ANTIBACTERIAL POTENTIAL OF BERRIES POWDER EXTRACTS

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Introduction. One of the global problems is the health of population. Progress in science and medicine around the world, including the generation of vaccines and antibiotics, has been fundamental to help of our lives. The food is one of the greatest pleasures of life.

Due to the current fast pace of life, and the profit oriented industries which minimise production and distribution costs by using preservatives, additives, antibiotics, hormones, and people eat a lot of fast food and quick meals, their health is often severely affected and the general population immunity is much more weakened. One of the problems facing humanity is increasing the resistance of pathogenic microorganisms to antibiotics and other stressors, which are becoming more and more pressing [2].Therefore, the trend of organic food has been growing more and more over the past decades. In this context, coming up with reliable natural alternatives to the synthetic compounds is imperative [1, 3]. With a future hope to decrease the use of synthetic additives and antibiotics as preservatives. Plant polyphenols are known for their antioxidant, antiseptic and medical effects contain a wide range of secondary metabolites that can inhibit the growth of bacteria, yeasts and molds [2, 4].

Materials and methodology. The purpose of this research was to investigate the antimicrobial properties of berries powders against pathogenic microorganisms, responsible for food alteration.

The following autochthonous fruit from berries and groats were used: rosehip (Rosa canina), white sea buckthorn (Hippophae rhamnoides), hawthorn (Crataegus monogyna), grapes and aronia (Aronia Melanocarpa).The bacterial strains used as test organisms are *S. aureus* ATCC 25923, *E.coli* ATCC 25922, *B. subtilis*, *S.* Aboni, *K. pneumoniae* ATCC 13883. Antimicrobial activity was screened by an agar well diffusion method and bacterial growth was measured in liquid culture. For determination of MIC and MBC was done dilution technique.

Results and discussion. It has been demonstrated that the lowest inhibitory and bactericidal concentration on S. aureus is found in white sea buckthorn powders, with the diameter of inhibition zone 22 mm, followed by rosehip groats and grape marc, the diameter being 16mm. In the case of *E. coli* and *K. pneumoniae*, only

white sea buckthorn powder showed minimal inhibitory and bactericidal concentrations. According to the obtained data, we noticed that sea buckthorn has the most pronounced effect on tested bacteria. It was determined MIC and the lowest concentration was for sea buckthorn 1,95 mg/ml for S.aureus. In case of rosehip the MIC was 3,91 mg/ml.

Nr.	Types of powders	*Staphylococcus aureus* ATCC *25923*	*Escherichia coli* ATCC *25922*	*Klebsiella pneumoniae* ATCC 13883
		the diameter of inhibition zone (mm)	the diameter of inhibition zone (mm)	the diameter of inhibition zone (mm)
1.	white sea buckthorn	22±2	18±2	17±2
2.	white sea buckthorn (groats)	18±2	15±1	13±1
3	Rose hip	16±1	10±1	9±1
4	Rose hip (groats)	12±1	9±1	8±1
5	Grape marc	11±2	9±1	7±1
6.	Aronia	10±1	7±1	7±1
7.	Hawthorne	10±1	8±1	7±1

Table 1. Antimicrobial activity of plant powders on pathogenic microorganisms (well diffusion method).

From the results presented in the table, we notice that the most active extract is the sea buckthorn extract. We observe that gram-positive bacteria show a more pronounced sensitivity to the tested bacteria. In the case of the examined micro-organisms, capable of rapidly colonising foods, specially meat products and obviously having a high degree of hydrophobicity, the maximum inhibitory and bactericidal effect was attested 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.

1 — white sea buckthorn
3 — aronia
6 — grape marc

Figure 1. Screening of substances using the well agar diffusion procedure - *B. subtilis*

Conclusion. However, the addition of plant extracts can be expected to aid in preserving food held at refrigeration temperature, at which the multiplication of

microorganisms is slow. The antimicrobial activity varies widely, depending on the type of plants, type of medium and on species of bacteria. Microorganisms differ in their resistance to a given plant extracts. Gram negative bacteria are more resistant than Gram positive bacteria.

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РЕЗЮМЕ

АНТИБАКТЕРІАЛЬНИЙ ПОТЕНЦІАЛ ПОРОШКОВИХ ЕКСТРАКТІВ ЯГІД

Кожокарі Даніела

Проаналізовано антибактеріальні властивості ряду порошкоподібних ягідних екстрактів. Очікується, що додавання рослинних екстрактів допоможе зберегти продукти при температурі охолодження, при якій розмноження мікроорганізмів відбувається повільно. Антимікробна активність сильно варіює в залежності від типу рослин, типу середовища та виду бактерій. Мікроорганізми відрізняються своєю резистентністю до дії екстрактів окремих ягід, причому грамнегативні бактерії більш стійкі, ніж грампозитивні бактерії.

EDIBLE FLOWERS AS IMPORTANT SOURCE OF BIOACTIVE COMPOUNDS

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