INFLUENCE OF COMPOST TEA ON INHIBITION OF GROWTH OF PHYTOPATHOGENIC FUNGI
Fusarium oxysporum AND Rhizoctonia sp.

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ABSTRACT
This research aims to examine the potential of different compost teas as biocontrolling agents. The teas are deriving primarily from composting process, and then from aerated and non-aerated treatments. Inhibition percentage of phytopathogenic fungi growth, Fusarium oxysporum and Rhizoctonia sp. has been tested in laboratory conditions. The effect of examined teas has given different growth inhibition levels of the phytopathogenic fungi. There is a difference in the sensitivity of Fusarium oxysporum and Rhizoctonia sp. to tested types of compost teas, with the emphasis of higher inhibition level of Rhizoctonia sp. The tobacco waste-derived compost tea has shown to have highest inhibition effect among all the tested compost products. The aerated teas comparing to non-aerated have harboured higher inhibition rate of Fusarium oxysporum, while supression in Rhizoctonia sp. growth was the same by both compost tea types.

KEY WORDS Fusarium oxysporum, Rhizoctonia sp., compost tea, inhibition

INTRODUCTION
In Europe, legislation on plant protection products has been re-evaluated since 1991 (Directives 1991/414 and 2009/128), leading to a drastic reduction in the use of chemical compounds. Usage of compost and its products can greatly contribute in reducing the application of fungicides. In this context the production of these green materials could develop into significant field of agricultural biotechnology. The application of compost is considered to be biological control measure, representing a complex interaction between microorganisms in compost, plant pathogens and plants themselves (Aviles et al., 2011).

There are two different groups of methods used in production of compost teas depending on the applied aeration system: with and without aeration. This research is aiming to examine the inhibition rate of phytopathogenic fungi Fusarium oxysporum ( Fig. 1) and Rhizoctonia sp. by using aerated and non-aerated teas. Compost teas are deriving from biodegradable municipal waste derived compost, green waste-derived compost (grass, leaves, tree branches), and tobacco waste-derived compost.

MATERIAL AND METHODS
The green waste-derived compost (GW) was made from source-separated municipal shredded green waste (mainly grass and hedge) obtained from the town of Cacak, Serbia. The municipal solid waste-derived compost (MSW) was made from biodegradable municipal waste, also obtained from Cacak town. Tobacco tea was obtained from tobacco waste-derived compost. Phytopathogenic fungi are part of the collection of Institute of plant protection at Faculty of Agriculture from Belgrade.

The inhibition percentage was calculated by following formula:

\[(P = \frac{(R_1 - R_2 \times 100)}{R_1})\]

where:

R1 - Radial mycelial growth in control,  
R2 - Radial mycelial growth in treatment.

RESULTS
The inhibition percentage of phytopathogenic fungi Fusarium oxysporum ranges from 26.4 to 36.4% in the treatment with aerated teas, while non-aerated teas proven range from 16.4 to 31.4% ( Graph 1 ). Tobacco tea has shown to provide the highest inhibition rate.

The inhibition percentage of phytopathogenic fungi Rhizoctonia sp. ranged from 78 to 100% in the treatment with aerated teas, while non-aerated teas shown percentage range from 77 to 100%. This treatment showed that the aeration did not influence the inhibition rate of this fungi. In contrast to the mentioned treatment, tobacco tea (both aerated and non-aerated) has completely inhibited the growth of Rhizoctonia sp. (Graph 2).

The inhibition percentage of Fusarium oxysporum i Rhizoctonia sp. under the influence of aerated and non-aerated compost teas.

DISCUSSION
The results of this research have proven the inhibition influence of compost teas to the growth of Fusarium oxysporum and Rhizoctonia sp. The inhibition rate depends on the type of fungi, as well as the compost tea type. Non-sterilized compost teas contain various microbial populations and microbial content is dependant upon chemical characteristics of material used for compost preparation (Castano et al., 2011).

The presented results of this research show that waste materials can reach their significance in application as biocontrolling agents. The inhibition mechanisms have proven to be very different, indicating the need for further investigations.

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