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INNOVATIVE APPROACHES TO THE MANUFACTURE OF FLOUR CONFECTIONERY IN A PANDEMIC CONDITION

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The sphere of hospitality has always remained one of the promising sectors of the dynamically developing economy. However, for the second year in a row, this area of activity is suffering significant losses due to the global pandemic caused by Covid-19. According to the end of 2019, the market of hospitality establishments in Ukraine numbered about 50 thousand establishments.

Poster restaurant automation company has published data indicating the closure of 2,500 establishments after the first two weeks of quarantine [1].

That is why, today, owners and chefs must be creative and modern, to implement their ideas in institutions, taking into account the current situation.

One of such solutions is the creation and implementation of the «Cooking box» service. The purpose of this service is that it is the delivery of a semi-finished product of a high degree of readiness for home cooking of restaurant dishes with a minimum amount of heat treatment.

Guests choose a menu for themselves, and employees deliver semi-finished products along with a detailed recipe to customers.

Restaurant analysts estimate that the introduction of this service will not only reduce the time of cooking, but from an economic point of view it is more profitable than visiting a restaurant or supermarket.

Because the owners of the restaurant buy raw materials at wholesale prices, firstly, and secondly, guests are delivered only the required amount per serving, so you will not have unused ingredients. Especially noticeable benefit when buying exotic ingredients.

Given this factor, it is proposed to develop a unified flour confectionery dough semi-finished product of a high degree of readiness, which will be stored and delivered in environmentally friendly packaging made of corn starch, which is due to the absence of harmful substances, and easy disposal.

Analytical studies of the market of restaurants allowed to establish the range of products that are most common among different segments of the population (Fig. 1).

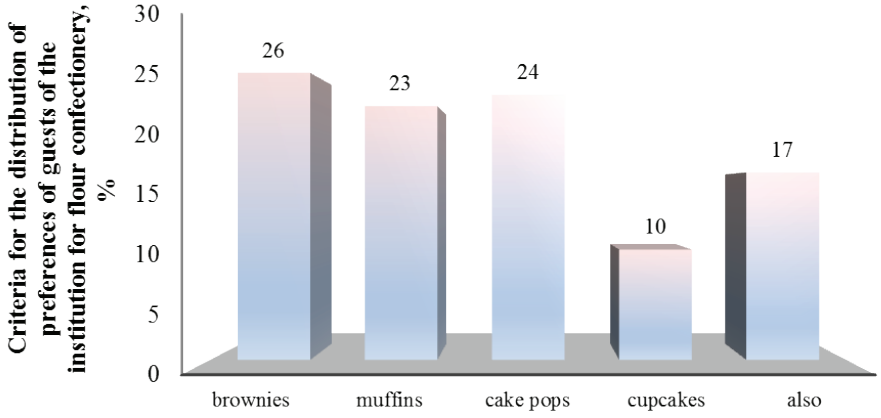


Fig. 1 – Criteria for the distribution of preferences of guests of the institution for flour confectionery

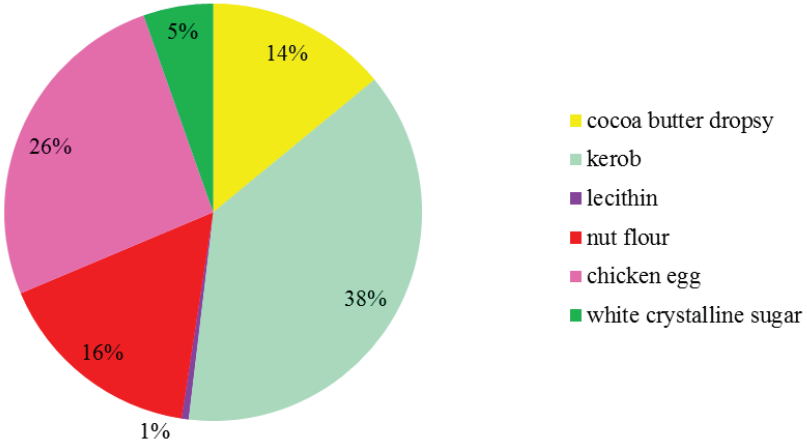


Fig. 2 – Prescription composition of high-readiness dough semi-finished product Cooking box [2]

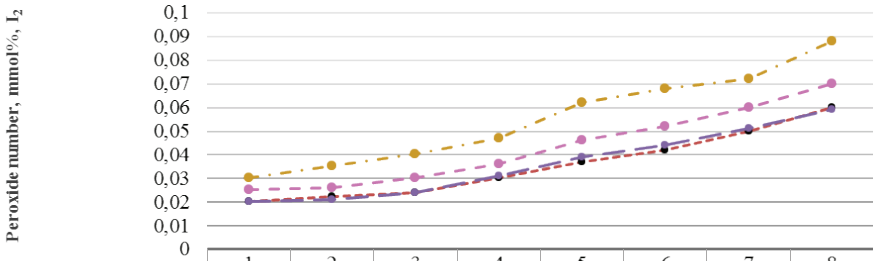
A special place in the menu of restaurants is occupied by products made of chocolate:

- brownies;
- muffins;
- cake pops;
- cupcakes.

As these products are characterized by a sweet taste and pleasant aroma, these products are high in calories and need improvement.

That is why it is proposed to make a substitution: high-grade wheat flour, butter, dark chocolate.

The selection of components takes into account the sensory characteristics of raw materials, physico-chemical quality indicators, storage stability, gastronomic



	1	2	3	4	5	6	7	8
control	0,03	0,035	0,04	0,047	0,062	0,068	0,072	0,088
brown "Lyubchik"	0,02	0,022	0,024	0,03	0,037	0,042	0,05	0,06
brown "Nut"	0,025	0,026	0,03	0,036	0,046	0,052	0,06	0,07
Brown Joy	0,02	0,021	0,024	0,031	0,039	0,044	0,051	0,059

Fig. 3 – Changes in the peroxide value of the lipid fraction of the dough «Cooking box» during storage at a temperature of (-5 ± 3) °C and a relative humidity of 75%

combination, chemical and food composition of the components. These innovative attractive ingredients are selected, such as: nut flour, kerob, cocoa butter, as a structuring agent and has antioxidant properties that will inhibit the development of pathogenic microorganisms during storage of the proposed products. The prescription composition of the experimental semi-finished product is shown in the form of Fig.2

The next stage of the study identified indicators that will affect the shelf life, namely acid and peroxide value. These indicators themselves give grounds to further store this semi-finished test product and sell it within the specified period (Fig. 3).

To confirm the safety of products for a certain period, it is necessary that all quality and safety indicators of the product were within the regulatory limits plus 50% in the specified period. Therefore, the change in the characteristics of the Cookin box dough must be checked within 7 days.

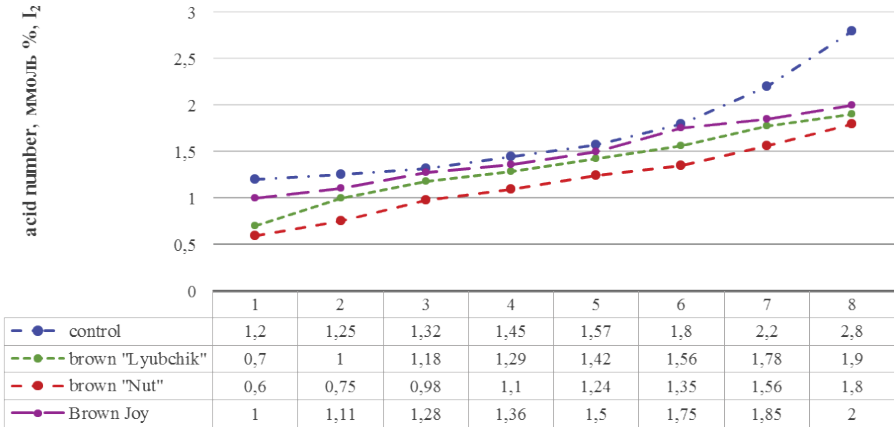
Nut flour-based doughs contain a significant amount of fat, which can change significantly during heat treatment and storage. Studies of changes in the peroxide value of the fat component have shown that fat oxidation is not the dominant factor.

After 7 days of storage, the peroxide value of the fat component was in the range of 0.059–0.07% iodine. Whereas 0.08% of iodine is critical for fat-containing BKV. The control sample is 0.88%, which is a negative factor.

For products manufactured by the new technology, the peroxide value remained at the level of 0.02… 0.07 mmol%, I2, which is 0.029… 0.1% less compared to the control. The decrease in the rate of the oxidation reaction is probably due to the fact that lecithin is a kind of antioxidant that inhibits the oxidation process [3].

However, it is known that the hydrolysis process can occur due to the action of molecular oxygen.

Therefore, the determined ability of the lipid fraction to accumulate free fatty



	1	2	3	4	5	6	7	8
control	1,2	1,25	1,32	1,45	1,57	1,8	2,2	2,8
brown "Lyubchik"	0,7	1	1,18	1,29	1,42	1,56	1,78	1,9
brown "Nut"	0,6	0,75	0,98	1,1	1,24	1,35	1,56	1,8
Brown Joy	1	1,11	1,28	1,36	1,5	1,75	1,85	2

Fig. 4 – Change in the acid number of the lipid fraction during storage at a temperature of (-5 ± 3)°C and a relative humidity of 75%

Table 1
Coordinates of brown color after shock freezing and microwave processing and baking

Product	Color coordinates								
	R	G	B	L	a	b	X	Y	Z
TEST SAMPLES									
control	23	19	18	17	124	124	120	20	125
Brown «Lyubchik»	23	19	18	18	124	123	113	20	125
brown «Nut»	25	23	24	21	124	124	120	24	125
Brown «Joy»	27	23	22	23	124	115	108	24	123

acids during storage of control and experimental test blanks is relevant and timely (Fig. 4).

Analysis of the acid number of experimental samples during storage (Fig. 4) showed that the increase in free fatty acids in products using nut flour in combination with leucine is less than in the control sample [3].

It should be noted that the accumulation of free fatty acids in the developed products in the first two days was much slower, and only on the third day of storage increased [3].

Thus, the processes of hydrolysis of fats in products made by the new technology were less intensive than in the control.

Also, the color change was determined after freezing and microwave treatment with subsequent baking [4].

As can be seen from the table that after heat treatment there was an impact on the color characteristics, this property will need to be considered in further work [4].

Thus, the manufacture of semi-finished products with a high degree of readiness is promising, relevant and timely in today's living conditions. The proposed products are not only in great demand in different segments of the population, but also have a long shelf

life, and visual characteristics do not differ significantly from the control sample, as evidenced not only by organoleptic evaluation, but also color coordinates.

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