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**«Advanced Agritechnologies, Environmental Engineering and
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**«The use of phytobiotics-based films as a condition of improving food
quality and reducing waste»**

Authors:

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Problem statement

- ***Problem statement.*** The deterioration of product quality is a consequence of a number of reactions (physical, chemical, fermentation, etc.) however, storage has to minimize the microbial growth that causes product spoilage. Therefore, the quality and safety of poultry meat products is directly related to their protection from microbial contamination. Implementing innovative technologies in processing and packaging will increase product stability during the storage. One of the promising ways to preserve the quality of poultry products and increase their shelf life is the use of biodegradable food packaging made of phytobiotics.
- Nowadays, it is important to create packaging materials based on natural biopolymers with characteristics that can replace synthetic polymeric packaging materials. In this regard, the purpose of the research is to evaluate the biodegradable properties of various compositions of edible films based on natural polymers (starch and gelatin) in combination with processed wild berries raw materials.
- The authors have studied the degree of biodegradation of gelatin- and starch-based films, the structure of biodegradable natural polysaccharide-based polymers, the water absorption of biodegradable edible films, and the chemical stability of biodegradable natural polysaccharide-based polymers during the ongoing research.



Solution methods

- The high solubility of films in acids (sulfuric acid) is inherent in samples based on starch phytopolymer. This is due to the aggressiveness of the environment towards starch. Gelatin is more resistant to acids. Polysaccharide films do not undergo hydrolysis in an alkaline environment. All studied film samples have shown a high degree of biodegradation.
- During storage, it is occurred the enrichment of protein degradation products, it leads to an increasing pH of the studied samples of raw smoked poultry products covered with film and without it. This contributes to the development of pathogenic microorganisms in products. The pH of the control sample increases significantly on the 40th day of storage, the medium becomes neutral. The pH value of the prototypes changes linearly over 50 days. The shift of pH to neutral is noted on the 66th day of storage. Thus, edible protective coatings in comparison with the traditional one help to increase the resistance of covered product to microbiological deterioration.
- Microstructural analysis of processed meat products with different structure formers in edible protective films and without them has shown that the appearance of finished products covered with edible films corresponds to high customer requirements and has an attractive look.
- The experiments allow to recommend cranberry and lingonberry juice obtained by high-temperature evaporation under atmospheric pressure as a structural additive in the composition of edible protective films. The technological process for food products with an extended shelf life includes additional operations for preparing coating compositions, their application to raw smoked products, as well as drying of coatings on product's surface.

Conclusions

Results, implementation

- **Protective systems based on phytobiotics and their derivatives can be in demand by the meat industry. They can prevent the impact of unfavourable environmental factors on the product for a long time, and minimize microbial degradation at the cover-product interface. The additives give the coating individual multifunctional properties, including those that contribute to maximum food preservation.**
- **At the same time, most coatings have a number of disadvantages that limit their use. These include insufficient strength and deformation characteristics, low resistance to bio corrosion, high humidity, high vapor permeability, etc.**
- **The study of the biodegradation parameters of phytobiotic edible films will allow the development of a new approach to the production process of edible packaging with an extended shelf life based on concentrated cranberry and lingonberry juice.**
- **As a part of the study, the authors have experimentally substantiated and developed the possibility of obtaining edible phytobiotics-based packages with a high biodegradation coefficient.**
- **A patent has been obtained for a proposed method for producing an edible protective coating for meat products.**

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