

## **Streszczenie w j. angielskim**

As a result of the self-organization of amino acids, simple peptide structures are created that can spontaneously transform into more complex structures, such as micro- or nanostructures of peptides. The spontaneous condensation of  $\alpha$ -amino acids dissolved in abiotic liquid systems stored at room temperature is a phenomenon that has been poorly described in the world of science. Understanding these processes, especially in relation to amino acids of biological importance, is desirable because peptide structures formed as a result of spontaneous oscillatory reactions of amino acids can be used, i. a., in nanotechnology, nanomedicine or nanobiotechnology. Knowledge of how these processes change under the influence of specific chemicals (in this case, heavy water ( $D_2O$ )) can be invaluable at the stage of creating peptide biosensors, various types of drug carriers or cosmetic additives.

This studies focused on the following amino acids: L-cysteine, L-methionine, L-proline, L-hydroxyproline, L-alanine and L-histidine. High-performance liquid chromatography with ELSD and DAD detection, mass spectrometry (MS), scanning electron microscopy (SEM) and turbidimetry were used to carry out the research.

In the course of the studies, it was shown that that the HPLC-ELSD and HPLC-DAD analysis supported by the Fourier transform is a research tool that allows to confirm the occurrence of the spontaneous peptidization process with the assessment of its periodicity. The results obtained with the other techniques complement each other, confirming the correctness of the statement that heavy water has an inhibitory effect on the process of spontaneous peptidization of the tested  $\alpha$ -amino acids.