Production of Plant Products as a Process of Functioning Biotechnical System

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Abstract:- ***The principle and essence of constructing technological line for the production of dried melon is discussed, providing a systematic complex approach and continuity of production based on the raw of developed and technical means: machines for peeling melons, aggregate for cutting melon into ring slices, chamber- chain drying device and other flexible technological systems.***

Keywords: biotechnical, system, combination, production, processes

I. INTRODUCTION

One of the most important requirements of the modern stage of scientific and technical progress is a systematic approach. Its essence leads to any being studied object is regarded all in diversity of its properties and functional indicators. Development of organizational, technological, technical, economic and other measures directed to the increasing the efficiency of equipment usage in the culture of plants will be more successful if the appropriate decisions are accepted due to the systematic approach. By this system is understood the set of elements with common properties, features, purpose or objective. Any system may include as a subsystem of a limited combination of elements, and at the same time it can be a part of another, more general system interacting with it through the external communication.

The aim of our research is a comprehensive systematic approach to the solution the problem of quality preservation of agricultural crop production and the creation of mechanized flow production line for waste-free processing and drying of melon fruit, suitable for the operation in the conditions of small farmers.

Systems are distinguished into physical, technical, technological, biological, informational and others. In order to study the production processes in the greatest interest of crop products are mixed biotechnical system in which technical units (machines, structures, buildings) in the manufacturing process interact with biological (human, fruits of plants). System "man-machine" are called ergatic and "man-machine-fruit plants" – are biotechnical ones.

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The methodological basis of the system analysis is the universal law of the dialectical unity of the material world, the study of the interaction and interdependence of all phenomena in nature and society. Agriculture, farm or a separate process in the analysis can be represented as a complex of multi-level dynamic system having a hierarchical structure. Let us consider the process of crop production from the standpoint of system analysis and represent the system "operator-machine-fruit plant environment" (G-M-PR-C) as information scheme shown in Fig. one.

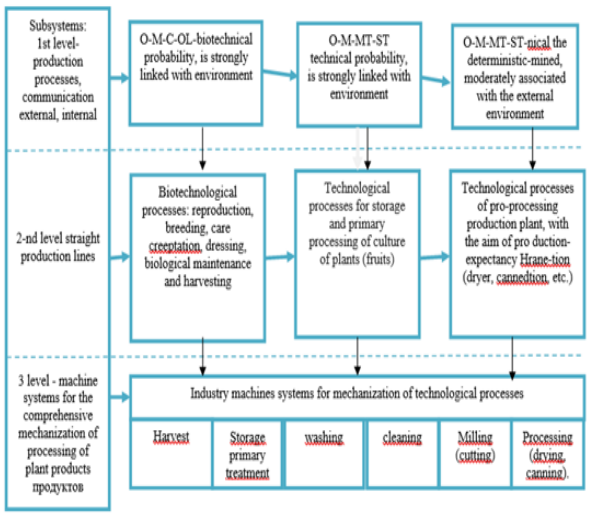

Fig. 1. Informational structurally-technological scheme process of crop production

Such system consists of several subsystems located at different levels. Her analysis is carried out in the downward direction by limiting the number of these levels three to five. In the development of new systems, their synthesis is carried out in the reverse order, taking into account the fact that the objective reality of any system imposes its own limitations.

Subsystems 1st - Level represent a set of processes which differ by the presence or absence of basic biological level - for example, fruit of the plant - and the nature of the coupling elements with the external environment. This gives the base to all processes in the plant (subsystem located in the top row) divided into three groups:

1) Biotechnological stochastic, in which the operator through the working bodies of machines is affected (contact) directly to the plant (fruit) (tillage, planting seedlings or sowing, fertilizing, pruning, harvesting, etc.); here are

predominant are communication and interaction with the probabilistic nature;

2) Technological stochastic process, in which represent the plant (biological unit) in the system is not involved; these processes are technical subsystem, with a certain probability strongly interacting with the outside through a direct and reverse connection (storage of fertilizers, irrigation and amelioration action, machines for cleaning, washing, drying and cutting, etc.);

3) Technological deterministic processes, which represent technical subsystems relatively weakly interacting with the environment, the management of which is performed by general rules using appropriate equipment (water, perform fertilizers, machine operation for cleaning, washing, cutting and drying and m. P.).

RESULTS & DISCUSSIONS

The functioning of technological system is to perform a series of operations on raw materials, and its efficiency is achieved through the most cost-effective, high-quality and intense transformation of raw materials into finished products. In all subsystems a second biological link is presented- the man (operator - D) - the most active element of ergonomics systems, acting as a productive force, a direct manufacturer of a product or production manager. Along with the biological subsystems have all the technical (deterministic) units: the machine (M) as a means of labor and materials (MT) as the object of labor. It is necessary to inform that the plants in the production system plays a dual role as both a means and object of labor.

Technological processes, for the course of which strongly affects the interaction with the environment, are allocated to the second subsystem. the harmful effects of the environment on the equipment (corrosion), need to be considered strictly in the operation of the equipment, as well as the negative influence of some technological processes on the environment. In operation, the system must be performed ergonomic and environmental requirements. In the third subsystem process equipment external environment has little effect, and its operation is made by general rules of use of machine technology use.

The subsystems 2 - Layer structure and communication are displayed within separate processes, the composition and nature of business operations, the analysis of which gives rise to the development of operating maps. They also serve as a basis for addressing scientific organization of labor and production automation.

CONCLUSION

Subsystems 3 – level are displayed the interaction, structural connection between the external environment and the elements of the system -technical and biological functioning (machinery, equipment, structures, buildings). By the nature of communication actions may be direct and reverse, positive, negative, and neutral; for bond strength (or strength of interaction) strong or weak. According to the methods of investigation and assessment of the impact of interacting communication factors can be probabilistic (correlation, regression) and deterministic (functional). If there are already two biological units of the system as a whole should be regarded as a probability.

Subsystems 4th-level are displayed communication characterizing the internal structure of these elements (the properties of the starting materials and final products).

The specific definition of the "man-machine" system, which is meant the system consisting of a human operator (operator group) and the machine, by means of which it is carried out the labor activity was given in GOST 26387-84. It is influenced by two groups -energy factors associated with the machine, and social, related to the operator (eg, purpose, benefits, competition). Comparing the system "man-machine" with the interests of our system "operator-machine-plant-environment", it is easy to notice that the second is much more difficult one, and the factors influencing its functioning are more; particular importance are the biological nature of factors.

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