit and vegetable paste has not been fully studied.

Research methodology. A variety of high-quality grapes and fruits are grown in our republic. The chemical composition of these grapes and fruits, i.e., the content of sugars and vitamins, is significantly higher than that of the fruits and grapes of the northern regions. The main purpose of storing agricultural products is to preserve and deliver to the consumer all the substances that are beneficial to the human body, collected by the raw material before ripening.

Today, with the development of science and technology, several modern technologies have been created and put into practice to preserve the quality of fruits and vegetables as much as possible.

Sustainable development of fruit and vegetable production, the use of advanced technologies for growing products, and the introduction of modern methods of processing and storage of products make it possible today to prevent food shortages. It is known that grown fruits and vegetables undergo a number of technological processes before reaching the consumer in the form of a finished product.

A systematic analysis was carried out during the drying of fruit and vegetable paste. It was learned that the object was composed of two substances. The first physical side of the object is the system, the second mental side is the process occurring in the system. Based on systems thinking, an analysis of fruit and vegetable lozenges was carried out. A fruit and vegetable lozenge is studied as an object consisting of a number of elements. The processes and phenomena occurring in the elements of fruit and vegetable lozenges are analyzed.

Fruit and vegetable lozenges were studied as the primary research system using appropriate multilevel systematic review methodology. A multi-level systems approach made it possible to develop computer models, determine the optimal conditions for the drying process of fruits and vegetables and the controlled system of the object under study.

System analysis is an approach to the study of objects and phenomena, considering them as a developing system, taking into account their composition (the composition of elements and connections), as well as the laws of change and development as a single system.

The systems approach is a methodology for solving large problems based on the concept of a system.

When analyzing a system, a new system is created, an existing system is improved and streamlined.

* The subjective analysis here is what elements the system consists of and how these elements are related to each other (structural analysis).

* Functional analysis – analysis of the dynamics of communication (analysis of task completion).

* Historical analysis - what the system was and what it will be. Here are the subsystems of the system, their connections, internal and external functions of the system, capabilities of the system, factors that influence the capabilities negatively and positively, critical situations of the system, in which the values of the factors of the system are analyzed to work with maximum efficiency.

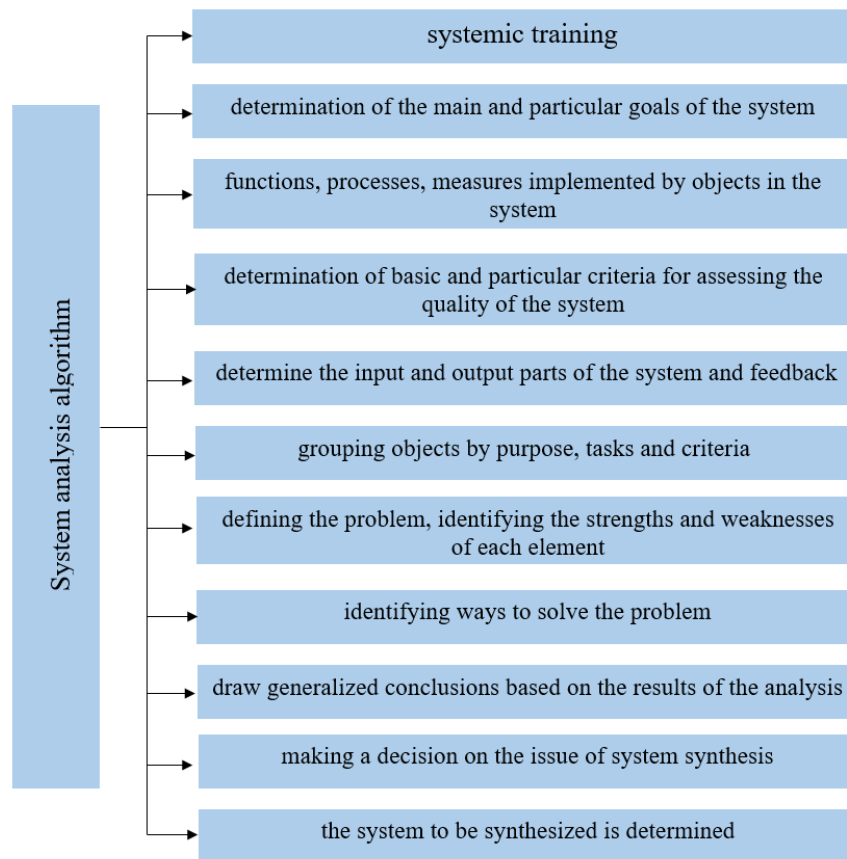


Fig 1. System analysis algorithm.

The modern development of systems thinking and analysis methodology creates ample opportunities for studying objects based on the information principle of analysis. Each object can be considered as an information processing element. The use of systems thinking and analysis methods makes it possible to clarify information processing

processes. The object of study consists of two components: the system itself as a physical component of the object - an element and a process in this system.

Analysis and results. Processes for processing fruits and vegetables vary depending on the raw materials processed and the types of products prepared.

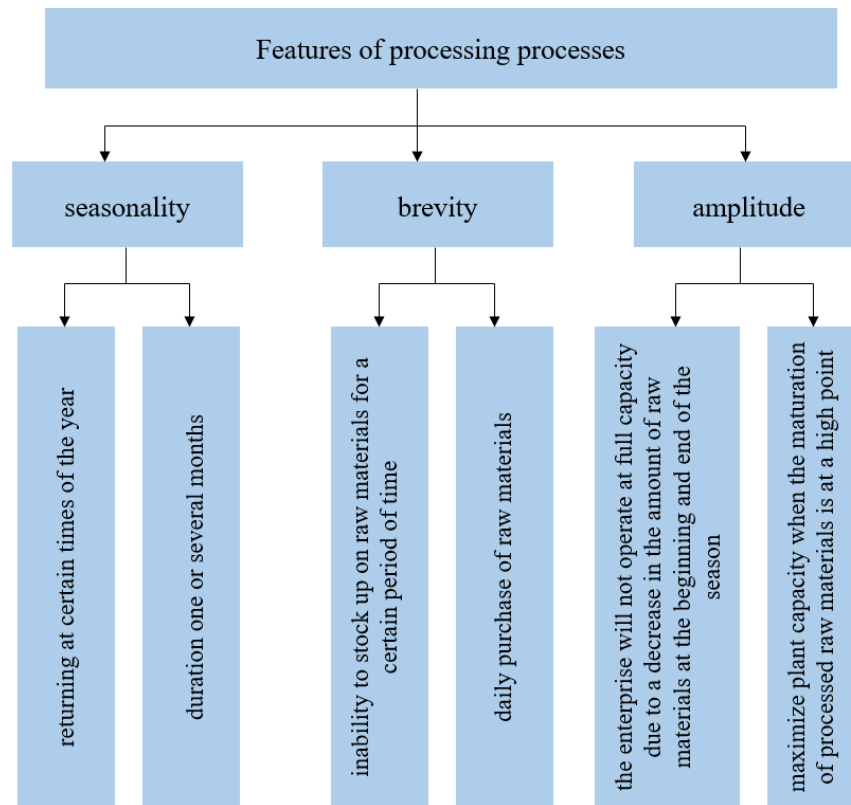


Fig 2. Features of processing processes.

The maximum preservation of useful substances contained in products over a certain period depends on the environment created in the storage chamber, that is, the more correctly a specialist organizes the work, the easier it will be for him to achieve his goals, and the profitability of the enterprise will increase. Today, science and technology are developing and many achievements are being made, that is, as a result of creating conditions during the storage process of products, their contents can be preserved in the same condition in which they were freshly cut.

Conclusions. Fruits and vegetables are important for the human body. The abundance of easily digestible sugars, organic acids, vitamins and minerals in them indicates how important fruits and vegetables are for the human body. We do not have the time or ability to store fruits and vegetables for a long time and send them to other remote places. If possible, fruits and vegetables can be stored in special warehouses for a maximum of 5-6 months. The quality of such stored fruits and vegetables decreases, and their physical weight decreases. This is why it is important to dry fruits and vegetables.

The dried product is very easy to load – unload, store, and at the same time, these products are high-quality products for all kinds of expeditions and passengers.

A mathematical model of the process of drying lozenges from different fruits has been created, and graphs of changes in humidity and temperature of the product layers have been constructed. Equations were obtained that describe the kinetics of the drying process depending on the limiting values of factors influencing the technological process.

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