THE TECHNOLOGY OF NANOSTRUCTURED HERBAL ADDITIVES WITH THE USE OF NON-ENZYMATIC BIOCATALYSIS – MECHANOLYSIS OF BIOPOLYMERS (HETEROPOLYSACCHARIDES AND PROTEIN)

R. Pavlyuk, V. Pogarska, T. Kotuyk, A. Pogarskiy, S. Loseva

Nanotechnology of herbal protein additives in the form puree from peas based on the deep processing of raw materials is developed. Fine-dispersed grinding and steam treatment of raw materials are used as innovation in this research work. When using traditional methods of processing herbal raw materials not all biological potential is used. Significant loss biologically active substance (20…80%) occur when use of traditional methods processing.

It is found that during the deep processing of herbal raw materials (dry peas), which is based on complex effect of steam treatment and fine-dispersed grinding to raw materials during the reception of nano-structured puree, the processes of mechanical destruction and mechanical chemistry occur. These processes are accompanied with non-enzymatic biocatalysis – mechanolysis (destruction) of sparingly soluble biopolymers and their nanocomplexes (protein and heteropolysaccharides, particularly, pectin substances cellulose and starch), which are transformed into monomers (35…55%) in the soluble easily-digestible form (almost 2 times more than in raw materials in hidden form). The mechanism of mechanical destruction of protein and its nanocomplexes connected with mechanical cracking is revealed. It is found that steam treatment and fine-dispersed grinding of peas during the reception of fine-dispersed puree results in the destruction of polysaccharides due to non-enzymatic catalysis, particularly, cellulose and starch (30…35%), protopectin (55%) into separated monomers. It is shown that at that time, glucose increases in nano-puree from peas (1,0 g…10,0 g/100 g in other words 10 times).

The complex use of these processes is accompanied by mechanical destruction, mechanical activation and mechanolysis of biopolymer nano-complexes (protein, heteropolysaccharides, etc.) to α-amino-acids, glucose, etc. (48…52%).

Keywords: nanotechnology, fine-dispersed grinding, mechanical destruction, activation, mechanolys, nano-complexes, biopolymers, heteropolysaccharides.