Table 1. Determination of sensitivity parameters of control samples of cookies and products prepared with different doses of additives.

The name of the indicator	Control sample, mg./100g.	Sample No. 1 Cookie prepared with 10% apricot oil meal mg/100g	Sample No. 2 Cookie prepared with 50% apricot oil meal mg/100g	Sample No. 3 Cookie prepared with 100% apricot oil meal mg/100g
Appearance and Color	With characteristic, different sizes, light yellowish in color with a reddish tinge	Stretched in appearance, with cracks, light yellowish color	Hard structure, light yellowish, without characteristic cracks	With a fragile structure, with cracks, light yellowish color
Taste and smell	According to the product name, without side flavors and odors		With a pleasant apricot flavor and aroma characteristic of this product	
Porosity	According to the product name, Porosity		Evenlyporosity	

According to sensory assessment indicators, the study indicates that incorporating 100% apricot puree significantly improves the sensory characteristics of the product, such as its texture and enhances the pleasant apricot flavor. However, such quality can only be achieved by using a cold dough preparation method. Examples of experimental samples are shown in Figure 1. The physico-chemical parameters of the study are presented in (Table 2.)

Figure 1. Examples of experimental sample

Table 2. Determination of physico-chemical parameters of control samples of cookies and products prepared with different doses of additives

Quality indicators of cookies	Products made from using apricot oil meal, %			
	Control sample	10%	50%	100%
The moisture content of finished products, %	15±0.01	14,1±0.01	13,6±0.02	12,9±0.02
Alkalinity,^{0}	0,8±0.01	0,7±0.01	0,6±0.01	0,5±0.01

*P<0.05

The physicochemical indicators also show changes based on these parameters. With the increase in the addition of ingredients, the moisture and alkalinity levels decrease. Given the high nutritional fiber content of the apricot oil meal, it likely absorbs the free liquid in the dough, resulting in reduced moisture levels in the samples. Nevertheless, these remain within normative limits and do not affect quality indicators.

The objective of using apricot oil meal is not only to utilize a secondary raw material but also to enrich the product with vitamins and minerals. An important next step in the research is to determine the changes in vitamins and minerals resulting from the use of apricot oil meal. The outcomes of the conducted studies are presented in Figure 1.

The daily requirement of the human body for vitamin B_1 is 1.4 mg, and for B_2, it is 1.4 mg, while for vitamin PP, it is 20 mg daily [23]. The data from the study show that the prescribed dosages of vitamins in samples N2 and N3 nearly fulfill the daily requirement of these vitamins for the human body.

The composition of minerals has also registered positive results. According to established norms, the human body's requirement for Kalium is 2500 mg, for Natrium, it is 1300 mg, for calcium, it is 1000 mg, and for Ferrum, it is 18 mg. It is evident that the daily demand for these specific minerals in the human body is quite high, and individuals may not always be able to meet that demand through their current diet. The studies conducted have shown that samples N2 and N3 contained a significantly high level of minerals, and a cookie made with 100 grams of apricot oil meal can substantially contribute to meeting the daily requirement for these four mineral elements. The results of the conducted research are presented in Figure 2.

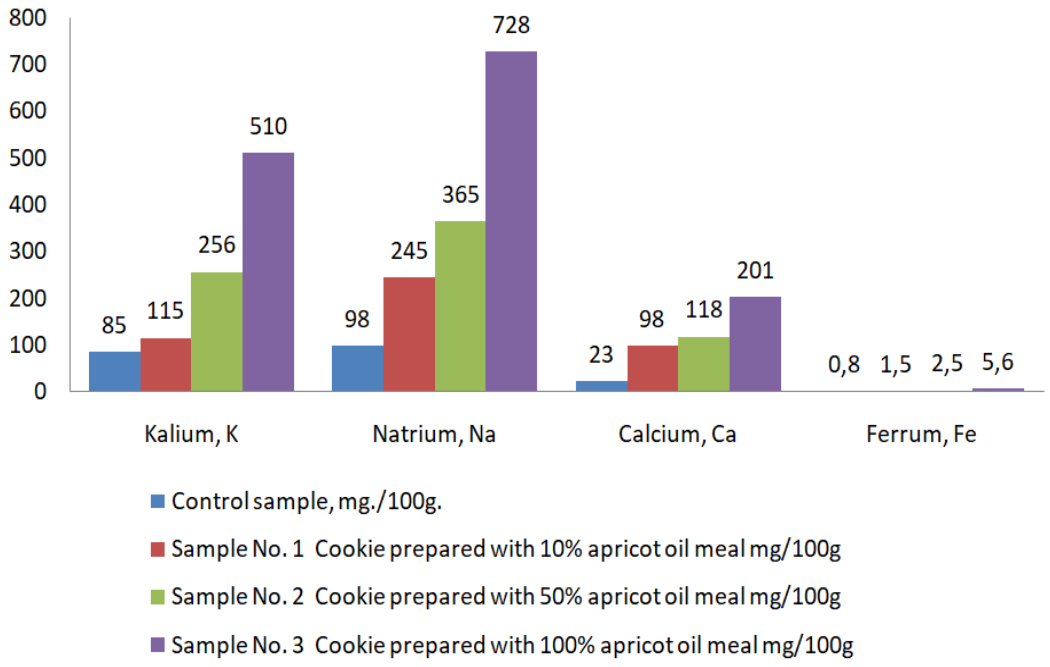

Figure 2. The content of minerals in the finished product, mg./100g.

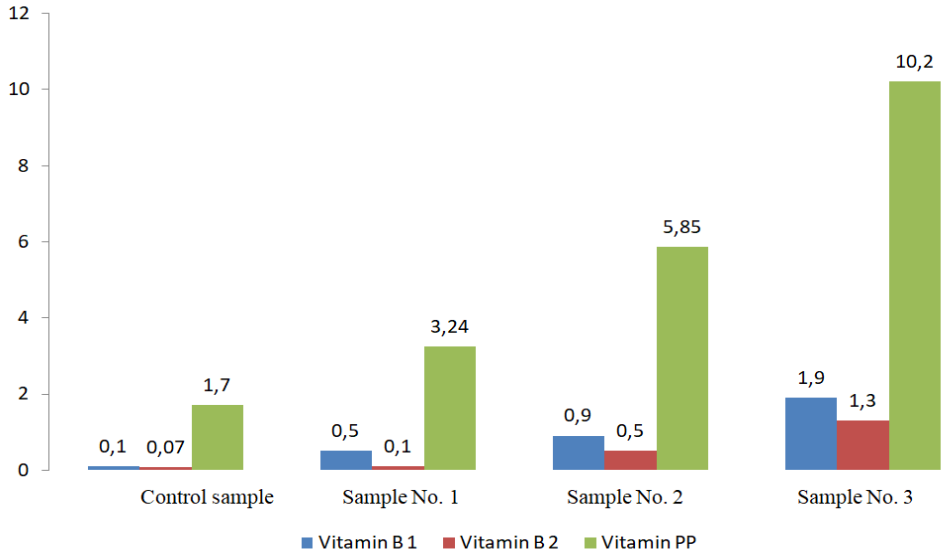

Figure 3. The content of vitamins in the finished product, mg./100g

It is well-established that the product contains dietary fibers, which have notably influenced the structural properties of the samples. In addition, dietary fibers have functional properties, and their increased presence in the samples is of substantial importance in human nutrition. The results of the conducted research are presented in Figure 4.

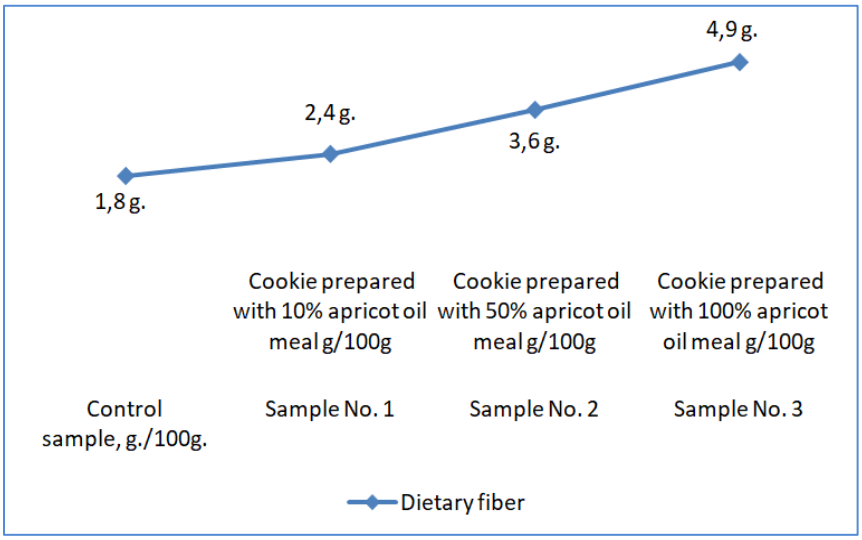

Figure 4. The content of dietary fiber in the finished product, g./100g.

As a result of the study, it is evident that the content of dietary fibers in the control sample was only 1.8 mg per 100 grams. In the case of adding the product, it increased to 4.9 mg per 100 grams of food. The human body's requirement for dietary fibers is 20-25 grams per day [18]. The body can only obtain this from plant-based foods; however, currently, this amount is only about 15 grams at most.

The research has established as a scientific novelty that the secondary raw material (by-product) obtained from apricot processing can be used in the production of confectionery as a biologically active component. It contains a considerable amount of vitamins and minerals, which are transferred to the final product, giving it functional properties.

CONCLUSION

The results of the conducted scientific and experimental research allow us to draw the following conclusions: The waste produced from oils during biotechnological production has been processed, resulting in a high-quality functional ingredient. This has been used in the production of domestic cake, significantly reducing the reliance on more expensive raw materials. The inclusion of apricot kernels in cake recipes, along with the substitution of wheat flour, enables a significant increase in the mass proportion of dietary fibers, vitamins, and minerals in the new product. The consumption of 100 grams of functional cakes partially meets the daily requirements for vitamins (B_1, B_2, PP) and minerals (Ca, Na, Fe, K) for an adult. The optimal use of kernels does not compromise the shelf-life indicators of the finished product and allows for the preservation of the characteristics typical of the control sample, while also improving them. To determine the optimal mass fraction of the ingredient added to the cake dough, it is necessary to consider several indicators of quality simultaneously. The experimental design method used in this work allowed for the establishment of the optimal ratio of using oil meal in the cake formulation and the material costs for acquiring new equipment in the enterprise. In this way, the production of cake promotes, on one hand, the processing of secondary raw materials, on the other hand, the creation of high-quality functional products without additional financial investments.

List of abbreviations: RA: Republic of Armenia; HPLC: High Performance Liquid Chromatography, mg: miligramm, g: gram, FFC- Functional Food Center.

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