

1. BIOTHECNOLOGIES

COLLAGEN HYDROLYSATE FILMS WITH BIOACTIVE ADDITIVES

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Collagen and its derivatives are compatible with human skin, which is why they are often used in the medical industry. Studies have been carried out to investigate the main properties, extraction, and application of collagen, gelatine, and collagen hydrolysate. Films of various compositions were produced using collagen hydrolysate, gelatine, and various plasticizers (polyethylene glycol (PEG) 1500, PEG 20000, PEG 100000, glycerol), their organoleptic properties were evaluated, and mechanical and physical tests were performed. It was found that the most suitable composition of protein films is collagen hydrolysate and gelatine in a 1:1 ratio, to which the plasticizer polyethylene glycol (molecular weight 20000 g/mol) is added.

The most suitable composition of the films was found to be a 2:3 ratio of protein to plasticizer. Using this composition, synthetic and natural biologically active substances are added: the preservative Euxyl® 9010 PE, an extract obtained from fireweed (lot. *Chamaenerion angustifolium L.*) and extract obtained from St. John's wort (lot. *Hypericum perforatum L.*) (Fig.).

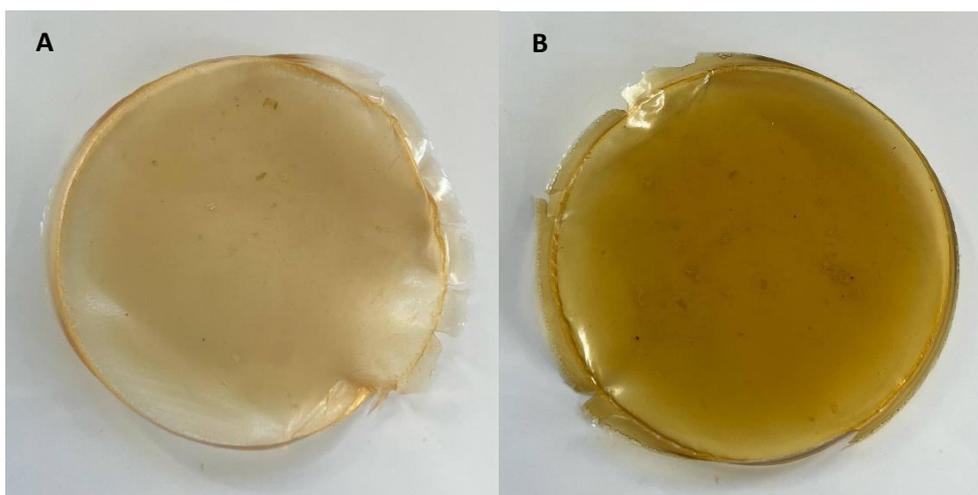


Fig. Protein-polyethylene glycol-herbal extract
(A - *Hypericum perforatum L.*; B - *Chamaenerion angustifolium*) films

Mechanical, physical, and microbiological tests are performed on these films to compare how different biologically active substances change the properties of the film. The thermal stability and chemical composition of all films are also evaluated and compared. Bioactive additives in films change their thermal characteristics: the addition of bioactive substances to the film results in greater changes in mass in the temperature range of 40-400 °C. Bioactive substances (preservative Euxyl® 9010 PE, fireweed extract and St. John's wort extract) have a positive effect on the antibacterial properties of films. Plant extracts provide the highest inhibition diameter for films.