



Přírodovědecká
fakulta
Faculty
of Science

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice

OPPONENT'S REVIEW ON BACHELOR THESIS

Name of the student: Jana Seiter

Thesis title: Antifungal potential of volatile compounds of Actinobacteria against a selection of fungal phytopathogens

Supervisor: Dr. Adam Ossowicki

Referee: Mgr. Hana Tykalová

Referee's affiliation: University of South Bohemia in Ceske Budejovice, Faculty of Science AND Biology Centre, Czech Academy of Sciences, Institute of Parasitology

	Point scale ¹	Points
(1) FORMAL REQUIREMENTS		
Extent of the thesis (for bachelor theses min. 18 pages, for masters theses min. 25 pages), balanced length of the thesis parts (recommended length of the theoretical part is max. 1/3 of the total length), logical structure of the thesis	0-3	3
Quality of the theoretical part (review) (number and relevancy of the references, recency of the references)	0-3	3
Accuracy in citing of the references (presence of uncited sources, uniform style of the references, use of correct journal titles and abbreviations)	0-3	3
Graphic layout of the text and of the figures/tables	0-3	2.5
Quality of the annotation	0-3	3
Language and stylistics, complying with the valid terminology	0-3	3
Accuracy and completeness of figures/tables legends (clarity without reading the rest of the text, explanation of the symbols and labeling, indication of the units)	0-3	3
Formal requirements – points in total	21	20.5
(2) PRACTICAL REQUIREMENTS		
Clarity and fulfillment of the aims	0-3	3
Ability to understand the results, their interpretation, and clarity of the results, discussion, and conclusions	0-3	3
Discussion quality – interpretation of the results and their discussion with the literature (absence of discussion with the literature is not acceptable)	0-3	3
Logic in the course of the experimental work	0-3	3
Completeness of the description of the used techniques	0-3	2
Experimental difficulty of the thesis, independence in experimental work	0-3	2.5

¹ Mark as: 0-unsatisfactory, 1-satisfactory, 2-average, 3-excellent.

Quality of experimental data presentation	0-3	2.5
The use of up-to-date techniques	0-3	3
Contribution of the thesis to the knowledge in the field and possibility to publish the results (after eventual supplementary experiments)	0-3	3
Practical requirements – points in total	27	25
POINTS IN TOTAL (MAX/AWARDED)	48	45.5

Comments of the reviewer on the student and the thesis:

In her Bachelor's thesis, Jana Seiter studies the antagonistic interaction between Actinobacteria and several candidates of phytopathogenic fungi. The interaction was mediated by volatile compounds emitted by Actinobacteria and as a result of exposition to volatiles, growth characteristics, as well as hyphae morphology of fungi were affected.

From the formal point of view, the thesis has adequate length, is divided into the standard sections that are logically structured and are presented with a good level of English, which complies with proper scientific terminology and shows a good understanding of the topic by the student. The text is almost void of mistakes or typos and only one of the total of 76 references was absent in the thesis text (Khushboo et al., 2022). This shows that the thesis writing was not hastied and the text was prepared with precision.

The introduction was brief but adequately informative and well structured. As a reader, I would appreciate the use of some figures for the introduction illustration, e.g. showing the morphology or life cycle of studied organisms. Results were presented clearly, with a table and two figures. I like how you combined two sets of data, growth inhibition and the effect on fungus colouration in one result table. Just a suggestion, a uniform order of species in all tables and graphs would increase the understandability to the reader (inconsistency between Table 3, Figure 4 and Figure 5). The discussion of the results was of a higher standard for the bachelor student with relevant sources and reasonable interpretation of the obtained data. Most issues and ambiguities I found in the method section. For example, when you described the preparation of bacterial inoculum, I am not convinced, that using "four large colonies" to prepare the initial inoculum solution will retain sufficient reproducibility. I would expect you to quantify the number of cells inoculated somehow (e.g. cell count, optical density). Also, the process of measuring the fungal growth and how the data were averaged is not completely clear to me. If I get it right, you checked the fungal growth continuously from day 3 to day 8 (and to day 16 for *Geotrichum candidum*?) after inoculating the fungus, but it is not stated how you determined "the last day before the maximal growth was reached", which was the day from which the actual data were taken and processed to results. It is also not clear, whether this time point was the same for all the fungus species or different. Further, it is also not specified, how you dealt with the measurement of the growth when the fungus reached the barrier of a two-compartment dish and thus was limited in spread (as is obvious from some of your pictures). I can only assume that the three measurements were done along the lines that are drawn on the cultivation dishes (Figure 3), but it is not stated anywhere. Except for the issues in the methodology, the overall impression from the thesis was good, exceeding the average theses.

Minor mistakes, which the student should avoid in the future:

- in vitro is written without hyphen (abstract)
- Sokolo should be Sokolov (p. 7)
- Latin names of an organism should be written in italics (occasionally forgotten), the correct spelling is *Teledeinopus aoutii* (not “aoiutii”) (p. 6, Table 1; p. 16)
- I found the way you stated concentration values confusing. It would be more obvious to use 1 g/l, 1 g.l⁻¹ or 1 gL⁻¹ is still fine. I wouldn't make a gap in between units as you did it (1g L⁻¹). Also, the units should not be separated on different lines (p. 6, line 5). You forgot to state the molarity or percentage for the potato dextrose agar (p. 6).
- You do not need to specify, that the pH was adjusted with NaOH and HCl.

Suggestions and questions, which the student has to answer during the defence.

1. What is the difference between biological and technical replicate? You state at the end of section 3.2.2. that “Each combination of Actinobacteria and fungal plant pathogen and each negative control was prepared in triplicates...”. Was it biological or technical triplicates in your case?

2. Could you describe in detail, how the data that you analyzed in the results section were obtained? Can you provide any kinetics of the fungal growth during the experiment and specify the time point for each fungus species at which the final data were obtained?

3. Only rarely you mention the specific compounds, that might be responsible for the observed effects. Could you name several specific examples of volatile compounds that might exert inhibitory functions against phytopathogenic fungi? By which method could such compounds be identified? According to your opinion, for the inhibitory effect of volatiles to happen is there only one compound important or rather a mixture of several compounds? Is there any published research on that?

4. Several times you suggest a possible application of Actinobacteria in the biological control of phytopathogens as an alternative to the use of pesticides. In a practical way, how could such an application be performed to be effective?

Conclusion:

In conclusion, I

r e c o m m e n d

the thesis for the defense and I suggest the grade excellent .

In **České Budějovice** date 12th of September

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signature