



Přírodovědecká
fakulta
Faculty
of Science

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

OPPONENT'S REVIEW ON BACHELOR/~~DIPLOMA~~^{*} THESIS

Name of the student: Sara Shojaei

Thesis title: Effect of various number of basal and covering polyelectrolyte layers on immobilized enzyme activity

Supervisor: RNDr. Ján Štěřba, PhD.

Referee: Mgr. Petra Havlíčková

Referee's affiliation: Department of Chemistry, University of South Bohemia, Czech Republic

Point scale¹ 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
Quality of the annotation	0-3	3
Language and stylistics, complying with the valid terminology	0-3	2
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	1
Formal requirements – points in total		17

(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	2
Discussion quality – interpretation of the results and their discussion with the literature (absence of discussion with the literature is not acceptable)	0-3	2
Logic in the course of the experimental work	0-3	2

* Choose one

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

Completeness of the description of the used techniques	0-3	1
Experimental difficulty of the thesis, independence in experimental work	0-3	2
Quality of experimental data presentation	0-3	2
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	2
Practical requirements – points in total		19
POINTS IN TOTAL (MAX/AWARDED)		48 36

Comments of the reviewer on the student and the thesis:

The bachelor thesis of Sara Shojaei is focused on how different numbers of basal and covering polyelectrolyte layers influence immobilized enzyme activity. For this purpose, Horseradish peroxidase was immobilized into polystyrene sulfonate and polyallyamine hydrochloride layers on glass surface and the activity of the enzyme was tested. Finally, the presence of the enzyme was confirmed by SDS-PAGE and immunoblotting.

The thesis is divided into eight parts (Introduction, Aims of the thesis, Materials and Methods, Results, Discussion, Conclusion, Appendix and References), however, I noticed incorrect numbering of chapters (starting from page 20).

Overall, the aims of the thesis are clearly defined and Sara managed to perform necessary experiments, analyze data and discussed results in context with current literature.

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

1. Was the enzyme prepared recombinantly or commercially purchased? How did you determine the concentration of the enzyme used for the experiments?
2. Could you comment on sentence from page 8, describing the enzyme: "HRP is a hemecontaining glycoprotein having a single chain of 308 amino acid residues, eight oligosaccharide side chains, two calcium ions, and one porphyrin group." How was the presence of two calcium ions determined?
3. Why did you choose glass slides as a solid surface for the experiments? Would you expect different results if different solid surfaces were applied?
4. Do you have any plans for the further experiments regarding this topic?

Mistakes, which the students should avoid in the future:

- I would recommend to include the list of abbreviations next time.
- The purity and producer of used chemicals are not provided in the thesis. Also, the producer and exact type of used equipment, such as centrifuge, or plates for the experiments are not mentioned.
- It is mentioned that running buffer is 10x concentrated, but I miss the final concentration of running buffer used for experiments. I also miss composition of loading buffer and blocking solution.

- I would recommend to describe SDS-PAGE and immunoblotting experiments more precisely, including exact concentrations of enzyme, time points, temperatures and composition of buffers for dilution of antibodies.
- I am not sure about the picture of SDS-PAGE gel on page 25, if it is CBB staining as mentioned in Materials and Methods, I would recommend to use better quality picture for the thesis if possible.
- I noticed incorrect numbering of figures (Figure 3 – 3x) and tables (Table 14 – 2x) in the thesis. Also, graphs on pages 23 and 24 do not include units.

Conclusion:

In conclusion, I

r e c o m m e n d / ~~d o n o t r e c o m m e n d~~*

the thesis for the defense and I suggest the grade based on the defense .²

In **České Budějovice** date **7.6. 2022**

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Mgr. Petra Havlíčková

² You can suggest a grade, which can be modified during the defense based on the presentation. However, if the reviewer is not present at the defense, the grade will not be counted. Grades: excellent (1). Very good (2), Good (3), Unsatisfactory/failed (4).