

MICROBIOSTATIC EFFECT OF BIOACTIVE COMPOUNDS FROM AGRO-FOOD INDUSTRIAL WASTES ON MICROORGANISMS CAUSING FOOD SPOILAGE

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In this research the effect of direct contact of raw materials and agro-food industrial wastes rich in bioactive compounds (polyphenols, carotenoids) on microorganisms that cause food spoilage was evaluated. The aim of the research is to elucidate their microbiostatic action on different types of food matrix.

The research methodology included the modelling of food matrices (emulsions, gels, pastes) and the study of the microbiostatic effect of plant extracts in situ and in vitro. The following methods were applied to determine the chemical composition and biochemical transformations of bioactive components from natural sources: physical, chemical and microbiological analysis, UV / dream spectroscopy, HPLC.

In vitro, the antimicrobial effect was determined by direct contact of various berries (sea buckthorn, rosehip, shrubs, hawthorn) and dried grape marc with microorganisms that cause food spoilage - *S. aureus*, *E. coli*, *K. pneumoniae*. *Staphylococcus* and *Escherichia* are the most common causes of outbreaks of contaminated food in the population. *K. pneumoniae* is responsible for nosocomial, urinary tract (UTI), respiratory tract and bloodstream infections, where contamination is possible after handling food.

The test results show that sea buckthorn powders and sea buckthorn flour have a more pronounced antimicrobial activity than the investigated pathogenic microorganisms.

For *Staphylococcus aureus*, the diameter of the inhibition zone is 22 mm (powder) and 18 mm (dry residue); for *Escherichia coli*, the diameter of the inhibition zone is 18 mm (powder) and 15 mm (dry residue). For *Klebsiella pneumoniae*, the diameter of the inhibition zones is smaller compared to *Staphylococcus aureus* and *Escherichia coli*. The other plant powders (rosehip, grape pomace, chokeberry, hawthorn) have a weaker antimicrobial activity against the pathogens tested. Sea buckthorn powder showed the lowest minimum inhibitory (MIC) and bactericidal (MBC) concentrations for *Staphylococcus aureus*, followed by sea buckthorn resulting from sea buckthorn, rosehip and grape pressing. Only sea buckthorn powder showed antibacterial activity on *E. coli* and *K. pneumoniae*.

The greatest inhibitory and bactericidal effect on the examined bacteria, capable of rapidly colonizing food, especially meat products with a high degree of hydrophobicity, was observed for sea buckthorn and rosehip powders, in which the content of biologically active lipophilic compounds (lycopene, b-carotene), zeaxanthin, chlorophyll) is considerably higher than aronia and grape pomace powders, in which flavonoids predominate. At the same time in hawthorn the content of biologically active lipophilic compounds is significant, however, the inhibitory and microbicidal effect was lower than for sea buckthorn and rosehip powders. It demonstrates that the presence of organic acids and active acidity plays an extremely important role, directly influencing bacterial adhesion and, ultimately, the process of inhibiting the proliferation of pathogenic microorganisms.

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