



Review of USB FFPW PhD thesis

First name(s), surname, titles of the PhD student: Roman Lunda, Dipl.-Ing.	First name(s), surname, titles of supervisor: Assoc. Prof. Dipl.-Ing. Jan Mráz, Ph.D.
Title of PhD thesis: Aquaculture waste valorisation	

REVIEWER:

Surname: Kalous	Institution: Česká zemědělská univerzita v Praze, Praha, Česká republika
Name: Lukáš	
Titles: prof.	E-mail: kalous@af.czu.cz
Please describe your professional relationship to the PhD student:	Please describe your field of expertise: aquaculture, ichthyology, invasive biology, culturomics

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**):

As far as competitiveness is concerned, I can say that the PhD thesis meets the qualitative requirements. It contains novelty by including three scientific articles published in international scientific journals. Compared to the state of knowledge, I have minor reservations about the construction of the introduction, which I list below. In any case, the thesis reflects the state of knowledge in the field and is qualitatively comparable to similar doctoral theses in the world.

I consider the management and rational use of waste from aquaculture production to be an important and topical issue with regard to the principles of circular economy having meaning economically as well as biologically.

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 regard to the assessment of the overall level of the dissertation, I can state that the thesis looks serious and rather austere, lacking accompanying illustrations, if I do not count those in



copied publications. The visual quality of inserted scientific articles is bad and cannot be easily read.

The thesis topic is very broad in terms of subject matter and I discuss this in detail below. With a few exceptions, which I also list below, the text is clear and of a decent standard. I find the order of the chapters to be logical and the chapter titles to be appropriate to the content, although I can imagine the subject matter of each chapter could be discuss much more in-depth by author but I understand the limited space.

The approaches chosen in the research articles are original and accepted by the scientific community.

The presented publications and the results described in them correspond to the stated objectives of the dissertation.

OVERALL COMMENTARY ON THE PhD THESIS

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

The topic of the thesis is very broad and basically cannot be comprehensively covered without some kind of simplification, which the author has obviously applied.

The introduction in some parts sounds more like a study script.

Overall, the thesis is rather austere but with the scientific output of a good quality.

In the following, I make some specific comments on the cited text.

- *"Many countries like China, the United States (US) and European Union (EU) have proposed restricted legislations and regulations for aquaculture activities"* **I would not consider the EU to be a state, substitute it the with the more broad term entity.**
- *"many developing countries cannot afford to construct or develop wastewater treatment facilities"* **I cannot agree with this statement. If there is built a RAS in so-called "developing country", it anyway requires large investments, which often come from abroad. Failure to build a wastewater treatment plant is more a matter of legislation in the particular state and its ability to enforce environmental regulations than a matter of government investments.**
- *"Therefore, RAS is not suitable for connecting directly to another production system.."* **interestingly, you're actually answering the problem of one loop aquaponics here**
- *"With the water source enabled, RAS do not need these parts owing to economic reasons – given that water is cheaper than construction and maintenance of a denitrification unit. Nitrate reaches high concentrations in recirculating systems where nitrifying biofilters are used for ammonia (NH₃) removal."* **rewrite the sentence, it is difficult to understand**
- *"Organic carbon discharge from RAS is reduced when endogenous carbon sources originating from the fish waste are used to fuel denitrification (van Rijn et al., 2006)."* **avoid copy-paste citations of the sentences**
- *"Moreover, vermicomposting is a farmer-friendly technique, where vermicompost can be prepared from a variety of locally available plant and animal wastes without much cost, labour, or expertise"* **avoid copy-paste citations of the sentences**
- *"Our research question intervenes into this exact lacuna, trying to re-use this less*



explored by-product. In general, excess biofloc biomass can be re-used in various ways, e.g. use of biomass in sewage treatment, as a microbial protein, fertilizer or inoculum to start a new system (van Rijn, 2013)“. **This is misleading sentence and citation, it was obviously not your research question but readers may get the meaning differently.**

- *“However, horticulture by greenhouses - with its huge crop production per square meter of land, less water consumption, and possibilities of placement in the town centre, is the only way to feed the Earth’s expected 10 billion people in a sustainable way (Attenborough, 2020).”* **Although I am also fan of David Attenborough, I would not use this citation in the context. This is about the visions you should work with approved data.**
- The paper of Roman Lunda first-authorship 50% „Understanding nutrient throughput of operational RAS farm effluents to support semi–commercial aquaponics: Easy upgrade possible beyond controversies. **Is well design and important paper bringing desperately needed knowledge into aquaponic hype.**
- The paper of 15% contribution of Roman Lunda is „Vermicomposting of sludge from recirculating aquaculture system using Eisenia andrei: Technological feasibility and quality assessment of end–products. **Vermicomposting is a great opportunity for reuse of organic matter. Information are very well presented and article collected more 20 citations.**
- The paper of first-authorship with 50% contribution. Recycling biofloc waste as novel protein source for crayfish with special reference to crayfish nutritional standards and growth trajectory. **Crayfish is an interesting model to aquaculture and the article brings knowledge regarding feeding on a potentially new resource.**

Question:

- 1)What do you think is behind the hype around aquaponics? Can you provide some examples?
- 2) Can you tell us something about the elimination of unpleasant odours when using Vermicomposting?

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

12.7.2021 Únětice

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Date and place



Lukáš Kalous

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Name and signature