



**UNIVERZITA KARLOVA**  
**Farmaceutická fakulta**  
**v Hradci Králové**

**Supervisor's report - Mgr. Michaela Kohlová**

Mgr. Michaela Kohlová finished her Master study of Healthcare Bioanalytics at the Faculty of Pharmacy, Charles University in Hradec Králové in 2011. During the last year of her master study, she has been granted by Erasmus+ for mobility programme and spent 3 months at Faculty of Pharmacy, University of Porto, preparing her Diploma project. During 2012 - 2014, she has been actively involved in research at University of Porto and cooperating laboratories, which resulted in a co-authorship of 4 impacted scientific papers. Her extended international experience in research and long-term cooperation between both Faculties of Pharmacy resulted in 2015 in agreement to prepare a Cotutelle PhD. study, under the 2 supervisors from Hradec Králové and Porto.

Therefore, Misa Kohlová started her PhD. study in 2015 in both Universities, with actually 2 supervisors - prof. Maria da Conceição Branco da Silva - with help of co-supervisor professor Alice Santos Silva - in Porto and prof. Petr Solich in Hradec Králové. She has been actively involved not only in research, but also in doctoral study at both universities equally.

The topic of her dissertation was to develop of new types of biocompatible hemodialysis membranes for separation of biomolecules. She has visited several international conferences with presentation of her scientific achievements. During her PhD. study, she has published 3 high-quality impacted scientific papers, in all of them she is a first author, and 2 of them are in Q1 journals.

There is no doubt that Misa Kohlová was a hard-working doctoral student, with high level of independence and efficiency. She has always worked diligently and conscientiously and was always pleasant in communication. She is able fluently communicate either in English, or in Portuguese language.

It is also important to mention, that this is the first Cotutelle between both Faculties of Pharmacy, at University of Porto in Portugal and Charles University in Prague in Czech Republic.

1 september 2020

prof. RNDr. Petr Solich, CSc.  
supervisor in CZ



### **Testimonial on Mgr. Michaela Kohlová**

Mgr. Michaela Kohlová has worked as PhD student at the Laboratory of Applied Chemistry, Department of Chemical Sciences, Faculty of Pharmacy, Oporto University, Oporto (Portugal), under my supervision.

Her thesis was developed in Co-tutelle regime, under a bilateral agreement between the Faculty of Pharmacy in Hradec Králové, Charles University, and the Faculty of Pharmacy, University of Porto.

The thesis, entitled “Development of new types of biocompatible haemodialysis membranes for separation of biomolecules”, includes an “Introduction”, where the general aspects of kidney disease, its related complications and treatment, are addressed, focusing on the common dialysis procedures, their beneficial and adverse effects, and on the importance of targeting the improvement of the complications associated to dialysis treatment.

Then, the “Experimental part” includes four works, in which the first refers to the development and characterization of flat sheet polysulfone membrane (PSf) for haemodialysis purposes. Different membranes with different compositions were prepared, and their separation ability was carried out using a microfluidic system, specially designed for this purpose.

A second experimental work was carried out, in which the effect of incorporating two antioxidants into the previously optimized PSf membrane was assessed. Alpha-tocopherol and lipoic acid were the used antioxidants and two methods of incorporation into the PSf membrane, namely, surface adsorption and direct incorporation into the casting solution, were studied. Physico-chemical tests were carried out to characterize the enriched PSf membranes, as well as the effect of these (isolated or combined) antioxidants on membrane separation capabilities. *In vitro* biocompatibility tests were performed with the (isolated or combined) antioxidants, when they were in solution or incorporated into PSf membrane. A third experimental work describes the development of polysulfone bioactive membranes enriched with neutrophil elastase inhibitors. These inhibitors were synthesized and purified by the Medicinal Chemistry group from Faculty of Pharmacy, University of Lisbon. Their physico-chemical characteristics were evaluated and, afterwards, the biocompatibility tests of the compounds in solution, were carried out; their capacity of incorporation into the membrane and the inhibitory

effect achieved, was also studied. The results of this work are being compiled to prepare their publication in a scientific paper.

The last work consisted of preparing a molecular imprinted polymer (MIP) for p-cresol and its incorporation into PSf membrane. The selectivity of MIP for this uremic toxin and also its effect on PSf membrane structure, was also studied. The importance of future research work to prepare MIPs for other uremic toxins with adequate selectivity is emphasized.

Finally, the “Conclusions” highlight the main results and achievements, stating that these new bioactive PSf membranes have potential for HD treatment, aiming to decrease the high morbidity and mortality in patients on HD treatment.

The student Michaela Kholová proved to be a very intelligent PhD student, always responsible, autonomous, showing high scientific standards and scientific rigor and always well integrated with her colleagues in the research team I lead.

The work she developed is interdisciplinary and resulted in three articles published in international scientific journals with peer review, eight communications at international conferences and five national ones, six of which were oral and two were published in international scientific journals.

In summary, I would like to state that the student Michaela has accomplished all the proposed goals, sometimes overcoming what was initially proposed, and for that I would like to openly invite her to stay with us in future research works.

Porto 2.9.20

Maria da Conceição Branco da Silva