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Proceedings of the 1st
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**PROGRESSIVE SCIENCE
AND ACHIEVEMENTS**



DOHA, QATAR

26-28.09.2021



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This issue of Scientific Collection «InterConf» contains the International Scientific and Practical Conference. The conference provides an interdisciplinary forum for researchers, practitioners and scholars to present and discuss the most recent innovations and developments in modern science. The aim of conference is to enable academics, researchers, practitioners and college students to publish their research findings, ideas, developments, and innovations.

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LIGHT INDUSTRY AND FOOD INDUSTRY

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DEVELOPMENT OF CULINARY PRODUCTS BASED ON EXTRUDED GRAIN RAW MATERIALS

***Abstract.** In the study, mathematical and computer design was carried out to obtain recipe compositions for sweet dishes, namely blancmange with a high content of vitamins and protein. When designing blancmange recipes, the main goal was to obtain the maximum value of the product with the following content of nutrients (per 100 g of finished product): fat - not more than 11%; monosaccharides - not more than 65% and not less than 50%; dry matter - not more than 85% and not less than 96%; proteins - not less than 20%). Optimization of blancmange formulations was performed using the Excel Solver of the MS Excel spreadsheet (WINDOWS 2010). The content of basic macronutrients in a portion 69.77 - 78.55 g / portion. The developed products have a high content of protein, and they do not contain lactose, which is important in terms of meeting the needs of the human organism with hypolactasia. The obtained data of the study of qualitative indicators showed that under certain storage conditions, the content of sanitary-indicatory microorganisms meets the sanitary requirements for sweet dishes. Sensory indicators during storage showed high values. Thus, the total sensory indicator after 5 days of storage was 29.5 - 31.7 points out of 35 possible. Developed desserts can be recommended for use by people with hypolactasia, children, in the dietary nutrition.*

***Keywords:** blancmange, whipped desserts, counting recipes.*

Introduction

One of the promising areas of research in the field of healthy eating is the development of the food industry focused on the production of healthy foods - low-calorie, high in vitamins, minerals, polyunsaturated fatty acids (PUFA) and more. Particular attention is paid to the creation of products that have antiallergenic, anti-stress, adaptogenic, tonic, stimulating and radioprotective properties [1,2].

It should be noted that the number of consumers who choose a vegetarian lifestyle and do not eat animal products is growing every year. This is due to the desire to avoid the now common "diseases of civilization", such as atherosclerosis, hypertension, allergies, various tumors, as well as premature aging [1-3].

Increasing the number of people suffering from allergies or hypersensitivity to animal proteins, as well as unable to digest milk sugar (lactose), stimulates the development of new generation products based on the use of vegetable raw materials as a source of protein and protein-fatty products. Special attention needs to be paid to the organization of nutrition of people suffering from allergies to dairy products, as well as to such an inherited disease as hypolactasia, rather the inability of the organism to absorb milk sugar – lactose [4,5].

Materials and methods

The purpose of the study is the mathematical design of a multicomponent blancmange composition for people with hypolactosis. To achieve this goal, the following tasks were set:

- to carry out mathematical and computer design of blanmange recipes for people with hypolactosis;
- to determine the conditions and terms of storage of the received blancmange according to change of their sensory and microbiological indicators;
- to determine the nutrient composition of the obtained blanmange.

The following raw materials were used for the study: almond kernels, dried sunflower fruits, cocoa powder, fresh blueberries, cashew kernels, soy yogurt, coconut oil, fresh mango, vanilla sugar, coconut shavings, collagen hydrolyzate. Sensory analysis was performed by profiling using the developed scale in

accordance with DSTU ISO 8589: 2013 Sensory research. General guidelines for the design of test rooms (ISO 8589: 2007, IDT).

Results

For the design of recipes deterministic standard was used, which is entered into the database and it included the norms of physiological needs of the human organism for carbohydrates and proteins. For selected types of nutrients in the process of modeling and assessing the balance of virtual recipes as criteria of food adequacy customized and general indicators of desirability were used.

For the preparation of blancmange according to the developed recipe, vegetable milk was used - 100 ml, grain extrudate - 20 g, gelatin - 5 g, blueberries - 10 g [3,4]. According to the indicators given in the graphs, it is possible to determine the optimal whipping mode for blancmange: at the second speed and whipping temperature of 30 ° C, the foamy structure of the blancmange is observed (fig 1). An important characteristic of dishes with a foam structure is the dispersion of the foam, which ensures the necessary stability of the food texture over time. According to theoretical provisions, the smaller the particle size, the greater the dispersion. Foam systems, which include whipped desserts, are characterized by the size and concentration of the air fraction.

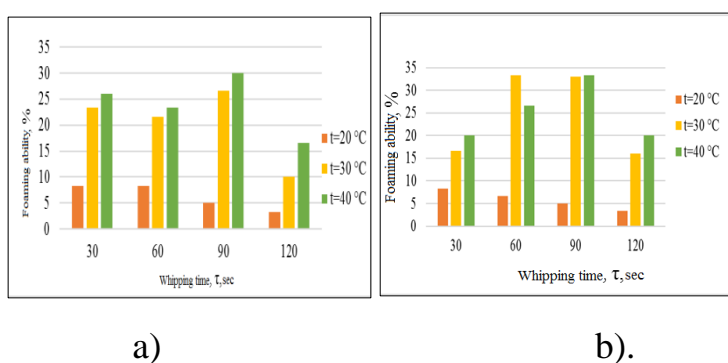


Fig. 1 - foaming capacity at t = 20, 30, 40 ° C and τ= 30, 60, 90, 120 s at the first (a) and second (b) mixer speed

We have carried (fig.2) out research and identification of the size and number of air bubbles. To obtain a foamy structure, the whipping time was chosen: 30, 60, 90 and 120 s at temperature conditions: t = 20, 30, 40 ° C.

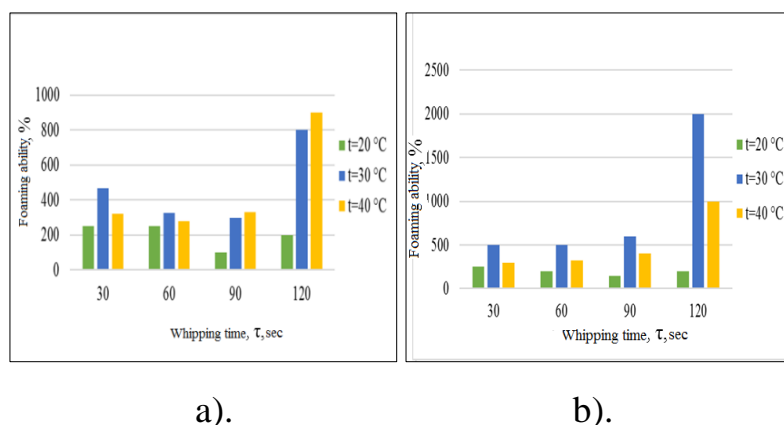


Fig. 2 - Stability of foam at $t = 20, 30, 40$ °C and τ (holding time 5 min.)
After whipping at the first (a) and second (b) mixer speed

Summarizing the data on the stability of the blancmange foam and the distribution of air bubbles in diameter, it can be noted that the functionality of the collagen hydrolysate in this case, is reflected primarily in the reduction of surface tension. From the data of dispersion of foams it is possible to see rather narrow peak at $d = (0,011 \pm 0,012)$ mm that specifies uniform beating of blancmange.

Conclusions

1. Blancmange recipes using non-traditional raw materials have been developed. Due to the use of vegetable milk, blancmange compositions were obtained, which can be used for the production of dessert products for people suffering from hypolactasia. The recipes were optimized using the Solver spreadsheet (MS Excel 2010), the optimal content of all components was set.

2. On the basis of the conducted microbiological researches it is established that at storage of the developed blancmange in regulated conditions, these products have rather quite good quantitative and qualitative indicators. The recommended shelf-life is 5 days at air temperature (4 ± 2) ° and relative humidity not more than 75% in glass or polypropylene containers.

3. Consumption of 100 g of developed blancmange will provide the human organism with 63.24 g. Consumption of a portion of developed blancmange will meet the average requirements of the organism in B vitamins by almost 40%. The ratio of calcium, magnesium and phosphorus is equal to blancmange 0.98; 1; 1.48, 1.01: 1: 1.49, which corresponds to the recommendations of nutrition.

4. The advantages of this study are the development of blancmange recipes with a balanced nutrient composition using vegetable raw materials. The resulting blancmange can be recommended for use by people with hypolactasia. Developed desserts can be included in the diet in the field of HoReCa: dining outlets, hospitality industry and children's nutrition.

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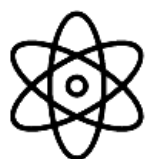
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