

**PhD Thesis Acceptance Report**  
**Faculty of Biology**  
**Jagiellonian University**

**Candidate's name and surname:** Zuzanna Świątek

**PhD Thesis Title:** Toxicokinetics and toxicity of zinc nanoparticles in the earthworm *Eisenia andrei*

**Thesis Supervisor:** Prof. Dr. hab. Ryszard Laskowski

**Assistant Supervisor / Second Supervisor/ Co-supervisor (if applicable):** Dr hab. Agnieszka Bednarska

**Reviewer:** José Paulo Sousa

**THESIS EVALUATION**

1. **Scientific merit of the thesis**

a. Originality of the research (25-200 words):

The thesis focus on a highly relevant topic in ecotoxicology, ie., the kinetics and toxic effects at sub-organism and organism level of Zn nanoparticles when compared to ionic Zn. Built up on existing ecotoxicological information, the thesis develops further and provide important contributions to understand key aspects on the behaviour of Zn nanoparticles when compared with its ionic congener. Therefore, I consider that the thesis comprehends original research and brings original quite relant data on this topic.

b. Scientific merit of the chapters / articles (25-200 words):

The core of the thesis, if excluding the General Introduction and the General Discussion, is composed by four chapters, three of them corresponding to scientific articles already published in high quality indexed journals. The fourth is submitted also to a high impact factor scientific journal. The four chapetrs follow a logical sequence by starting to study and compare the toxicokinetics of Zn nanoparticles and ionic ZN (chapter 2) followed by an analysis of the metabolic response of the organisms exposed to both compounds (by analysing energy reserves and cellular and organism respiration) (Chapter 3) and by analysing effects at histological level (Chapter 4), and ending a long-term experiment where effects at population level were assessed (Chapetr 5). The scientific quality of all chapters is quite high. Its quality was already been assessed during the normal publication proves of peer revision (on those 3 chapters already published), and the quality of chapter 5, although not yet published, is in the same line of those already published. The General Introduction (Chapter 1) and General Discussion (Chapter 6) have also a high scientific quality not only due to how the topic of the thesis was reviewed and presented, but how the results obtained are discussed.

2. **Substantial merit of the thesis**

*(ability to introduce the research topic and clarity of research hypotheses, the choice of research methods and statistical tools for data analysis, presentation and critical analysis of the research data, the ability to discuss research data and the theoretical background, clarity and quality of the conclusions) (25-200 words):*

As mentioned above, the research topic was well presented and well contextualized in face of the current knowledge in this area within Ecotoxicology. Moreover the general and specific objectives of the thesis are well presented. This is not only seen in the General Introduction, but also in each one of the chapters/articles. Nevertheless, I would have liked to see the working hypotheses associated with the different objectives both in the General Introduction and on each chapter/article.

The experimental approach and the statistical methods used to analyse the obtained results in each chapter/article are appropriate. I also believe that the discussion made in each chapter/article and also in the General Discussion, is also quite complete and written in a clear and comprehensive way.

3. **Layout and register**

*(layout, register and the clarity of the language, the quality of the visual material etc.)  
(25-200 words):*

The layout of the thesis is appropriate, with the different chapters following a logical sequence and “telling a coherent story”. The language is impeccable, being the thesis extremely easy to read. The quality of the graphical material is also quite high-

4. **Critical notes**

The only critical note I have, from a scientific point of view, is the lack of clear working hypotheses associate to the different objectives in each chapter/article

5. **Final grade** (justification 25-200 words):

I am not familiar with the Polish grading system, but using a qualitative grading scale, I would consider this thesis as being “Excellent” (top grade).

I, hereby, declare that the reviewed PhD thesis by **Zuzanna Świątek** meets the criteria pursuant to art. 13.1 of Act of 14 March 2003 on Academic Degrees and Academic Title and Title in the Arts (O.J. no 65 item 595 as amended) and request that the Council of the Faculty of Biology of the Jagiellonian University accepts **Zuzanna Świątek** for further stages of doctoral proceedings.

YES

I, hereby, request that the thesis is accepted with distinctions. Justification (25-200 words)

For the reasons pointed above, I believe that this thesis presents a high scientific quality, is well written and well organized, and therefore should be accepted with distinctions

YES



Reviewer's signature

Coimbra, 23 July 2020  
date

INFORMATION FOR THE REVIEWER:

1. Information on requirements concerning PhD thesis structure:  
[http://www.wb.uj.edu.pl/en\\_GB/stopnie-tytuly/doktoraty](http://www.wb.uj.edu.pl/en_GB/stopnie-tytuly/doktoraty)

2. A digital copy should be sent to:

**wydzial.biologii@uj.edu.pl**

A duly signed original should be sent to:

**Dziekanat Wydziału Biologii  
Uniwersytet Jagielloński  
ul. Gronostajowa 7  
30-387 Kraków**