



Review of USB FFPW PhD thesis

First name(s), surname, titles of the PhD student: Koushik Roy, M.Sc.	First name(s), surname, titles of supervisor: Assoc. Prof. Dipl.-Ing. Jan Mráz, Ph.D.
Title of PhD thesis: Circular and Sustainable Fish Nutrition	

REVIEWER:

Surname: Kloas	Institution: IGB, Berlin, Germany
Name: Werner	
Titles: Prof. Dr. rer. nat.	E-mail: werner.kloas@igb-berlin.de
Please describe your professional relationship to the PhD student: Roy Koushik performed a 4-day visit at our department	Please describe your field of expertise: <i>Animal Physiology, Endocrinology, Ecotoxicology, Sustainable Aquaculture, Aquaponics</i>

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**):

The PhD thesis of Koushik Roy entitled “Circular and Sustainable Fish Nutrition” is providing excellent insights concerning future directions to develop and enhance sustainability for fish aquaculture by focussing on fish nutrition (including excretion) as a tool to foster circular bioeconomy for providing food security on a global scale. The PhD thesis of Mr. Roy is based on four publications and two submitted excellent manuscripts to internationally esteemed journals and one book chapter providing advices how to use alternative feed resources in aquaculture. The submitted cumulative PhD thesis contains a very well written general introduction and is well structured concerning its chapter contents and is followed by an excellent discussion considering all recent literature in a well balanced way. Furthermore the work of Mr. Roy provides not only important original research but also implications for recent and future practice towards sustainability of aquaculture triggered by fish nutrition. Next to the submitted PhD thesis Mr. Roy is also internationally already recognized due to his outstanding research concerning overarching review papers concerning the topic of circular and sustainable fish nutrition. Taken together his presented PhD thesis and his research is also at an international level outstanding and in Germany he could be only rated as excellent getting the best grade „summa cum laude“.



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**):

The cumulative PhD thesis of Mr. Roy is a very well chosen selection of his research being logically very well presented. His dissertation aims at circular and sustainable applications of fish nutrition (including excretion) to improve resource utilization efficiency of aqua food systems. These objectives have been addressed by multidisciplinary approaches and point out future directions to embrace circular blue-based (fisheries and aquaculture centric) bioeconomy and environmental sustainability. The general introduction is providing the state-of-the-art knowledge and an overarching hypothesis about fish nutrition towards sustainability and his selected chapters are building on each other addressing very well the scientific hypotheses put forward followed by an excellent general discussion. The PhD thesis presented is concerning its scientific content as well as its formal presentation an excellent paper.

OVERALL COMMENTARY ON THE PhD THESIS

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

The cumulative PhD thesis of Mr. Roy entitled “Circular and Sustainable Fish Nutrition” is an excellent selection of his research and contains only some parts of his publications being logically very well presented. His dissertation aims at circular and sustainable applications of fish nutrition (including excretion) to improve resource utilization efficiency of aqua food systems. These objectives have been addressed by multidisciplinary approaches and point out future directions to embrace circular blue-based (fisheries and aquaculture centric) bioeconomy and environmental sustainability. The general introduction is providing the state-of-the-art knowledge and an overarching hypothesis about fish nutrition towards sustainability. Here the overarching hypothesis as well as implications for recent and future research concerning sustainability of aquaculture triggered by aquaculture feed and rearing systems, e.g. closed recirculation systems and aquaponics. The seven selected research chapters representing each an already published or submitted paper are building on each other addressing very well the scientific hypotheses put forward and that presentation of research chapters is excellent to correspond to the objectives formulated for that thesis. The final chapter as a general discussion proves again the high scientific level Mr. Roy is putting forward and is assessing his research in the context to the international available literature in an outstanding manner. It should be



mentioned in order to honor the scientific merits of Mr. Roy that he did not put together all his research outcome he received during his PhD period and left out some of his intriguing publications. This selection of the best fitting papers makes the overall PhD thesis very stringent and scientifically sound and clear and thus I have to say that in this case less (papers included) is more. It is enjoyable to review such an outstanding PhD thesis due to its scientifically logic and important content. There is no objection at all or any minor point for criticism concerning this PhD thesis and it has to be rated as an outstanding piece of research making pace for important future developments of sustainable aquaculture focusing on the potentially main aspect fish nutrition.

FINAL RECOMMENDATION

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

4th January 2022, Berlin

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Date and place

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Name and signature