

Review of the Doctoral Thesis

Title of the Doctoral Thesis: **Nanofibrous Polymer Systems for elimination of Estrogenic Hormones from Wastewater**

Submitted by: **Muhammad Yasir, M.Sc.**

Doctoral study program: **Materials Science and Engineering**

Doctoral study course: **Biomaterials and Biocomposites**

Supervisor: **prof. Ing. Vladimír Sedlařík, Ph.D.**

Consultant: **Ing. Dušan Kimmer, CSc.**

The doctoral thesis submitted by Muhammad Yasir is dealing with important and actual topic which is the pollution of water by hormones, an arising danger around the world. The work is composed of 160 pages where pages 15-56 include the theoretical introduction to the topic of doctoral thesis and methodology. This part is written quite readably and provides insight into presented issues and current methods used for purifying of wastewater as well as methods for material characterization. Despite the fact that this is a theoretical part, the student already includes part of his methodology here, which seems a bit confusing. In my point of view, I also miss the deeper insight in the current situation with wastewater treatment. On the other side, the chapter with the material characterization is comprehensive and well described. However, the most important fact is that the student has demonstrated adequate knowledge base in this part.

After the theoretical introduction, student clearly defines the motivation for the topic of his doctoral thesis. Besides the description of main aims of the thesis, the gap in the existing purification systems regarding the hormones removal is clarified.

Here, one of the four main aims is called the “Development of method for estrogenic hormones”. If this is truly a completely new methodology developed by the student, more detailed description should be provided.

The parts with methodologies, results and discussion are supported by information presented in already published manuscripts. Together these provide extensive view into the methodology the student used within the work on his doctoral thesis. It is clear, that students have to at least understand a principle of a number of characterization methods and their interpretations. As mentioned, the results of student’s work have been already published in four impacted journals. I highly appreciate that the student is main author

of all four publications with very high claimed mental share on the results. Except the main papers involved in the thesis, student is also main author of another paper which is also mentioned in the thesis and is devoted to degradation of Estriol. Moreover, he is a co-author of three more manuscripts. In total, he is an author of 8 manuscripts which is quite impressive for a Ph.D. student.

At the end of the thesis, the comprehensible conclusion takes a place. I also appreciate the clearly defined contribution to the science and future plans.

It should be also mentioned, that the text is equipped with author's "CV"; "List of publications" as well as with necessary formal items like "Lists of tables, figures and abbreviation". It should be also stated that some imperfections can be found in the text but in an amount common for the doctoral thesis.

Although I identified few weak points of doctoral thesis in previous text, it is important to notice that the thesis itself is original and concisely written. I can conclude that the thesis fulfils the criteria for the doctoral thesis and Muhammad Yasir has proven his expertise in his scientific work.

Questions:

- The complexity of study in terms of used techniques is wide. Student should clearly present which experiment was done and interpreted by himself.
- Please clarify what is meant by the development of the method compared to current state-of-the-art.
- Are developed methods (nanofibers) suitable for large industrial scale applications in wastewater treatment? What would be the main hurdles?

The submitted doctoral thesis fulfils all requirements given by Tradition, Law and by The Study and Examination Rules of Tomas Bata University in Zlín as Ph.D. qualifying paper **and therefore I recommend approval of the paper for further needful assessment.**