



### ***Review of USB FFPW PhD thesis***

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| <b>First name(s), surname, titles of the PhD student:</b><br>Kouhsik Roy, Ph.D. | <b>First name(s), surname, titles of supervisor:</b><br>Assoc. Prof. Dipl.-Ing. Jan Mráz, Ph.D. |
| <b>Title of PhD thesis:</b><br>Circular and Sustainable Fish Nutrition          |                                                                                                 |

#### **REVIEWER:**

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| <b>Surname:</b><br>Kalous                                                      | <b>Institution:</b><br>Česká zemědělská univerzita v Praze,<br>Česká republika                                 |
| <b>Name:</b><br>Lukáš                                                          |                                                                                                                |
| <b>Titles:</b> prof.                                                           | <b>E-mail:</b> kalous@af.czu.cz                                                                                |
| <b>Please describe your professional relationship to the PhD student:</b> none | <b>Please describe your field of expertise:</b><br>aquaculture, ichthyology, invasive biology,<br>cultiuromics |

### **QUESTIONNAIRE**

#### ***Originality, scientific importance, perspectives and impacts of results presented in the PhD thesis for basic and/or applied research***

Evaluate competitiveness of the PhD thesis in the international context and compare its level with the current state of the art in the field (**extent ¼ – ½ page**):

This dissertation touches on severe global issues, which are partially political, at least in two chapters. I do not see the work as original in these topics, even though it shows interesting approaches and knowledge. But I consider the dissertation original in the specific view of contemporary aquaculture of Central Europe, from the perspective of the above-mentioned global problems. The work is competitive in an international context and reaches a high level in its results, which means that the results are published or will be published soon in high quality journals.

#### ***Elaboration of the PhD thesis, objectives of the work and deliverables***

Evaluate the overall level of elaboration of the PhD thesis (structuring of the main text, comprehensibility, logicity of the chapters and their ordering) and the originality of the selected approaches to solve the objectives; evaluate publications and whether the results described correspond to objectives of the PhD thesis (**extent ¼ – ½ page**):

In assessing the overall level of the dissertation, I have only a few comments. The structure of the first chapter is clear, except for subchapter 1.6 "Aim and objectives", which is written in past tense and is not completely clear to me. The following text "Overall, Chapters 3, 5 and 6 have contributed to the first objective. Chapters 2, 4 and 8 contributed to the second objective. Finally, Chapters 6 and 7 contributed to the third and final objective." This explanation is strange; why wasn't the order of the chapters rearranged instead? I found a few minor errors in the text, which is negligible. The text is wordy and could be written more economically since it repeats similar



ideas on various text parts.

The approaches chosen are original, and it can be concluded that the publications are in line with the given aim and objectives of the dissertation.

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### OVERALL COMMENTARY ON THE PhD THESIS

Please write in the box specific comments concerning the PhD thesis in extent of 1-2 pages:

The presented dissertation prepared by Koushik Roy under the supervision of Assoc. prof. Jan Mráz is a comprehensive work. The author has devoted a relatively large amount of energy to the compilation of the dissertation at the ideological level. The thesis consists of published papers, scientific publications, one submitted manuscript of a scientific article, and one scientific methodology. All the presented publications correspond to the defined objectives of the dissertation and its focus. In brief, they deal with the following chapters: Chapter 1 is a general introduction to the circular and sustainable approach to food production, focusing on aquaculture in the context of global policies. It places the presented dissertation in this context. Chapter 2 presents important physicochemical information for using coupled RAS and hydroponic systems. Chapter 3 deals with the fascinating topic of eutrophication of common carp ponds. Chapter 4 deals with the issue of bioflocks and provides specific information for the farming of the crayfish *Procambarus clarkii*. Chapter 5 sheds light on carp farming in ponds and its environmental impact, nutrient loading and compares carp farming with other food production sectors in Europe. Chapter 6 deals with improving resource use efficiency in the ecosystem and addressing eutrophication concerning balanced fish nutrition. Chapter 7 introduces the new "TilaFeed" database, which deals with nutrients in aquaponics, both for fish and plants. Chapter 8 is a methodology offering a database of "alternative" feed ingredients based on digestible nutrients that meet the nutrient requirements of common carp and replace fish derivatives in carp diets. Chapter 9 contains a general discussion with conclusions and other components required for the dissertation.

An extensive introduction and general discussion cover the overall work, and here I have my minor criticism of the thesis, and that is its length. I think the thesis could have been less wordy. Although the thesis is well readable, the author does repeat some information in various chapters. I appreciate the graphic additions, which to some extent speak to the author's very comprehensive approach to the issue of circularity and sustainability with overlap into global policies.

**Some detail notes:**

The graphics used in the dissertation cover is the same as in Reviews in Aquaculture call for papers. Should be mentioned the origin and author?

p.6 Earth should be with the capital letter "E".

p.6 the sentence "Nonetheless, an urgent change is needed in how we use the planet; for example, how we produce food and eat. "Although I got the meaning, it would be better to use this sentence less as proclamation and more explanatory. We need to change the quality and quantity of products we eat, not exactly how we eat.

p.9 It is rare to see the citation (author opinion); this should be understandable without citation from the context.

p.10 and further in the dissertation "Waste is not a waste but a resource in circularity." I think there is a kind of proclamation again. Waste is waste, should it be a resource. There is no waste in the totalitarianism of circularity.

p.15 I have not found the support for the following statement "The aquaculture research community feels responsible for promoting a future that would embrace circular aquaculture, adopt an aquaculture-centric bioeconomy, and find bio-based solutions in aquaculture or with aquaculture (Roy et al., 2021). The cited article (Roy, K., Turkmen S., Turchini G.M., 2021. Triggering circularity in aquaculture - an introductory virtual special issue. in Reviews in Aquaculture: Special Virtual Issue. Reviews in Aquaculture, pp. <https://onlinelibrary.wiley.com/journal/17535131>.) does not provide data for this statement.



**Question:**

I have one question, which concerns freshwater footprint. The author claims that this footprint to be much below the European limit. Please, explain in detail.

***FINAL RECOMMENDATION***

- ☒ PhD thesis can be recommended for defence
- ☐ PhD thesis can be recommended for defence with reservations
- ☐ PhD thesis cannot be recommended for defence

25.12.2021 Únětice

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Date and place

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Name and signature