

Posudek školitele na diplomovou práci Alžběty Vojtíškové
"Vliv iontů a oxidace na hydrataci a pohyblivost modelových lipidových
membrán“

Alžběta Vojtíšková has been working in the Biospectroscopy Group at the Heyrovský Institute of Physical Chemistry for three years. During this time, she gained both theoretical background and practical skills sufficient to independently perform steady-state and time-resolved fluorescence spectroscopic measurements and to analyse the results using so-called solvent relaxation method developed in our laboratory. Alžběta has been successful in applying this method to model phospholipid membranes of increased compositional complexity that are relevant for cell physiology and pathophysiology. The presented diploma work is divided into two parts.

First, the specific ionic effects, previously studied by Alžběta in one-component neutral phospholipid bilayers, have been investigated in negatively charged model of inner leaflet of cellular membrane. Strong differences in adhesion of sodium, potassium and caesium, leading to different levels of dehydration and hindered mobility of lipid headgroups are the most valuable results of this work.

The second part of the work was devoted to investigation of effects of lipid oxidation in neutral and negatively charged model lipid membranes with and without the presence of KCl. Such complex systems are presently on the border of applicability of the solvent relaxation method. Thus, a complete understanding of interplay of all the components needs farther experiments as well as a back-up from computer simulations. Nevertheless, interesting findings have been already reported in this diploma work.

The whole laboratory work, fluorescent experiments and analysis of the obtained results was carefully performed by Alžběta. She was consequent in her work and was able to defend her results when they were discussed during seminars. She was able to present her work both in Czech and in English. The presented Master thesis is clearly composed and edited. The statements are formulated with a sufficient precision and the references are correctly cited. A more careful discussion would be needed in order to justify all the conclusions formulated in the part of the work that deals with oxidized lipids. However, the complexity of the studied systems made this task very difficult.

I believe that the thesis fulfils the requirements for a Master's degree. I hereby recommend it for further proceedings and propose to evaluate it as excellent.