SUBSTANTIATION OF MODES OF MILK-PLANT STUFFINGS FREEZING

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The technology of fundamentally new foods in the form of multifunctional semi-finished products on the basis of protein-carbohydrate dairy and plant raw materials is developed. The new approach to the use of uninvolved natural properties of dairy and plant raw materials gives the possibility to maximize their functional properties, increasing the economic efficiency of technologies by reducing the use of nutritional additives, as well as increasing the nutritional and biological value of finished products.

It is advisable to store the developed semi-finished milk-plant dtuffings in frozen form. The advantages of the use of frozen semi-finished milk-plant stuffings in the foods production at restaurant establishments are the possibility of using quick-frozen semifinished products in the fast food system, reducing of labor and producing costs, the flexibility of the technological process, the long storage time of semi-finished milk-plant stuffings, significant expansion of the range of culinary products and possibility to transport frozen semi-finished products at long distances.

To extend the storage time of foods it is expedient to use a freezing process, in particular quick freezing. Quick freezing is one of the methods of preservation, which guarantees long-term storage of raw material properties due to the action of low temperatures on the development of microflora. The decrease in temperature is accompanied by a slowing down of reactions related with the activity of enzymes and microorganisms.

The effect of low temperatures on food causes changes in their consistency and structure, affects the quality of products after defrosting. The degree of these changes depends on the speed and temperature of freezing, the duration and conditions of storage, the method of defrosting and composition of products.

The purpose of the work is to study the influence of plant raw materials on the state of water during freezing-defrosting of semi-finished milk-plant stuffings and the definition of regimes of their freezing.

It is determined that the developed semi-finished milk-plant stuffings require a deeper overcooling than a control sample (cottage cheese stuffing). This is related to the presence of vegetable purees in the stuffing, containing a large amount of carbohydrates, which bind water and stabilize its condition in the composition of stuffings. Such impact of vegetable purees creates more favorable conditions for the long-term quality storage of the frozen stuffings.

The comparison of the non-freezing water presence, registered by the method of nuclear magnetic resonance in protons at the temperature of –25 °C, indicates an increase in this water fraction amount in all investigated semi-finished milk-plant stuffings comparing with this amount in the control sample. For example, at –25 °C the control sample contains 0,21 g of H_2O per gram of dry matter, when for the semi-finished milk-carrot stuffing the amount of H_2O per gram of dry matter is 0,40 g, for milk-pumpkin stuffing – 0,39 g, for milk-zucchini stuffing – 0,37 g at the same temperature. At the temperature of –30 °C the control sample contains 0,20 g of H_2O per gram of dry matter, and the semi-finished milk-carrot stuffing – 0,32 g of H_2O per gram of dry matter, milk-pumpkin stuffing – 0,25 g of H_2O per gram of dry matter, milk-zucchini stuffing – 0,24 g of H_2O per gram of dry matter. This fact further confirms the conclusion that in the samples of semi-finished milk-plant stuffings the water is bound by carbohydrates (sugars).

The conducted studies show that the smallest amount of non-freezing water in samples of semi-finished milk-plant stuffings is kept at a temperature of –25...–30 °C and amounts 0,26–0,40 g of H_2O per 1 g dry matter or 8,1–11,1%. of its amount in stuffing samples at a temperature of 0 °C. It is established that during further freezing, the content of non-freezing water is almost not reduced, which allows to recommend an indicated temperature range for the freezing of semi-finished stuffings.

It is determined that further storage of semi-finished milk-plant stuffings at a temperature of –18...–19 °C (which is a normative temperature of the majority of industrial freezing chambers used in the food industry and recommended for storage of frozen foods and semifinished products) contributes to a slight increase in the content of non-freezing water in them. If we take into account that at the temperature of –25...–30 °C the amount of

non-freezing water in semi-finished stuffings is the smallest and makes 8,1–11,1%, of its amount at 0 °C, then at the temperature of –18...–19 °C, which is recommended as the storage temperature of semi-finished stuffings, the non-freezing water will amount 22,2–23,8%. Since the increase in the amount of non-freezing water in semi-finished milk-plant stuffings is insignificant, the temperature of –18...–19 °C can be recommended for the further storage of frozen stuffings.

ТЕХНОЛОГІЯ МАРМЕЛАДУ З ДОДАВАННЯМ ТРИКОМПОНЕНТНОГО ПЛОДОВО-ЯГІДНОГО НАПІВФАБРИКАТУ

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Сьогодні велика кількість людей у світі віддає перевагу «здоровим продуктам» харчування. Це пов'язано з великою кількістю джерел інформації, що висвітлюється у ЗМІ, соціальних мережах тощо. Споживачі ретельно вивчають склад продукту на етикетках та обирають продукцію з натуральними інгредієнтами, без додавання синтетичних добавок або з мінімальним їх вмістом. Крім того, вони надають перевагу виробам із підвищеним вмістом корисних компонентів.

Оскільки більшість кондитерських виробів майже не містять біологічно активних речовин, важливих для здорової життєдіяльності людини, актуальними є дослідження щодо покращення їх хімічного складу. Серед усіх кондитерських виробів саме мармеладно-пастильні мають найбільший потенціал для збагачення, що пов'язано, по-перше, з відсутністю в рецептурі жиру; по-друге, з наявністю фруктової та плодово-ягідної сировини (пюре, припаси тощо). Проте сучасне виробництво зефіру, пастили та мармеладу зазвичай відбувається на застарілому обладнанні, з додаванням синтетичних барвників і ароматизаторів, із використанням сировини низької якості, що, як наслідок, має негативний вплив на харчову цінність продукту, а отже, і на організм людини в цілому.

Сучасною тенденцією є використання різноманітної рослинної сировини, яка дозволить природним способом внести біологічно активні речовини до складу продукції та надати їй приємних смакових і візуальних характеристик без застосування синтетичних барвників і ароматизаторів.