

DEVELOPMENT OF THE FUNCTIONAL COMPOSITIONS FOR GERONTODIETARY BAKERY GOODS

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A century ago only 5% of the population on the Earth were older than 65, whereas, by the predictions, in the nearest 30 years the aged and elderly will make about one third of the world's population. This tendency for the population ageing makes the problems of extending the ability to work and of being able-bodied extremely vital.

According to data of the World Health Organization (WHO), the human state of health and longevity is influenced by several factors: individual characteristics of the genotype, organization and availability of medical care, the lifestyle and nourishment type being of critical importance.

In the process of life all humans acquire the features usually associated with age: lowered adaptation and functional abilities, reduced life activities, particular diseases of locomotor apparatus, metabolic disorders, maldigestion, cardiovascular diseases which are especially fatal.

Human ageing is conventionally considered to be a natural physiological process but, unfortunately, a natural aging rate is observed only for about 6% of the population and in all other cases ageing is enhanced by exogenous factors. Because of this, of particular importance is the problem of aging kinetics. The efforts of modern scientists are directed to various means slowing down the ageing process, the latest-generation food products including.

Within the scope of the state-budget financed Program "Foodstuffs for aged", complex enriching mixtures of the series "Long life" (Daugalette) have been developed by the researchers and specialists of the Unitehprom BSU, Biophysics Department of BSU, Beltekhokhleб concern, Pharmacology and Biochemistry Institute of the National Academy of Sciences, Science-Technological Park Foundation.

Functionary nourishment is essential for living in good health, contributing not only to a long life time but also to a better quality of life. Owing to such nourishment, the deficiency of vital components is compensated for. These components include the following special gerontodietary substances and additives intended to suppress the adverse changes associated with age at a cellular level, to neutralize aggressive chemical agents, to purify blood and to ease defecation, to improve the brain metabolism, to regulate human immunity:

- **Antioxidants** - regulate the quantity of free radicals which damage the cell membranes and affect the cell metabolism.
- **Adaptogens** – facilitate adaptation of a human organism, contributing to better resistance to adverse environmental conditions.
- **Biostimulators** – stimulate the processes of metabolism improving the functioning of central nervous, cardiovascular, and endocrine systems.

These essential components may be obtained from the chemically synthesized substances, may be extracted from plants or contained in the phytopowders representing a mixture of the substances adapted to the human metabolic processes.

To illustrate, such a unique plant biocomplex as licorice root is a highly-effective adaptogen having anti-inflammatory and anti-fatigue effects. The Tibetans regard the licorice root as a longevity improving means. It contains about 5% of various flavonoids, the same quantity of pectin and organic acids (succinic and fumaric acids including) and triterpenoids. Licorice includes the substances having strong anti-inflammatory action, which are similar to steroid hormones in their effect and structure, and also the biologically active substances releasing cholesterol patches from blood vessels.

The development of the "Long life" complex enriching mixtures was based on the following principles:

- (1) Selection of the components for additives facilitating health recovery by the aged.
- (2) Provision of the essential components compensating for the quantitative and qualitative deficiency.

- (3) Enrichment with micro- and macronutrients in the biologically most acceptable form.
- (4) The use of various components in the form of particular substances and as dried and powdered plant products to enhance their mutual effects.
- (5) Using of the components with antioxidant and adaptogenetic effects.
- (6) Consideration of the price structure as the developed products are intended for the social layers of moderate means.
- (7) Organization of a series of the relevant investigations.

The "Long life" complex enriching mixtures have been produced in 6 compositions including such ingredients as succinic acid, taurin, lysine, B group vitamins, carrot, beat, apples, tomato powder, ascorbic acid, flower pollen, ginger, turmeric, cinnamon, barley and rice flour.

The antioxidant effect of the developed compositions has been tested in two ways. The content of peroxide compounds with and without the use of the compositions was controlled titrimetrically using particular vegetable oils at T-90⁰C. For 100-hour observations the content of peroxides in the control group was higher than in the stabilized complex enriching mixture "Long life" by 50%.

The antioxidant properties of the compositions were tested by biophysical studies. The formation of free radicals is a most important process in a human organism. Free radicals and active molecules comprising active forms of oxygen, chlorine, and nitrogen utilize alien microorganisms and participate in numerous metabolic transformations. But being in high concentrations, these substances can oxidize essential molecules, causing the development of different pathologies. The formation of radicals is growing with ages contributing to the ageing process, to cardiovascular disturbances and joints affliction. Because of this, the use of foodstuffs rich in natural antioxidants selective to the most toxic active forms is vital as a prophylactic means against the ageing process.

It is demonstrated that aqueous extracts of the samples of the "Long life" phytocompositions are capable to utilize hypochlorite in model systems almost completely.

Based on the preliminary results obtained at the Pharmacology and Biochemistry Institute of the Belarus National Academy of Sciences, the compositions contribute to the fitness and resistance of animals.

The specialists of the Beltechnokhleб concern have conducted a series of the experiments estimating the technological characteristics of the developed compositions, establishing the physical and chemical properties of the fabricated bakery goods. Besides, the usage recommendations have been developed.

All the documents necessary to produce the proposed compositions have been worked out.