

Supervisor's statement on bachelor thesis

**Characterization of fucoxanthin triplet-state in pyridine and photoprotection in the LHC of
*Aureococcus anophagefferens***

by **Marco Trathnigg**

Study program: Biological Chemistry

The topic of the bachelor thesis of Mr. Marco Trathnigg is the photoprotective function of carotenoids in photosynthetic organisms. Chlorophylls, the molecules responsible for capture and conversion of solar energy are also efficient photosensitizers of singlet oxygen, hence, efficient quenching of chlorophyll triplet states is one of the crucial roles of carotenoids in photosynthetic systems.

The focus of the thesis was on the characterization of the triplet state of fucoxanthin (fux), one of the most abundant carotenoid molecule on earth. The work aimed at characterization of fux triplet spectrum in solution, using chlorophyll a as a photosensitizer and use these data in analysis of fux triplet spectrum in native systems, the light-harvesting pigment-protein complex isolated from a marine alga, and the thylakoid membrane of this organism.

Practically, the work consisted mainly in application of optical spectroscopy. The student successfully mastered the fundamental type of time-resolved absorption spectroscopy, the pump-probe method, or flash photolysis, including the basics of analysis of the time-resolved data using nonlinear regression. This was no mean task, considering that this required ability to integrate the concepts of chemistry (encompassing biochemistry as well as theory of chemical kinetics), physics (interaction of light and matter), mathematics (nonlinear data fitting) and employ these to answer biologically relevant questions (photoprotection in living systems). In my opinion, Marco has managed to familiarize himself with all the experimental and theoretical concepts of the methodology so that, should the necessity arise in the course of his future career, he will be able to identify the problems appropriate for application of optical methods and carry out the necessary experiments, as well as proceed towards more complex experimental approaches. Moreover, the dataset he collected during the course of his work is very valuable for our research group and parts of it will no doubt find their way into future publications of the team.

I consider the thesis well balanced between the theoretical/introductory and experimental part and sufficiently referenced. The writing is generally clear and understandable and the depth of the introductory part and discussion of the experimental results are appropriate for a work on the BSc thesis level.

In conclusion, I recommend the thesis for defense.

In České Budějovice, 17 September 2018


David Bina