

Supervisor's statement on bachelor thesis

Investigation of stability and dynamics of photosynthetic pigment - protein complexes using optical spectroscopy

by **Mirjam Odermatt**

Study program: Biological Chemistry

Seen in context, the bachelor thesis of Mirjam Odermatt aimed at investigation of photoprotective mechanisms of photosynthetic organisms. Photosynthetic energy conversion depends on the ability of the pigment-protein complexes to efficiently capture photons and deliver the excitation energy to the place of its conversion to chemical energy. Equally important is the ability of the molecular machinery to dissipate the excess energy harmlessly, preventing damage to the photosynthetic apparatus. The pigment-protein light-harvesting complexes are capable of switching between the energy capturing and energy dissipating states. Mechanism of this process is still poorly understood

The goal of the present work was to investigate the possibility of using the UV-excited fluorescence of the native aromatic aminoacid residues and circular dichroism to monitor the protein dynamics of pigment-protein complexes. The switch from light-harvesting to dissipating state of the protein was achieved by manipulating the detergent content and pH.

In the course of the experimental work, Ms. Odermatt applied a range of spectroscopic techniques: time-resolved and steady-state fluorescence spectroscopy (of both tryptophan and chlorophyll a), absorption spectroscopy and circular dichroism. She showed remarkable ability to master all the difficult experimental approaches as well as the data processing methods almost immediately and she worked independently from the very beginning. Furthermore, the student showed a keen interest in the topic, quickly familiarized herself with the relevant literature and was able to perform all the data analyses with only a minimum input from the supervisor.

This transferred to the process of writing which was, in my opinion, remarkably smooth. The work is well written and no aspect of the experimental work is neglected in the analysis. Even complex issues pertaining to the explanation origins and mechanisms of tryptophan fluorescence are dealt with clearly, showing that the student achieved the necessary understanding of the issues studied. This manifests also in the Discussion section that is clearly structured and the issues singled out for in-depth discussion were chosen appropriately. At this point I have to stress that all these qualities were present in the manuscript from the very first draft.

I consider the performance of Mirjam Odermatt excellent and recommend her thesis for defense.

In České Budějovice, 25 January 2021

