

SUMMARY

Despite the dynamic development of medicine, the issues of effective prevention and treatment of chronic non-communicable diseases are still relevant. Among them, osteoporosis is to be mentioned, with nearly 2 million of people suffering in Poland. Complications of osteoporosis can lead to disability and even death, hence this disease is considered as one of the most serious health problems of the XXI century. Due to the changes in the organism during the menopause period, women are at high risk of developing osteoporosis.

The aim of the work was to develop a recipe and production technology for a soy product enriched in fructans, organoleptically acceptable by consumers and having health-promoting properties, confirmed in *in vivo* studies. As part of this work, 2 types of products (i.e. drinks and pastes), based on non-genetically modified soybeans of the Merlin variety, and enriched in fructans were obtained. Among these products, pastes received highest marks from panelists.

Taking into account the fact that there are scientific evidencea that both fructans and bioactive compounds of soybeans (including isoflavones) are important in the context of calcium and lipid metabolism in the organism, it was decided to verify their action in the feeding experiment, with 12-month-old female rats (being an animal model, according to published data, equivalent to a female organism at the beginning of the postmenopausal period). The animals were randomly assigned to four groups (n = 8) and fed for 8 weeks the AIN-93 M diet, where: group 1 (K) received a control diet with the recommended amount of calcium (100%); group 2 (N) - diet containing 60% of the recommended dose of Ca; group 3 (NF) - diet containing 60% of the recommended dose of Ca with 4% added fructans; group 4 (NSF) - diet containing 60% of the recommended dose of Ca, with soybean paste containing fructans (in the amount corresponding to their 4% share in the diet).

On the basis of obtained results, with a special attention paid to the taste and consistency, it was found that soybean paste with a 4% fructan share is the most acceptable product by consumers.

Moreover, the paste was characterized by a high protein and fat content, and a lowered, as compared with raw material, raffinose content. It contained also a several

bioactive compounds, including genistein and daidzein. Thus, this product had a beneficial chemical composition.

The incorporation of soybean paste enriched in fructans into the Calcium-deficient diet resulted in a statistically significant increase in the bone mineral density parameter of the femur of female rats after 8 weeks of feeding. Moreover, an increase in the values of such tomographic parameters as the density and content of trabecular bone tissue or the density and the content of cortical bone tissue were noted.

It was found that the examined product has a positive effect on the most important aspect of calcium metabolism, i.e. bone health.

On the other hand, the feeding rats with the diet containing soybean paste enriched in fructans, under the conditions of calcium hypoalimentation, did not exert a statistically significant effect on the lipid profile of the blood serum, as well as on the other parameters related (directly or indirectly) to the liver condition.

The subject of functional ingredients as well as their usage in the products dedicated to different expectations, as well as health problems of consumers is very extensive. Nevertheless, the use of fructans in the matrix of a soy product appears to have a great potential.