



STATEMENT OF THE BACHELOR/DIPLOMA* THESIS REVIEWER

Name of the student: **Nina Nicole Troppmair**

Thesis title: **Pigment composition of photosynthetic light harvesting complexes of eukaryotic alga *Emiliana huxleyi***

Supervisor: **Radek Litvín**

Reviewer: **Radek Kaňa**

Reviewer's affiliation: **Institute of Microbiology, Centre Algatech, Třeboň**

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

* Choose one

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

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	3
Quality of experimental data presentation	0-3	3
The use of up-to-date techniques	0-3	2
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		24

POINTS IN TOTAL (MAX/AWARDED)	48	41
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Comments of the reviewer on the student and the thesis:

The presented bachelor thesis represents an interesting compilation of experimental data dealing with changes in pigment composition in light harvesting complexes of haptophyte alga, *Emiliania huxleyi*. Thesis contains all necessary parts required for typical bachelor thesis at University of South Bohemia - *Introduction, Material and Methods, Results and Discussion*. The initial part of *Introduction* describes model organism (*Emiliania huxleyi*), describes basic mechanism of photosynthesis (kind of confusing is the separation of photosynthesis into four phasis - I haven't seen it before - usually only two phases are used - light/dark reaction). In the final part, mechanisms of photoadaptation and photoprotection are described. In the part "Results" student presents data showing changes in pigment/protein composition during photoadaptation to two light intensities, high and low light. It is useful set of new and original data. Based on biochemical and biophysical methods student has managed to show increase in the fucoxanthin substitute, 19'-Hexanoyloxyfucoxanthin, during adaptation to high light. The only weak point of the presented thesis is the poor description of figures/table (Table 10 presents data normalized to chlorophyll a content, this is not clear from the figure legend etc.). However, in summary, student has fulfilled, all necessary demands required for bachelor thesis. It contains sufficient amount of experimental data that are clearly described and discussed. Therefore, I fully support and recommend the thesis for defense.

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

Mistakes, which the students should avoid in the future:

Questions:

1. Based on the presented data, it seems, that only concentration of Diadinoxanthin (not Diatoxanthin) has increased for HL cells? How did you collected sample for HPLC, did you used light or dark adapted sample? Author claims that increase in Diadinoxanthin is due to the Dd cycle. I'm not fully convinced that the increase is due to the Diatoxanthin - Diadinoxanthin cycle or due to some other biochemical pathway (e.g. Diadinoxanthin synthesis). There are no data showing Dd/Dt ration between light and dark sample for HL/LL cells. Could you address this point?

2. Can you roughly estimate fractions of free carotenoids for HL and LL cells? Can you guess, how much from the carotenoids are in bound into antennas or free in the membrane fraction? Would you expect an inhibitory effect of free Diatoxanthin in NPQ, as it has been recently described for violaxanthin (see 2016. FEBS Lett. (2016) 590:1076–85)?
3. There are some inconsistencies in the text. In discussion, author claims that most from the pigments are bound to proteins (page 33 first paragraph), however it is in contrast with final conclusions and reference Xu et al. used at page 34. Could you explain this discrepancy?
4. Author has deduced presence of photosystems in particular zones based on beta-carotenoid content (see discussion, page 33). I'm not fully convinced by the interpretation - Have you tried to measure 77K fluorescence spectra that would be helpful in this sense?

General question for discussion:

5. Is the mechanism of NPQ triggering in *Emiliana huxleyi* (pH, PsbS analogue etc) known from the literature?


Suggestion

1. Figure and table legends are not sufficiently described (e.g. Table 10) - it is not clear from the table that values are normalized to chlorophyll, Table 9 - it is not clear whether Dd/Dt ratio was detected for light/dark adapted sample.

Conclusion:

In conclusion, I r e c o m m e n d the thesis for the defense and I suggest the grade very good

In Třebonĭ date 14.6.2018



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signature

