Antibacterial Activity of Pollen Extracts on Pathogenic Microflora from Milk

Liviu Al. MĂRGHITAŞ¹, Claudia PAŞCA^{1*}, Daniel S. DEZMIREAN¹, Otilia BOBIŞ¹, Victorița BONTA¹, Rodica Mărgăoan², Floare CHIRILĂ³ and Nicodim FIȚ³

¹Department of Apiculture and Sericulture: University of Agricultural Sciences and Veterinary Medicine, România

²Department of Horticulture, Micropropagation: University of Agricultural Sciences and Veterinary Medicine, România

³Department of Microbiology (Veterinary Medicine): University of Agricultural Sciences and Veterinary Medicine, România

* corresponding author: claudia.pasca@usamvcluj.ro

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Abstract

Bee-pollen was used for thousands of years as functional food and medicinal plant product. Various beneficial effects were attributed to it and its consumption was increased years. The tests have been made on 16 pollen samples of the following families: *Rosaceae*, *Salicaceae*, *Fabaceae*, *Tiliaceae*, *Asteraceae*, *Brassicaceae* and two polifloral pollen assortment, using difuzimetric method. Among the tested bacteria, the *Onobrychis viciifolia* pollen has the highest sensitivity 11.86 ± 1.79 mm and the low antibacterial activity is for *Brassica sp.* pollen 8.65 ± 2.65 mm. The use of antibiotic substances over a long period of time resulted in larger doses of residues in milk, representing a potential biohazard. The conclusion from this study is that the use of ethanol extracts of pollen is a real alternative in the treatment of cow with various diseases.

Keywords: antibacterial activity, strains, pollen extracts

INTRODUCTION

The honeybee (*Apis mellifera*) makes various bee products from plants, flower nectar and flower pollen. Bee pollen is rich in carbohydrates, crude fibers, lipids, vitamins and phenolic compounds, being commonly named as the “perfectly complete food”, due to the presence of all the essential amino acids (Marivalda *et al.*, 2015).

Katarína *et al.* (2015), Pascoal *et al.* (2014), found that bee pollen is a healthy food with a wide range of therapeutic properties such as antimicrobial being Gram-positive bacteria the most sensitive, antifungal, antioxidant, anti-radiation, hepatoprotective, chemoprotective and/or chemopreventive and anti-inflammatory benefits.

AIMS AND OBJECTIVES

The aim of our study is to assess the antibacterial activity of some pollen extracts over

bacteria in milk as an alternative to current antibiotic treatments.

MATERIALS AND METHODS

For the experiment the preparation of alcoholic extracts from pollen (*Crataegus monogyna*, *Salix sp.*, *Prunus sp.*, Multifloral bee pollen, *Amorpha fruticosa*, *Tilia sp.*, *Rosa canina*, *Taraxacum sp.*, *Crataegus monogyna*, *Brassica sp.*, *Onobrychis viciifolia*) 2g milled and homogenized pollen were extracted using 15 ml of ethanol:water solution (70:30, v:v).

The antibacterial activity was assessed by difuzimetric method (similar to antibiogram), and calculating the minimum inhibitory concentration for the pollen extracts against the isolated microorganisms of pathogenic milk from cows with clinical mastitis (Paşca *et al.*, 2015), using 10 strains belonging to *Staphylococcus* genera.

Tab. 1. Results of the test for the determination of the susceptibility of bee pollen extracts (mm, zone of inhibition)

Pollen species	<i>Staphylococcus xylosus</i>			<i>Staphylococcus hominis</i>		<i>Staph. chromogenes</i>	<i>Staphylococcus intermedius</i>			
	Strain 1	Strain 2	Strain 3	Strain 1	Strain 2	Strain 1	Strain 1	Strain 2	Strain 3	Strain 4
<i>Crataegus monogyna</i>	11.00	15.33	9.17	11.00	7.67	10.00	9.00	6.83	8.00	9.50
<i>Salix</i> sp.	13.33	12.33	10.33	9.33	7.50	8.00	8.67	8.83	8.00	9.17
<i>Prunus</i> sp.	8.17	11.00	9.67	10.33	7.33	10.17	8.83	8.33	9.67	7.50
Multifloral bee pollen	8.83	12.00	10.67	10.67	7.00	9.33	8.67	9.67	9.33	9.17
Multifloral bee pollen	9.83	11.00	11.33	8.33	7.50	10.33	9.83	8.17	8.67	9.00
<i>Amorpha fruticosa</i>	8.67	11.67	8.33	10.67	7.00	10.00	9.00	7.00	8.67	8.50
<i>Prunus</i> sp.; <i>Salix</i> sp.	10.17	10.67	13.33	10.33	8.00	8.67	8.67	7.50	8.00	9.00
<i>Prunus</i> sp.	11.83	11.00	9.33	9.33	8.00	10.00	8.83	8.67	9.33	10.33
<i>Tilia</i> sp.	11.00	9.00	10.00	10.67	7.83	8.33	8.67	7.67	8.50	8.67
<i>Rosa canina</i>	8.33	11.17	11.00	9.00	7.33	8.00	9.67	8.67	9.00	7.33
<i>Taraxacum</i> sp.; <i>Salix</i> sp.	12.33	8.67	10.00	10.33	8.67	7.00	9.67	9.17	7.83	10.00
<i>Brassica</i> sp.	9.67	8.00	10.33	8.83	7.50	9.33	9.50	7.50	7.67	8.65
<i>Crataegus monogyna</i>	15.33	10.17	13.00	9.00	9.50	9.67	11.00	9.67	9.33	8.67
<i>Crataegus monogyna</i>	16.33	15.33	10.67	8.33	7.67	8.00	10.67	8.33	6.00	7.83
<i>Salix</i> sp.	16.00	11.33	10.67	10.00	7.67	7.67	14.33	13.00	8.00	8.67
<i>Onobrychis viciifolia</i>	14.13	13.00	14.33	12.50	6.80	17.33	10.17	11.00	10.33	9.00

RESULTS AND DISCUSSION

Among the tested bacteria, the *Onobrychis viciifolia* pollen has the highest sensitivity 11.86 ± 1.79 mm and the low antibacterial activity is for *Brassica* sp. pollen 8.65 ± 2.65 mm (**Table 1.**)

CONCLUSION

The results of the present investigation revealed that bee pollen extracts could be useful in the prevention of diseases in which *Staphylococcus* spp. are implicated.

Using ethanol extracts of *Onobrychis viciifolia* in the treatment of cow's mastitis with positive impact could reducing contaminants in milk and emergence of antibiotic resistance.

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