

The aim of the project is to design, obtain and study the biological and physicochemical properties of the new β -glucan-modified collagen material with the addition of natural phenolic compounds and Manuka honey's compounds as antimicrobial agents. The by-products from fish processing e.i. fish skin will be used as a collagen source.

Currently, the global problem that concerns the public health zone is the increasing antibiotic resistance of microorganisms. This problem concerns both systemic and internal infections as well as the surface of the body - the skin. The skin is the largest and the outermost organ, therefore its main function is to protect muscles, bones, ligaments and internal organs from external factors. As a result of various types of injuries, the skin may lose its integrity and primary functions.

Cuts, burns, surgical wounds and those associated with other diseases, disrupt the function of the skin. Therefore, the process of repairing the structure and functions, starts almost immediately after the injury, to prevent infection of the wound. If the immune system is unable to remove the pathogen, infection occurs and the normal wound healing process is disturbed. It can turn into a chronic wound. Many types of dressing materials are used to prevent this.

The current trend is the creation of "new generation" dressing materials, i.e. active materials. Active materials in their composition contain drugs, antimicrobial agents, growth promoters. Therefore particularly effective in the treatment of hard-to-heal wounds.

Unfortunately, the urgent problem is drug resistance, especially antibiotic resistance of microorganisms, forces researchers to search for new antimicrobial substances that can be introduced into dressing materials.

Our goal is to develop a new biocompatible, active material based on collagen modified by β -glucan and enriched with natural phenolic compounds or Manuka honey chemical ingredients. This material should stop microbes from entering the wound's environment, eliminate microbes that get into the wound, during damage to the skin, inhibit the formation of biofilms and provide optimal conditions stimulate the healing process.

Collagen is protein naturally occurs in a humans body, is biodegradable, biocompatible, non-toxic and is able to interact with cells and improve wound healing process. β -glucan in combination with collagen may improve its properties especially swelling properties and exudate absorption. Moreover, an addition of naturally occurred antimicrobial agents may be a promising solution of increasing antibiotic resistance through microorganisms. Furthermore, as naturally occurring compounds, they are a part of the assumptions of green chemistry and are not harmful to the environment. Part of the phenols of natural origin appears to be completely safe for mammals, including humans.