The Fungistatic Effect of Plant Extracts Against *Monilinia fructigena* (Aderhold Et Ruhl) Honey Ex Whetzel as Causal Agent of Brown Rot

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ABSTRACT

Whereas it is generally acknowledged that the use of pesticides has large benefit to farmers, the present use of pesticides in agriculture also causes negative environmental effects to society. These negative effects demand an alternative solution for conventional pesticides. Plant extracts is a group of substances extracted from different parts of plants which contain compounds with antimicrobial properties. By using the „poisoned food technique” we’ve managed to study the effect of plant extracts on inhibiting the growth of *Monilinia fructigena*, the most effective extracts were those of *Echinacea purpurea*, *Cynara scolymus*, *Salvia officinalis*, *Tagetes sp.*, *Hyssopus officinalis*, *Artemisia absinthium*, *Hypericum perforatum*, *Aristolochia clematidis* and *Achillea millefolium*.

Keywords: *extracts, fungistatic, Monilinia, pesticides.*

INTRODUCTION

Monilinia fructigena (Aderhold et Ruhl) Honey ex Whetzel commonly referred to as „apple brown rot” is the most common *Monilinia* species on apple and pear in Europe (Jones and Aldwinckle, 1990). The negative effects of conventional pesticides demand an alternative solution (Sokovic Marina et al., 2013).

AIMS AND OBJECTIVES

Considering the fact that apple brown rot is a disease that can cause significant damage and there are used high doses of pesticides, the aim of this study was to find some alternative solutions to conventional treatments.

MATERIALS AND METHODS

The pathogen was isolated from mummified apple fruits collected from the experimental plot by using standard phytopathological isolation techniques. Fragments of mummified tissues were surface sterilized by immersion in potassium permanganate solution for two minutes, then placed

on sterile Malt-Agar medium in Petri dishes and incubated. The obtained isolate were subcultured on Malt-Agar medium for 7 days at 25°C (Hrustic Jovana et al., 2012). The hydroalcoholic extracts used were obtained from 18 species of plants. For testing the fungistatic effect of plant extracts the „poisoned food technique” was used (Johnson and Sekhar Chandra, 2012). In order to observe the fungistatic effect of the hydroalcoholic extracts, the colonies developed on Petri dishes were daily measured by diameters and the colony area was calculated (Hrustic Jovana et al., 2012).

RESULTS AND DISCUSSIONS

The inhibitory effect of plant extracts on pathogen *Monilinia fructigena* is shown in Tab. 1. On 16 and 17 days after inoculation on sterile Malt-agar medium, the colony area increased on studied variants, the difference between the average area of the first day of growth and the average area of the last day of observation is very significant positive (Tab. 1).

Tab. 1. The growth rate of *Monilinia fructigena* colonies

Measurements	Colony area (mm ²)	% to control	The difference to control	The significance of the difference
Day 2	3.14	100.0	0.00	Control
Day 6	5.93	188.8	2.79	-
Day 11	16.17	514.8	13.03	-
Day 16	54.66	1740.8	51.52	*
Day 17	91.38	2910.2	88.24	***
LSD (p 5%) 45.51	LSD (p 1%)	59.99	LSD (p 0.1%) 77.23	

Tab. 2. The influence of the plant extracts on the development of colonies of *Monilinia fructigena*

Hydroalcoholic extracts	Colony area (mm ²)	% to control	The difference to control	The significance of the difference
Artemisia absinthium	3.14	100.0	0.00	Control
Armoracia rusticana	3.67	116.7	0.53	-
Carum carvi	64.63	2058.3	61.49	-
Echinaceae purpurea	3.14	100.0	0.00	-
Rumex patientia	262.00	8343.9	258.86	**
Cynara scolymus	28.89	920.0	25.75	-
Ocimum basilicum	209.91	6685.1	206.77	*
Allium ursinum	3.87	123.4	0.73	-
Calendula officinalis	4.56	145.1	1.42	-
Allium sativum	6.83	217.6	3.69	-
Salvia officinalis	3.14	100.0	0.00	-
Tagetes sp.	3.14	100.0	0.00	-
Hyssopus officinalis	3.14	100.0	0.00	-
Achillea millefolium	3.14	100.0	0.00	-
Hypericum perforatum	3.14	100.0	0.00	-
Aristolochia clematitis	3.14	100.0	0.00	-
Mentha piperita	3.35	106.7	0.21	-
Lippia citrodora	3.77	120.0	0.63	-
LSD (p 5%) 157.40	LSD (p 1%) 211.16	LSD (p 0.1%) 279.01		

The most effective extracts for inhibiting the growth of *Monilinia fructigena* can be seen in Tab 2, with the colony area of 3.14 mm². The reduced effectiveness in the inhibition of the pathogen had the extracts of *Ocimum basilicum* and *Rumex patientia*, the average areas of the colonies treated with these extracts were higher than the average area of the colony treated with the extract of *Artemisia absinthium* (control), differences statistically assured (Tab 2). *Tagetes* spp. and *Ocimum basilicum* extracts were used in the control of pathogen *Monilinia* spp. by Teodorescu Georgeta et al. (2010), Lopez-Reyes et al (2013).

CONCLUSION

In vitro, the degree of inhibition was different depending on the hydroalcoholic extracts used, but all in all, half of the natural extracts tested had a good efficiency on inhibiting the growth of *Monilinia fructigena*.

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