



Uniwersytet Gdański, Wydział Chemii, Wita Stwosza 63, 80–308 Gdańsk

ABSTRACT

Peptides in cosmetics - design of sequences, synthesis and study of the properties in cosmetic products

In recent years scientists are more frequently looking for ingredients that influence the skin's condition and slow down the aging process. Peptides are involved in many natural processes with relevance to skincare and therefore have been used in skincare and pharmaceutical industry. The PhD project explores the new areas of knowledge in the field of cosmetic chemistry and biochemistry of active peptides.

The first part of the PhD project focuses on designing new sequences of peptides, chemical synthesis and research of physicochemical characteristics. Chemical synthesis of peptides was carried out on a solid phase (SPPS) using Fmoc chemistry methods, purification of the peptides by high performance liquid chromatography (HPLC). Molecular ion mass of peptides was obtained using the technique of mass spectrometry by laser desorption in the matrix (MALDI–TOF MS). In addition, the experimental part focuss on the development of cosmetic recipes of hydrogels, their formulas, including peptides obtained.

The second part of the PhD project focuses on the research of a cosmetic formula with peptides. The influence of peptides as ingredients in semisolid gels on animal tissue ex mortuo is evaluated. The project introduces diagnostic methods with the use of Skintest plus and PSI apparatus, which enable investigation of skin before and after the application of cosmetic products. The main part of the PhD project concerns the measurement of the degree of hydration of the skin after applying hydrogels with peptides. In the final stage changes of the structure of tissue are determined. The results of the analysis before and after studies using the refractometric camera are compared. Due to the research with the camera, changes in the structure of the “model” epidermis penetrated by modified peptides could be observed. In the last part of the research, the interaction of the peptides with a lipid barrier using HPLC and

MALDI-TOF MS is studied. The PhD project concentrates on release studies of peptides from hydrogels, using Franz cell equipment for *in vitro* release.

The results obtained in the PhD project should enable a better understanding of the requirements for cosmetic components, and thus provide the information needed for the design, synthesis and testing of cosmetic products with peptides. They can also be helpful in developing a "model" for testing skin cosmetics and provide a proposal for an alternative method of preliminary tests for quality control of cosmetics.