

INVESTIGATION OF COMBINED TREATMENT OF SUNROOT TUBERS

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The process of vegetables cleaning is a very urgent direction of studies despite the large number of existent methods and equipment for their realization. Cleaning is the one of most laborious procedures at fruit and vegetable raw material processing. At studying cleaning process one must pay attention to such parameters as cleaning quality, waste quantity and also maximal preservation of vitamin and mineral composition of a product. Today the most widespread methods of vegetables cleaning are mechanical and steam ones. But despite the fact that these two methods have many advantages comparing with other ones, shortcomings, typical for each of them, need a detail study of these ways for their more effective use at enterprises of restaurant economy. To shortcomings of the existent equipment may be referred its material and energy intensity, insufficient quality of a product cleaning, big percent of waste, auxillary equipment presence. The special attention must be paid to the process of peeling of sunroot tubers of the surface cover. Today this process is very laborious and needs manual labor. At the same time an essential part of a raw material is lost at peeling. It takes place because of a complicated form of sunroot tubers. Under modern production conditions there is a necessity to create the resource-saving equipment, correspondent to the world requirements. Today the one of most prospective directions of sunroot cleaning quality improvement and decrease of raw material losses is a creation of such equipment, which working principle is based on the combined effect of thermal and mechanical processes on a product.

Today the absence of complex experimental studies on using the combined effect of these processes on a product essentially complicates the elaboration of new, energetically effective equipment. The solution of the problem of raw material cleaning is the elaboration of combined process of tubers cleaning at the expense of combination of thermal and mechanical effect on a product. For studying the cleaning process a series of experiment that allow to determine rational parameters of the process realization are necessary. Taking into account the importance of determination of rational regimes of sunroots tubers cleaning there were realized the studies of the influence of thermal processing parameters and duration of mechanical

additional cleaning on the surface layer of sunroot tubers. It was necessary to establish the influence of steam pressure and thermal processing duration on the surface layer of sunroot tubers. The experimental apparatus was designed for studying thermal processing regimes. At the studies there was established the dependence of raw material losses on regimes of the cleaning process realization. The thermal processing depth is 1,0–5 mm. The increase of the steam pressure and the duration of the thermal processing raise the sunroot surface layer thermal processing depth and decrease the effort of peel separation from a tuber. The thermal processing depth is 1,0–5 mm. The effort of peel separation from a sunroot tuber after the thermal processing is within 1,142–15,0 N. The increase of the duration of mechanical additional cleaning raises the percent of cleaned sunroot tubers but leads to the growth of raw material losses. It was determined that the decrease of the effort of peel separation from a tuber at the thermal processing allows to decrease the duration of the mechanical additional cleaning process. It was determined that the growth of the thermal processing depth of the sunroot tuber surface layer is attended with the increase of raw material losses. The steam pressure at the thermal processing must be 0,3 MPa at the duration 35–60 s. The duration of the mechanical additional cleaning is within 70–105 s. The rational parameters of the mechanical cleaning process for the elaborated apparatus provide the maximally possible rate of cleaning quality – no less than 80% by the percent of cleaned tubers. At the beginning of the studies on determination of the percent of raw material losses, the general mass of studied sunroot tubers was 5 kg. After the series of experimental studies of the combined cleaning process, the mass of cleaned tubers was 4–4,7 kg. The regimes of the combined cleaning process were determined for minimization of raw material losses and improvement of sunroot tubers cleaning quality. There were established the necessary steam pressure and the duration of the preliminary thermal processing and mechanical additional cleaning. The experimental apparatus for the sunroot tubers cleaning was elaborated. The methodology of the combined cleaning process was also elaborated. The experimental apparatus with this methodology allows to study the sunroot cleaning process taking into account such factors as the thermal processing duration and steam pressure. The percent of cleaned sunroot tubers and the one of raw material losses were determined at the study. The experimental studies of the combined cleaning process allowed to determined its parameters. The rational parameters of the combined process of sunroot tubers cleaning allow to minimize raw material losses and to provide the high quality of cleaning of a product.