

Biopolymer aerogels for pharmaceutical and medical applications

Daria Lovskaya, Natalia Menshutina

Mendeleev University of Chemical Technology of Russia, International Center for transfer of
Pharmaceutical and Biotechnology

daria.lovskaya@gmail.com

Aerogels are porous materials with high adsorption capacity, which makes it possible to successfully impregnate various substances into aerogels: active pharmaceutical ingredients, antimicrobial substances and many others. Various polysaccharides (alginates, proteins), as well as various proteins (egg, whey protein, etc.) can be used to prepare biopolymer aerogels. All these substances are united by the ability to form gels either in the presence of water and/or a crosslinking agent, or under the influence of temperature and other factors. After removing the liquid (supercritical drying process), dried solid particles of organic aerogels of a given size are obtained. The possibility of obtaining aerogels based on various biopolymers opens up the possibility of creating innovative materials with desired characteristics and possessing a number of important properties. These properties include high specific surface area, high porosity along with low density, high sorption capacity and, most importantly, biocompatibility, which guarantees complete safety for human. Present research was oriented towards the preparation of various biopolymer aerogels, using supercritical fluid technology with potential applications in pharmaceutical industry and medicine. A study of the production of alginate-based, protein and chitosan aerogels by different methods followed by drying in supercritical carbon dioxide was conducted. In the framework of this work, a comprehensive study of the process of obtaining various biopolymer aerogels was carried out. The data of experimental, analytical, in vitro and in vivo studies were presented.

Acknowledgements

The research is supported by the Ministry of Science and Higher Education of the Russian Federation within the framework of the State Assignment (№ 075-03-2020-232/3).