OPTIMIZATION OF THE MARMELADO RECIPE COMPOSITION WITH ANTOCIAN ADDITIVES

I. Piliugina, M. Artamonova, D. Torianik

It is possible to increase the nutritional value of marshmallow and give the product pink color due to the use of anthocyanin additives obtained by cryogenic technology – cryopowders of black-headed rowan and Sudanese rose in the form of 40% aqueous-alcoholic extracts with the addition of citric acid. However, the introduction of cryopowder extracts of black-headed rowan and Sudanese rose in marshmallow prescription composition affects the organoleptic, functional, technological, physico-chemical quality of the finished products. Not only the concentration of the cryopowder extract, but also the concentration of citric acid influence the above properties of marshmallows during cooking. Therefore, it is important to study the influence of these additives on the marshmallow production process and determine their optimal dosage.

The article describes results of the optimization of marshmallow prescription composition with anthocyanin additives obtained by cryogenic technology and cryopowders of black-headed rowan and Sudanese rose. The optimization was performed by means of the method of mathematical model minimization, which was obtained by the second-order orthogonal central composite plan. The matrix of the factor experiment was compiled and implemented, which allowed us to find the response functions. The optimization criterion (y) was marshmallow density (g/cm³), the control factors being: $x_1$ – concentration of the cryopowder extract (%), $x_2$ – concentration of citric acid (%).

Mathematical models characterizing the prescription composition new types of marshmallows were received. According to the results of mathematical modeling of marshmallow formulations, the dosage amount of the selected cryopowders and citric acid was optimized that was 3.0–9.0% and 0.043–0.086% of the total mass of the system respectively.

Based on the obtained data, the technology and formulations of marshmallow with anthocyanin additives were improved: marshmallow on gelatin with aqueous-alcohol extract of cryopowder from black-headed rowan or Sudanese rose, and marshmallow on gelatin with the solubilized substances with aqueous-alcohol extract of cryopowder from black-headed rowan or Sudanese rose. New marshmallow had high organoleptic and physico-chemical quality parameters.

Keywords: marshmallow, cryopowder, black-headed rowan, Sudanese rose, extract, optimization criterion, regression equation, mathematical model, quality indicators.