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ORGANOLEPTIC PARAMETERS AND CHEMICAL COMPOSITION OF GERODIETIC SEMI-FINISHED PRODUCT

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Abstract. *The analysis of scientific and technical information identified the trend of the aging population in Ukraine, confirming the relevance of the food industry development in the direction of creating gerodietetic products. It has been demonstrated that the development of semi-finished products based on plant raw materials as sources of geroprotective substances, with their subsequent use in the technologies of popular and accessible food products, including minced cutlet mass, is promising and timely. Organoleptic indicators of the semi-finished product have been determined, and the main indicators of its nutritional value have been calculated. The directions for its use in the production of products from minced fish cutlets have been identified.The chemical composition of minced products has been calculated. It has been determined that replacing the bread component with the semi-finished product allows obtaining products with reduced calorie content against a radical change in the qualitative carbohydrate composition.*

Key words: *products for the elderly, geroprotector, puree semi-finished product, fish cutlet mass products.*

Introduction.

The current demographic situation in Ukraine is characterized by a stable tendency to a dynamic increase in the share of older working age people, which accords to the global process of population aging. Today, there are 20.7% of Ukrainians in this age group (that is every seventh Ukrainian). In recent years, there has been a deterioration in the physical health indicators of the elderly: elderly people's diseases (60-74 years old) is 2 times higher, and in the old age group (75-89 years old) is 6 times higher than of young people age categories [1]. The predominant factor in the development of diseases and the progressive aging of the population is poor and unbalanced diet. Today, 76-89% of the older age group have one or more foodborne illnesses. Only 9.2% of respondents older working age take vitamin-mineral complexes, dietary supplements, use specialized food products for preventive medicine, thus contributing to the improvement of the physiological state of the body [2]. According to domestic and foreign research it is possible to reduce the number of diseases (diabetes, arthritis – by 50%, heart diseases – by 25%, eye diseases – by 20%, etc.) and significantly reduce the risk of premature aging with a properly organized diet [3, 4]. Therefore, the development of specialized food products for the elderly is very relevant. In all countries, investments in people, their health and quality of life have become the key idea of the country's development. The priority direction is the technology of functional and specialized food products and in particular, for gerodietic purposes.

Gerodietic products can be used by both the elderly and younger people in order to prevent (or slow down) the aging processes of the human body and prevent age-

related diseases [5]. The gerodietic group includes products with geroprotectors (which slow down the aging process), with pro- and prebiotics, as well as enriched with micro- and macronutrients (vitaminized, enriched with calcium and iron, dietary fibers, etc.) [6]. The products rangefor for gerodiet food in Ukraine is quite limited. Most of these are fermanted dairy products, meat and vegetables canned ones, which have antioxidant and immune-correcting properties, enriched with additional sources of calcium, vitamins, amino acids, and enzymes; low-lactose milk drinks [7, 8]. Also known are gerodiet products based on fish components, as well as fortified gluten-free and with a low salt content [9, 10].

The practice of gerodietic food requires a new approach to the development of product technologies for the elderly, which is based on professional knowledge of nutritionology. In conclusion, it is possible to conclude about the prospects of developing the technology vegetable geroprotective semi-finished product, which can be used as a filler for chopped cutlet mass. The introduction of new technologies into the production will allow to expand the range of specialized products for the elderly.

Main text.

The aging of the population is a process characteristic of all European countries, but a high proportion of elderly people is mainly achieved by a long-life expectancy, known as «from below». In Ukraine, however, it is achieved through a decrease in the number of children, known as «aging from above». This will continue in the future. The age structure of krainian population indicates a regressive type of generational reproduction: it has over 14.3 million pensioners, of which over 10.3 million are elderly and over 2.0 million are disabled [11]. The increase of the birth rate in the world is accompanied by a significant aging of the population as a whole. In 1988, 488 million individuals were over 60 years old, but by 2025, their number is expected to surpass 1.1 billion, with 61% residing in economically developed nations [12]. So, the share of elderly people in the total number of populations at the planet will be about 14% by 2025 [13]. Aging is accompanied by changes affecting all levels of the cellular organism: predominance of dissimilation (decay) processes over assimilation in organs and tissues; shifts in the nervous and hormonal systems; genetic transformations caused by the accumulation of waste products of cells; disruptions in the self-regulation and information transmission systems; immunological shifts (decrease in immunity, autoimmune diseases) [14].

Based on the above, the range of specialized products for the elderly, including those in state nursing homes, is quite limited in terms of the number of product names and production volumes. Food products for the elderly can be conditionally divided into 3 groups: gerodietic – for sick and weakened elderly people; geroprophylactic – for elderly individuals without diseases; geroprotectors possesses the ability to restore reproductive function, impedes autoimmune inflammation in the body, and reduces the likelihood of developing oncological and cardiovascular diseases (fig. 1).

Geroprotectors include 5 main groups: antioxidants, senolytics, adaptogens, regulators of signaling pathways, regulators of metabolism [15].

The inclusion of compounds with geroprotective effects in the composition of food products will allow the creation of geroprophylactic products, the consumption of which will contribute to increased human longevity. After examining the array of

scientific, technical, and patent information regarding the use of vegetable additives in the production of minced cutlet masses, it is necessary to note the following: both traditional vegetable raw materials (potatoes, carrots, onions, white cabbage) [16] and non-traditional ones (zucchini, cauliflower, pumpkin, etc.) [17] exhibit distinct technological properties in the composition of products from minced meat mass.

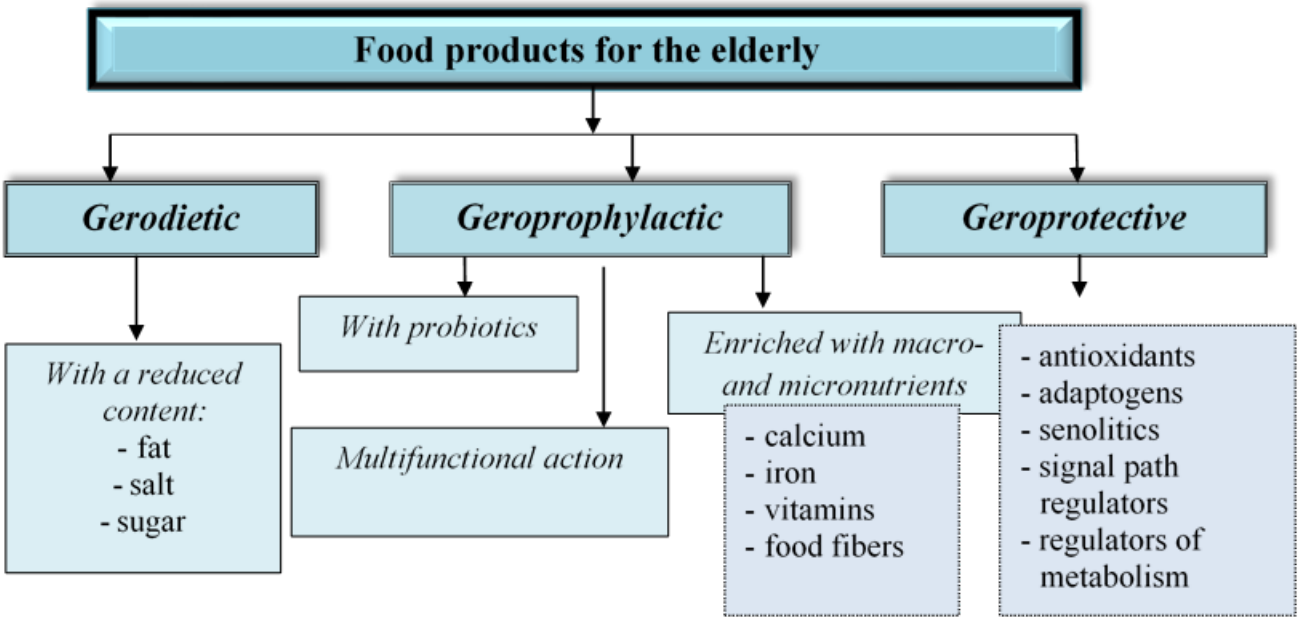

Figure 1 – Products classification for the elderly

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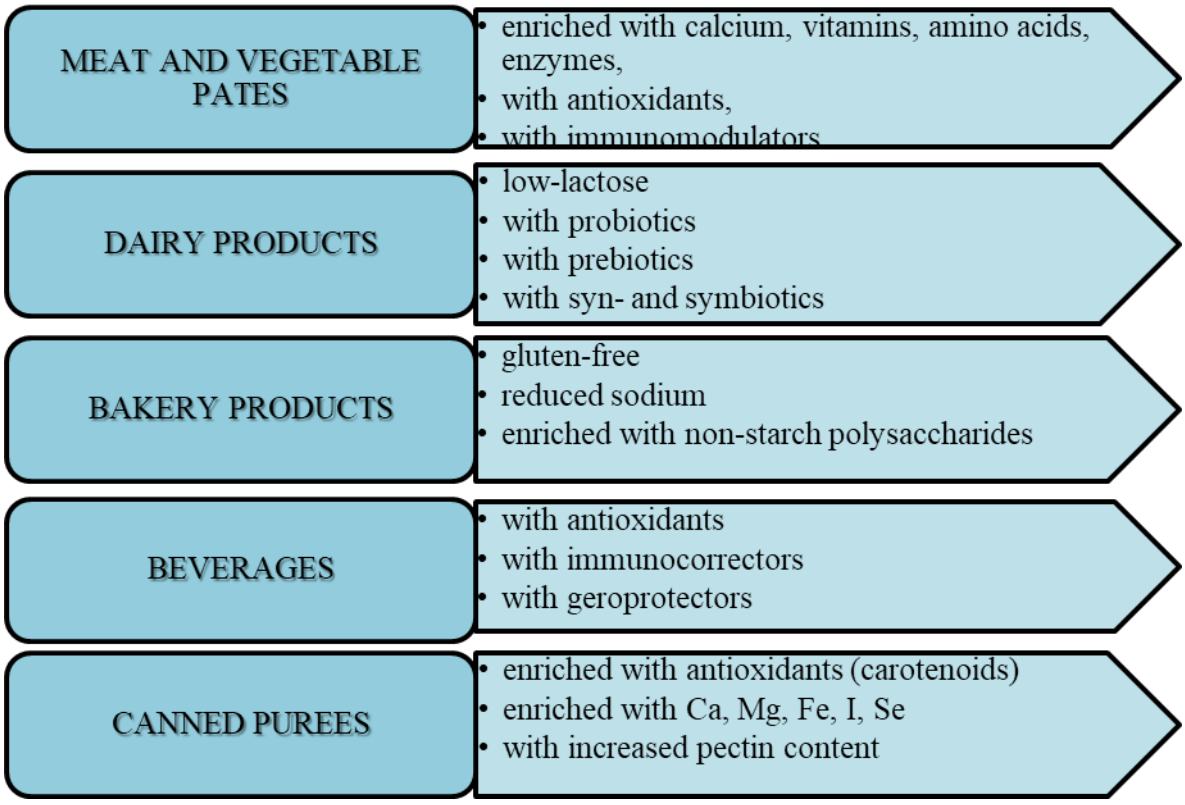

Figure 2 – Assortment of gerodietetic products

Source: [15, 17, 18]

This provides an incentive to explore the technological characteristics of other non-traditional plants, allowing for a significant expansion of the assortment of minced products and a more comprehensive utilization of plant resources in nutrition.

Valuable plant raw materials, in our opinion, are Jerusalem artichoke, ginger, and celery, which have a very high cumulative index of minor biologically active substances (inulin, bioflavonoids, indole compounds, derivatives of coumarin, ascorbic acid, tocopherols). Thanks to the set of biologically active substances, they all possess powerful geroprotective properties: anti-atherosclerotic (ginger, celery), prebiotic (Jerusalem artichoke), antioxidant (ginger, Jerusalem artichoke), anticancer (ginger, Jerusalem artichoke), cardioprotective (ginger, celery, Jerusalem artichoke), activators of the digestive process (ginger, celery) [19]. The specifics of storage and mechanical processing of all the listed plants have some difficulties, so their use in restaurant enterprises is very limited. In this connection, there is a need for industrial processing of Jerusalem artichoke, ginger and celery and the production of semi-finished products, the technologies of which allow to preserve biologically active substances as much as possible. Also ginger and celery are able to interrupt the unpleasant fish smell and at the same time harmonize well with it.

Semifinished products from plant raw materials, especially multi-component ones, are complex systems in which various chemical substances combine, capable of interacting with each other under certain conditions, undergoing various chemical processes: hydrolysis, condensation, oxidation, reduction, etc.

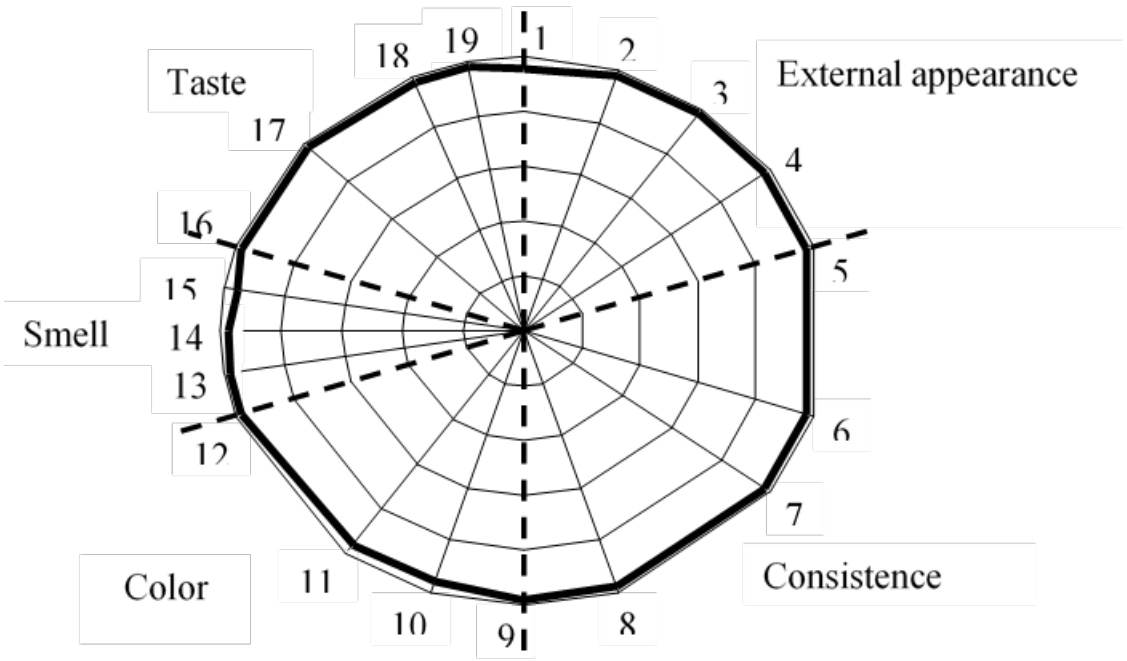

Figure 3 – Quality panel of semi-finished product

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Table 1 – Organoleptic parameters of the semi-finished product

Quality indicator	Characteristics of the semi-finished product
External appearance	Homogeneous, evenly rubbed mass
Consistence	Paste-like, easy to apply and form, does not spread when applied to the surface
Smell	Pleasant characteristic of ginger and celery, without extraneous odors
Color	White-gray, uniform throughout the mass
Taste	Natural, pleasant, with the taste of ginger, without extraneous flavors

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Table 2 – Chemical composition of the semi-finished product

Name indicator		UOM	Jerusalem artichoke puree (control)	Semi-finished product
Moisture		%	75,2±1,15	74,6±1,15
Protein		-//-	0,32±0,01	0,29±0,01
Fat		-//-	0,1±0,02	0,08±0,002
Carbohydrates		-//-	21,31±0,04	15,7±0,04
Flavonoids		mg/100g	87±21	578±88
Fiber		%	0,6±0,01	1,9±0,01
Minerals	Cu	mg %,	22,2±0,3	29,7±0,4
	Fe	-//-	197,2±0,2	344,8±0,1
	Zn	-//-	40,1±0,1	48,1±0,1
	Mn	-//-	103,4±0,2	115,10±0,2
	Ca	-//-	118,2±0,2	214,4±0,2
	I	-//-	0,86±0,02	2,86±0,02
Ash		%	1,30±0,01	2,10±0,01
Energy Value		Kcal/100g	92,9	88,2

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The analysis of the data presented in Table 2 shows that the semi-finished product «Geroprotect» is characterized by high nutritional value. So, the conducted research indicates the high quality of the developed semi-finished product, making it suitable for use in the production of a wide range of sliced products.

Summary and conclusions.

The analysis of scientific and technical information identified the trend of the aging population in Ukraine, confirming the relevance of the food industry development in the direction of creating gerodietetic products. It has been demonstrated that the development of semi-finished products based on plant raw materials as sources of geroprotective substances, with their subsequent use in the technologies of popular and accessible food products, including minced cutlet mass, is promising and timely.

Organoleptic indicators of the semi-finished product have been determined, and the main indicators of its nutritional value have been calculated. The directions for its use in the production of products from minced fish cutlets have been identified.

The chemical composition of minced products has been calculated. It has been determined that replacing the bread component with the semi-finished product allows obtaining products with reduced calorie content against a radical change in the qualitative carbohydrate composition.

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