



THESIS EVALUATION OPPONENT EVALUATION

Author name: Ondřej Mach

Thesis title: Impacts of Cerium Dioxide Nanoparticles on Freshwater Microorganisms

Opponent: RNDr. Jaroslav Semerád, Ph.D.

Opponent workplace: Institute for Environmental Studies, Charles University

- A. Abstract quality, keywords matching Excellent (1)
- B. Research scope and processing Excellent (1)
- C. Level of theoretical part Excellent (1)
- D. Appropriateness of the methods Excellent (1)
- E. Results elaboration and discussion Excellent minus (1-)
- F. Students own contribution Excellent (1)
- G. The conclusion statement Excellent (1)
- H. Fulfillment of Thesis tasks (goals) Fulfilled
- I. Structure, correctness and fulness of references Excellent (1)
- J. Typographical and language level Excellent (1)
- K. Formal quality Excellent (1)
(text structure, chapters order, clarity of illustrations)

Comments, remarks:

- 1) Not all statements need references. The author should avoid the citation of well-known facts, e.g., p19: "according to Klaine et al. (2008), microorganisms play essential roles in the environment" or "LC50 in the concentration of toxic substance which is lethal..."
- 2) In such a thesis the corresponding values gained by one method should be presented with the same number of decimals, e.g., Table 4.1 and Table 4.2.
- 3) The discussion of some of the presented results is not appropriately expanded, e.g., chapter 4.5 Epifluorescence microscopy.

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Overall assessment:

The presented Bachelor's thesis written by Ondřej Mach is dealing with the evaluation of possible adverse effects of cerium dioxide nanoparticles on real microbial communities collected from a river. It is mainly an experimental work consisting of the results of the author's experiments. The work contains 56 pages, 79 references and is divided in 6 chapters.

This topic is certainly important from the environmental point of view and the goals of the thesis were set high. Nevertheless, the type and content of the work was chosen appropriately to fulfill the objectives of the work and goals set. The author prepared an extensive literature review, performed a sufficient number of laboratory tests and appropriately evaluated and commented the obtained data. All goals of the thesis were met within the reasonable and appropriate ranges of the proposed work.

Despite the few minor comment listed above, I found the proposed thesis to be of excellent quality. This work meets the requirements for a Bachelor's thesis and I definitely recommend it for acceptance.

Questions for the defense:

1. Is there any information about the transformation of CeO₂ NPs in wastewater treatment plants? This process could change the structure of NPs and thus the toxicity. For example, silver NPs are during this treatment process transformed into silver sulphite NPs, which are several times less harmful.
2. Metal NPs release soluble ions and many recent studies are showing that these ions could cause the majority of the adverse effects. Is this theory also applicable for CeO₂ as an example of a rare-earth metal?

Overall classification and recommendation:

Work meets the Master degree requirements and therefore I recommend it for the defense
I suggest to classify this work by grade: Excellent (1)

By signing I certify that I am not in any personal relationship with the author of the thesis

In Prague

date 3. 6. 2022

Opponent signature

