HYDROGELS BASED ON THE Fmoc-FF DIPEPTIDE WITH ACTIVE PHARMACEUTICAL INGREDIENTS

Mirgazieva E.R., *Ziganshin M.A.*
Kazan Federal University
420008, Kazan, Kremlevskaya st., 18

Currently, the development of ways to increase the bioavailability of poorly water-soluble drugs is actively underway. It is known that an increase in the bioavailability of the drug is possible when it is encapsulated in a gel matrix, which can be both polymer and supramolecular gels. Supramolecular gels with a high water content, hydrogels, have a high potential for use.

Short-chain oligopeptides, in particular, Fmoc-substituted linear dipeptides that form gels due to intermolecular interactions, can act as a low-molecular-weight gelating agent. Such gels have high stability, mechanical strength, they are biocompatible and non-toxic. In combination with bioactive molecules, such materials can be used to treat life-threatening diseases such as cancer, in the development of non-invasive drug delivery systems, and can also promote the healing of soft and hard tissues.

In this work, we propose a method for obtaining hydrogels based on Fmoc-FF with encapsulated active pharmaceutical ingredients (API) belonging to the class of antibiotics and antitumor drugs. The strength of a pair of interactions between dipeptide molecules and API in the systems studied is evaluated. The structural and mechanical properties of the hydrogels were characterized using IR spectroscopy, rheology, and powder X-ray diffractometry. The effect of API on the kinetics of gelation was studied by NMR spectroscopy. The features of the structural organization of xerogels containing APIs have been demonstrated by atomic force microscopy.

The work is supported by subsidy provided to the Kazan Federal University to fulfill the state assignment in the field of scientific activity № FZSM-2026-0026.