

## SUMMARY

The study aimed to determine the physicochemical properties and the quality of powdered, 80% whey protein concentrate and beverages obtained on the basis of the concentrate and nutritional supplements for athletes and physically active people. The physicochemical properties of powdered protein concentrates were investigated using a laser particle size analysis and RP-HPLC. The research methods used for the WPC 80 solutions included the determination of their surface properties, optical and rheological characteristics, as well as properties of their internal structure (including the indications on the TurbiscanLAB and  $\zeta$  potential measurement). The chemical properties of the compounds were evaluated by HPLC and the microbiological analysis was carried out. It has been shown that the method of laser particle size analysis and lightness examination can be used as quick tests for quality determination of powdered WPC 80. The most preferred packaging materials were selected for the potential usage in the industrial production of WPC 80 aqueous solutions, and WPC based beverages containing dietary supplements. It was found that bovine serum albumin was a whey protein especially susceptible to degradation during the whey bleaching. For the 2-16% WPC 80 solutions, at the shear rates of  $50 \text{ s}^{-1}$  -  $300 \text{ s}^{-1}$ , the Newtonian flow was found. It has been also shown that the application of exponential function allows for more accurate description of the effect of whey protein concentration on the apparent viscosity of WPC 80 solutions, compared to a power-law function. It has been shown that the estimation of  $\zeta$  potential may be crucial for the qualitative characteristics of the beverages based on WPC 80 with the addition of the dietary supplements. The compounds of the beverages on the basis of WPC 80, with the addition of dietary supplements, to varying degrees are utilized by microflora, during the storage time. Beverages produced on the basis of WPC 80 with the addition of  $\beta$ -hydroxy- $\beta$ -methylbutanoic acid, are characterized by high microbiological quality and can be stored at cooling temperature for a period of one month. The addition of antioxidants to the beverages on the basis of WPC 80 with dietary supplements, may indirectly contribute to the inhibition of the undesirable growth of microflora in beverages. It has been demonstrated that the whey proteins contribute to a slowdown of creatine intramolecular cyclization process.