IMPROVEMENT OF LOW-LACTOSE DIABETIC ICE-CREAM PRODUCTION TECHNOLOGY

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High prevalence of diabetes and lactase deficiency in developed countries puts diabetes and lactase deficiency among a number of social diseases that require widespread treatment and prevention measures. In this regard, problem of developing functional products becomes especially relevant. One of the rational ways to solve this problem is to expand the assortment and, as an option, to develop technology of low-lactose ice-cream for diabetics [1].

Composition of traditional plum ice cream includes 15 % sucrose, in our opinion, they can be replaced with whey, and four vegetable additives can be added: Jerusalem artichoke, stevioside – a sugar substitute, pectin, and a stabilizer too.

Technological process of ice cream production can consist of mixing abovelisted components with components of dry, whole, skimmed milk and cream. Jerusalem artichoke must first be mixed with whole milk at a temperature of 35 – 40°C, pasteurized at a temperature of 85 °C and cooled to a temperature of 4 – 6 °C. Then it is necessary to leave it at this temperature before adding it to the main mixture [2].

Main mixture is stirred for 5 – 10 min, pasteurized at a temperature of 85 °C with a holding time of 60 s, homogenized at pasteurization temperature and pressure on the first stage of 10 – 12 MPa, on the second stage - 2.5 – 3.5 MPa, cooled to a temperature 40 °C and adding enzyme ß-*D*-galactosidase in the amount of 0.2 %, hold at this temperature for 4 hours, cool to a temperature of 4 – 6 °C [3]. Next, a previously prepared Jerusalem artichoke mixture with whole milk is added and mixture is matured for at least 4 hours. Freezing is carried out in a batch freezer without forced air supply. When adding enzyme ß-*D*-galactosidase in the amount of 0.2 % of the mixture mass and fermenting mixture at a temperature of 40 °C for 4 hours, hydrolysis of the disaccharide lactose into sweet monosaccharides -- glucose and galactose occurs by 80 – 90 %, which allows to reduce amount sugar substitute added to mixture, up to 0.05 % [4].

Thus, it can be concluded that development of low-lactose diabetic ice cream is possible if you follow the requirements of each component and do not neglect conditions of production stages.

References:

1. Ozdemir, C., Dagdemir, E., Celik, S., Ozdemir, S. (2003). An alternative ice cream production for diabetic patients. *Milchwissenschaft-Milk science international*, Vol.58, Is.3-4, 164-166.

2. Abbasi, S., Saeedabadian, A. (2015). Influences of lactose hydrolysis of milk and sugar reduction on some physical properties of ice cream. *Journal of food science and technology-Mysore*, Vol.52, Is.1, 367-374. DOI10.1007/s13197-013-1011-1.

3. Лазоренко В.В., Носик Д.В., Бєлінська А.П. (2022). *Застосування ферментних препаратів при непереносимості лактози*. Хімія, біо- і нанотехнології, екологія та економіка в харчовій і косметичній промисловості: Збірник матеріалів X Міжнародної науково-практичної конференції, 18–19 жовтня 2022 року, с. 177

4. Gaikwad, S. M., Joshi, R. R., Kulkarni, A.J. (2017). *Cohort intelligence and genetic algorithm along with modified analytical hierarchy process to recommend an ice cream to diabetic patient*. Proceedings of the international conference on data engineering and communication technology, Vol.468**,** 279-288. DOI 10.1007/978-981-10-1675-2_29.