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STABILIZATION OF QUALITY CLEANING ONION INNOVATIVE WAY

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Abstract. The questions the relevance of resource development combined treatment processes produce materials and hardware design with emphasis on quality and safety of products. The existing methods and equipment for purification of vegetable raw materials may reveal their characteristic weaknesses that need removal. It was proved the feasibility of developing and implementing new combined treatment processes produce raw materials and equipment for their implementation in enterprises vegetable processing restaurants and businesses. In present paper it was described the principle of the structure and principle of operation of the machine to clean the onion. The process is that of combined treatment of onion using heat treatment process of steam and subsequent mechanical refining process. The basic indicators were obtained from a combined purification process onion and process parameters that have a significant effect on the percentage of material loss during treatment and percentage of treated bulbs. The rational modes of purification process of onion combined method.

Keywords: onions, quality of treatment, the combined process, heat treatment, mechanical purification

In today's economies of European countries there is a need for a new resource processes and equipment that are responsible global requirements. This should be strictly monitored indicators such as product quality and environmental safety conducting manufacturing processes. Horticultural products play an important role in the nutrition of all population groups, and should be s present in the diet of people. Therefore, safety and quality of food, lack of physical, chemical and microbiological contamination should be provided by manufacturers and processors. To ensure safety manufacturers must apply control measures along the chain of production processes - receiving, processing and preservation of fruits and vegetables. Particularly relevant is the question arose of bringing businesses to the standards of the World Trade Organization. These requirements provide high quality and environmental safety of products, and the maximum mechanization processes. The primary objective for vegetable processing industry is using technology for economic production. But the intensity of the pace of development is reduced due to the low degree of mechanization of most processes of raw materials, a high percentage of use of manual labor, primitive equipment. Because this can not manufactured products that would meet-wide requirements.

One way to ensure the chosen direction for resource conservation and energy saving is the development and introduction of new technologies and equipment for cleaning fruits and vegetables raw. Despite the fact that today many types of equipment used for the process of cleaning materials, there are many problems to be solved in the near future. It is known that during the cleaning process much of this material is lost. This is due to the moral and physical deterioration of previously created equipment for the purification process. Most developed treatment processes produce raw materials lost their relevance as defined by significant power consumption and low levels of product quality. Promising avenue intensification and mechanization of cleaning process raw fruits and vegetables is to develop new specialized devices whose operation is based on a combination of thermal, hydrodynamic and mechanical processes. Implementation of innovative methods combined treatment is complicated by the lack of comprehensive research in this area as a whole, including adequate information on the specific structural and mechanical, physical, mechanical and thermal properties of fruit and vegetable raw materials, methodologies and experimental settings to determine their influence on the process parameters. In modern society relevant and important area that provides more efficient use of resources is the development and implementation of new processes. At this time, there is an intensification of food processing industry and the introduction of new advanced technologies, energy- and resource-efficient manufacturing processes of

raw materials with maximum preservation of food and biological value [1].But it should be noted that labor productivity in enterprises that process agricultural raw materials is 2-4 times lower than similar enterprises in developed countries, about 50% of the time-consuming operations are performed manually and only 10% of operating equipment operates automatically. To solve the problem of agricultural raw materials necessary to develop technical tools not only for industrial processing of agricultural raw materials, and debug output of compact equipment for the enterprises of restaurants, mini-workshops on farms and private enterprises. Economically appropriate to apply multi-operational universal and compact equipment, which implemented a number of processes that will recycle various types of raw materials and produce a variety of products with stable quality indicators. Development and implementation of mass production of environmentally friendly new generation of energy-efficient equipment, which implements the innovative methods combined complex processing of agricultural raw materials, competitive in foreign markets is an urgent task.

Processing of raw materials is important in the food industry and restaurant industry. One of the most time-consuming processes that are used in enterprises restaurant management is the process of purification of vegetable raw materials, in particular onion. This process is one of the most important in preparing onions for further processing. Today, there is proper equipment to mechanize the process of cleaning onion, but this kind of equipment has certain specific applications, as well as specific weaknesses that should be removed to ensure better cleaning materials.

Currently, the most common ways of cleaning vegetables are mechanical air. But despite the fact that these two methods have many advantages over other shortcomings of each of these require a detailed study of these methods for a more efficient use of processing establishments and enterprises restaurant facilities. The problem of cleaning onion in enterprises restaurant business is very important. In many businesses, the cleaning process consists in cutting onions upper pointed collar, lower stems and root removal of scales, a laborious process operation. In some plants to clean the neck and the bottom plate of onion is cut by hand, and to clean the onions from the scales used air blasting machine for onions. The final bow after treatment is carried out manually. Some air blasting machine for onions can work in wet mode. This means that during rotation of the broken and bulbs of friction disc and the roughened surface of the cylinder wall scales removed without compressed air and water fed under pressure. Since in the plants of this type consists of several units (the working chamber, the dispenser) when the design calculations should coordinate value of each performance. The disadvantages of this type of systems are the need to manually cutting the neck and a bottom bulbs. In addition, the cleaning equipment is a high bow and has large dimensions, which greatly complicates its application in enterprises restaurant facilities.

Many types of cleaning equipment onions and inappropriate use cannot be in the business of restaurant business. They are complex in design and have a large number of operations. In the application of existing equipment there are significant material loss resulting from the use of hard abrasive elements [1]. The disadvantages of the existing equipment can be attributed to material and energy, lack of quality cleaning products, the availability of auxiliary equipment and the need for preliminary operations - sorting and calibration materials. Today, it was necessary to create devices for processing of agricultural products which will have a small, energy-efficient performance and are environmentally friendly. Currently, there is need to address the issue of quality cleaning onion. One way to resolve this issue is to develop a combined method of treatment and the creation of modern equipment for its implementation. To intensify the development of new equipment necessary to carry out a series of theoretical and experimental studies, in which will be determined by the influence of process parameters on the percentage of clean onions raw material losses and efficiency of cleaning product. One of the promising areas of research to improve the purification process of onion is to develop new specialized devices whose operation is based on a combination of thermal and mechanical effects on the product being processed.

Combining steam and mechanical way in one unit will provide an opportunity to address deficiencies that are characteristic of the two.

Based on analyzing the advantages and disadvantages of existing methods combined cleaning vegetables, it should be noted that during the development of a new method of cleaning onion vegetables, namely due to the weakening of the onion peel - should be used with a pair of high pressure to minimize the size and lower power penetration costs of vaporization. A promising way of improving treatment of onion is a combination of

heat treatment processes couple with mechanical removal of the husk.

The use of high-tech equipment for the processing of vegetable raw materials to factories restaurant business is a very urgent task. After analyzing the current problems cleaning raw materials, it was suggested a promising device for the effective implementation of the purification process. The basis of this unit is the principle of combination of the previous heat treatment of onion steam and its subsequent mechanical treatment [2, 3].

The unit combines heat treatment process bow ferry and its subsequent mechanical treatment. Heat treatment is a short bow ferry operation and the need for steam cleaning the surface layer of the bulb, with a view to a more effective separation of scales. Then, the process of machining is a bow. Mechanical cleaning of the onion is done by a specially developed body of work, which is cylindrical and provides rotational motion, thereby contributing to the pressing of the walls of the onion. The walls of the working body have special holes that rotating brushes the inedible part of the bulb. A characteristic feature of the device is the combination of the heat treatment process and the process of mechanical treatment of bulbs in one of the working chamber, which greatly simplifies and intensifies the process of cleaning them, to reduce the dimensions of the device, thus ensuring its application in enterprises restaurant facilities [5].

It should be noted that the process of heat treatment of onion and a pair of mechanical treatment process occurring in one chamber, which greatly simplifies cleaning and reduces its holding. Quality Cleaning onion and percentage losses of raw materials in line with those typical for pneumatic cleaning methods. This apparatus for combined purification process has compact dimensions, consumes a relatively small amount of electricity, and its performance and frequency of use allow it to restaurants and catering enterprises and small processing plants. To intensify the development of new equipment necessary to carry out a series of theoretical and experimental studies, during which will be determined by the influence of varietal characteristics of onion and process parameters on the effectiveness of a cleaning product. A promising way to improve the purification process is a combination of onions processes of its thermal steam treatment to remove the skin. The main idea is to implement the proposed method of cleaning onions of design unit ACO-10/160. During operation onions loaded into the hopper, from which falls into the perforated drum. Then, follow the same steps for steamed onions. After a brief steaming, and the termination of its supply bow begins to rotate together with the drum under the influence of centrifugal force press against the drum surface. At the moment when the centrifugal force will exceed the forces holding the integrity of the skin, there is a failure of scales from the surface of bulbs and pressing it against the walls of the drum. After cleaning the drum stops and peeled onions discharged into the collecting tray. Unloading is provided by unloading valves that open in opposite directions. Varying the speed provided by the use of asynchronous motor with three windings that prevent the use of additional converters and various gears. A drum, depending on whether the desired operation, moves at a predetermined speed in the range 10...800 rpm. The drum has a chamfered shape on the sides of the cylinder. Bevels act as reflectors for mixing layers of onion during cleaning. In the middle of the drum have ribs that serve as agitating blades and ensure the integrity of the drum. Between the blades is a free space for feeding the bow into the drum during loading and unloading of onion free after cleaning. Furthermore, in the middle of the drum ribs include between which there is free space, whereby the steam is fed into the middle of the drum, which allows processing with simultaneous steam bow by stirring. To supply steam into the drum units are made of nozzles which are connected to steam pipes the steam generator to the electrode. Application of the device in the food industry and restaurant industry will improve the quality of cleaning onions, intensifying processes of its processing, lower power consumption of the cleaning process, to improve the working conditions of the personnel.

The primary objective in the study of the purification process onion is determining the parameters of the purification process and characteristics of raw materials affect the separation of husks. By the characteristics of the product are: initial moisture content, shape, size, thickness of the shell, weight, bulk layer thickness of onion. The parameters that characterize the process of cleaning are steam temperature, steaming time, frequency, speed drum camera, load factor, the size and shape of the perforation holes. For investigation of the combined treatment of onion is designed and manufactured an experimental setting. This plant is proposed to use the cooking chamber as drum rotates. Developed by this technique experimental setup allows us to investigate the process of

cleaning onion with the possibility of taking into account all external factors of the research subject can be studied by standard methods. As the parameters that influence the percentage loss of material was chosen depth thermal blanket onion storage life of onions, and the duration of the process of mechanical treatment. As mentioned, one of the stages combined purification process onion is the process of heat treatment prior onions steam. To ensure the desired depth of the heat treatment is necessary to determine a rational treatment duration onions steam. The depth of the heat treatment of the surface layer of onions should ensure effective removal of husks with minimal loss of material. If you increase the depth of the heat treatment of the surface layer of onions increased raw material losses during the mechanical treatment, as with the husk is separated surface layer of the onion, which has undergone changes under the influence of steam. In this case, it becomes necessary to reduce the depth of thermal processing of onion by reducing the duration of heat treatment. But in case of a significant reduction of this parameter process of separating husks from onions can be inefficiently or not occur at all.

When considering the cleaning process should pay attention to such factors as the quality of treatment, the percentage of waste, the maximum preservation of the vitamin and mineral content of the product.

In order to study the combined purification process onion we conducted a series of related experiments. The primary objective was to determine the optimum geometrical parameters holes drum work and process parameters - duration of pretreatment steam drum speed, the duration of treatment. Experiments were carried out for 3 load factor drum. Note that $Ks = 0.3$ was included in the experiment based on a practical point of view. As for restaurants and catering enterprises manufacturing process does not always require the maximum load of the machine. Whole experiment was conducted for $Ks = 0.3$, $Ks = 0.5$, $Ks = 0.7$. As initial experimental parameters were selected two holes form a circle and an ellipse for reasons of convenience and efficiency of the manufacturing unit. Geometric dimensions of the vehicle within 12...22 mm are selected based on the minimum and maximum sizes of stems and neck bow different varieties and forms. During the experiment, but the geometry of the holes needed to determine the optimal duration of treatment and duration of prior heat treatment. According to the preliminary studies found that while steaming at a temperature of 100 ... 105 °C is penetration surface layer of onions with scales, but not pay attention or the fact that the surface layer after heat treatment becomes unusable – steaming within to 4.0...4.2 mm top layer provides steaming bulbs, which, depending on the variety must be removed because it has a low moisture content and is not suitable for use. So the fact penetration surface layer is a good thing and satisfies the conditions of the process. According to experimental data brief steaming within 50...60 seconds onion does not lead to the desired steaming dry peel and pulp of the first layer. Further steaming versus time increases the thickness of steaming but reduces processing time. Speed range, within 40...150 rpm. During the process, the treatment was chosen according to the results of previous studies. Since the process can be divided into three stages: steaming cut stems and neck, removing scales from the bulb, remove the scales from the working chamber, the study of the purification process of the scales should be performed at this stage. Previous studies have shown that with increasing drum speed within 200...300 rpm. observed irreversible deformation of the bulb, its cracking and destruction. It was therefore selected range in which the pre-steaming at low speeds up to 50 rpm. And immediately the process of removing scales to 150 rpm. Experimental study of the effect duration of heat treatment and mechanical treatment on the surface layer of the onion will continue to determining optimal parameters of the combined purification process. The use of rational parameters of the combined purification process onion will enable to reduce the loss of raw materials, improve the quality of treatment and significantly intensify and mechanize the cleaning process. Rational parameters of heat treatment of onion and its mechanical refining process will ensure appropriate quality indicators cleaning onions, given its variety and shelf life. Presented rational parameters combined purification process onion will ensure maximum preservation of raw materials and complete cleaning of the onion husks and stems.

A comprehensive review of equipment that has similar functionality, but is used for different kinds of raw materials, makes it possible to systematize the knowledge of the processes purification plant material from the outer cover that provides a scientific basis for the development of new technologies that will allow the decrease of negative factors and critical control points of the whole process. Development of hydro resource,

mechanical, thermal processes that enable hardware to implement the combined methods of cleaning fruit and vegetable raw materials will reduce the losses associated with negative effects return products, food poisoning and other problems, which in turn allowed businesses to ensure a consistently high level of food safety and consumer confidence due to an increasingly competitive preserve and expand its share of the domestic and foreign markets.

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