

для формуванні повноцінних за харчовою цінністю страв в закладах харчування.

Подальші дослідження будуть спрямовані на підбір раціональної формули стерилізації сосисок консервованих та визначення здатності до ферментації в системі *in vitro* розробленої продукції.

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DEVELOPMENT ULTRASONIC HOMOGENIZER

According to the results of experimental studies it was found that processing of ultrasound waves with a frequency of 22 kHz milk with a fat content of 3.2% allows to increase the dispersion coefficient by 27...64% during the ultrasound treatment of 135 ... 180 s.

To develop a project for ultrasound milk processing, it is necessary to formulate requirements regarding its characteristics. The process of milk homogenization is effectively carried out under the conditions of the specific power of ultrasonic processing 15 W/dm^3 [1]. The productivity of the ultrasound installation must meet the requirements of modern development of the economy. Therefore, for the process of milk homogenization, productivity of $100 \text{ dm}^3/\text{h}$ should be achieved.

Laboratory research was based on the use of ultrasound disperser UZDN-2T for the processing frequency of 22 kHz and the amount of the treated mixture of 0.5 dm^3 . In order to intensify the process of homogenizing the milk and increase the productivity of the device, it is necessary to achieve the conditions under which the mixture will be fed into the processing chamber under the influence of pressure and a new portion of the mixture will flow through 135...180 s. Based on the distribution of the acoustic field of ultrasonic oscillations in a fluid with a developed cavitation it is necessary that the diameter of the radiating surface of the working tool is 1...3 cm in diameter, and the longitudinal size of the working volume of the acoustic device does not exceed 10...20 cm.

Since the working tool of the ultrasonic vibrational system is usually performed in the form of a disk of the required diameter and has two opposite emitting surfaces (that is, simultaneously radiate ultrasonic vibrations towards the bottom of the working volume and the surface of the liquid in volume), it would be optimal to immerse the working tool in the treated medium to a depth, close to half the length of the working volume.

The main factors for choosing the parameters for the development of an ultrasound machine are: the intensity and frequency of oscillations; sounding time, machine performance, temperature, pressure and other conditions for conducting the process in the ultrasonic field [2]. On the basis of these data, a principal arrangement of the ultrasonic apparatus was proposed for the homogenization of milk. It consists of an ultrasonic transducer with an emitter, an external element, an internal element, a seal, a branch of the input of the raw material and the output of the homogenized milk, the lid. In the middle of the external element an internal element with a gap of 0.5...2 mm is installed, which results in the formation of an ultrasonic chamber. The size of the gap varies with the use of internal elements of different diameters. Adjustment of gap allows processing of various raw materials with increased viscosity. External and internal elements are made of materials with high reflecting properties of ultrasonic vibrations. An ultrasonic transducer with an emitter is introduced through a hole in the base of the external element directly into the ultrasonic processing chamber.

Use a screw to attach an ultrasonic transducer with an emitter to an external camera. Tightness is achieved by using sealants. To intensify the process of homogenizing milk on the inner walls of the outer element, there is a screw-like channel. The lid is fastened through the bolts through the holes with the elements. Sealants are used for sealing. The device works as follows. An ultrasonic transducer with an emitter is turned on. Through the nozzle of input, the prepared raw material enters the ultrasonic processing chamber. Due to the fact that the external and internal elements are made of materials that have high indexes of ultrasound reflection, there is an intensive process of homogenization of milk. In the process of homogenization, the raw material fills the chamber and enters the interior space of the elements. The flow of raw materials is divided into two streams, one of which continues to move in the propellant channel, and the second - along the lateral surface of the inner element. Due to the fact that the vectors of flow velocities are directed at an angle of 90° , the turbulization of the total flow occurs, which increases the quality of the received homogenized milk and intensifies the process of homogenization. Homogenized milk through the outlet connects to the container for collecting the product.

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УДОСКОНАЛЕННЯ ТЕПЛОМАСООБМІННОГО ОБЛАДНАННЯ ШЛЯХОМ ВИКОРИСТАННЯ СИСТЕМНОГО АНАЛІЗУ

Проблема ресурсозбереження під час переробки харчової сировини, зокрема, плодів та овочів і до сьогодні стоїть доволі гостро. До 60% сировини після переробки є відходами. Цим питанням займаються багато науковців [1; 2]. Крім того, існуюче обладнання часто не