Fakulta rybářství
a ochrany vod
Faculty of Fisheries
and Protection
of Waters

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice
Czech Republic

Confidential

Review of USB FFPW PhD Thesis

First name(s), surname, titles of the PhD student: Tomas Zajic, Dipl.-Ing.	**First name(s), surname, titles of supervisor:** doc. Dr. Jana Pickova
Title of PhD thesis: Impact of production systems on lipid quality of common carp (*Cyprinus carpio*)	

REVIEWER:

Surname: Trattner	**Institution:** Inst för vilt, fisk och miljö Skogsmarksgränd 901 83 UMEÅ Sweden
Name: Sofia	
Titles: Ph.D.	**E-mail:** sofia.trattner@slu.se
Please describe your professional relationship to the PhD student: We met in Aquaculture, September, 2012 and at SLU, Uppsala. But we have never been working together.	**Please describe your field of expertise:** I have been working with lipid and gene expression analysis in fish fed different diets. The main focus has been n-3 fatty acid metabolism.

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 theses and the paper included in this work are of high international level. The methods used are similar to other leading groups working in this field. The hypotheses are also relevant with a holistic approach covering the hole chain from fish feed to the quality of fish as food including cooking methods. The holistic approach is to my opinion an exceptional interesting set up unique for this thesis. The author has a deep understanding on his research both in terms of fish nutrition and human nutrition.

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, logicality 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 work has a clear structure easy to follow. Firstly it gives a breath introduction to the field and is then focused on the key questions of the thesis. It is a well structured and logic main text with a clear over all aim and specific sub goals, which are addressed in paper I-IV. The aim to increase levels of n-3 fatty acids in common carp, has many advantages for public health. The authors have a number of innovative solutions for this e.g. finishing feeding, purging and evaluation of cooking methods. I think it is important, as described in the thesis to understand the metabolism of lipids and how one could interfere with the lipid metabolism. The studies included in this thesis are closely related to the aim of the thesis. The thesis is well describing the research, hypotheses and solutions, but it is still structured with a good comprehensibility.

OVERALL COMMENTARY ON THE PhD THESIS

The thesis is focusing on a research topic, which has a word-wide importance and also the results in this study will contribute to improve the knowledge among researchers in this area. In fact the author is covering several, today very important topics such as sustainable production, increased levels of n-3 fatty acids in human foods and also the aspect how processing and cooking methods are affecting the nutritional value of the product.

Farmed fish is a suitable way to produce of healthy n-3 fatty acids for humans. This thesis focuses on common carp which is interesting to study since it is an omnivorous species that could be well suited for vegetable based diets and possibly has the capacity to synthesise long chain omega-3 fatty acids. As describe in this thesis this is an important question as the raw material for fish dies based on fish oil and fish meal is limited. It is interesting to study the biochemical changes in the fish lipid metabolism and to relate that to optimal feeding and purging methods for production of fish with a high lipid quality. Further it is interesting to study cooking method and its effects on the final product to be consumed. The studies are well controlled with a good study design and clear hypotheses. Over all I think that the author has described and studied the key points in the chain from fish diet to fish as human food.

However I have some comments:

In capture 2.2.2, starting with commenting on the possibilities of ruminants to elongate and desaturase fatty acids. To me this is out of the scope of the thesis. Further the comparison to pigs is irrelevant for this thesis on fish and fatty acid metabolism in fish. If this comments on ruminant and pigs should be in the theses, than the author should also need to explain for the reader how this is related to the present study.

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As described in paper II, natural feed (plankton and benthos) would be the cheapes wat to achive a high proportion of n3-HUFA. On the other hand it is stated that it has lower economic benefits for the farmer. Do this statement incude a calculated higher price for the fish fed natural feed and a lower price for fish diet or is the statement only based on production volume?

It is suggested that the increased SAFA content in carp fried in butter increases the cholesterol content in the blood of the consumer. Is that regardless of other dietary components. If you have a generally low intake of SAFA would carp fried in butter still contribute to increased cholesterol level or is this only true if you allready have a high intake of SAFA? Has it ever been tested if carp fried in butter increases the blood cholesterol? Could it be that other components in the fish e.g. peptides have positive effects that decrese the effects of the SAFA in fish fried in butter?

FINAL RECOMMENDATION

x **PhD Thesis can be recommended for defence**
☐ **PhD Thesis can be recommended with reservations for defence**
☐ **PhD Thesis can not be recommended for defence**

2013-06-04 Nyköping, Sweden
Date and place

SOFIA TRATTNER
Sofia Trattner
Name and signature

Confidential

Review of USB FFPW PhD Thesis

First name(s), surname, titles of the PhD student: Tomáš Zajíc, Ing.	**First name(s), surname, titles of supervisor:** doc. Dr. Jana Picková
Title of PhD thesis: Impact of production systems on lipid quality of common carp (*Cyprinus carpio*)	

REVIEWER:

Surname: Dostálová	**Institution:** Vysoká škola chemicko-technologická v Praze Technická 5 166 28 Praha 6 – Dejvice
Name: Jana	
Titles: Prof. Ing., CSc.	**E-mail:** jana.dostalova@vscht.cz
Please describe your professional relationship to the PhD student: I have no professional relationship	**Please describe your field of expertise:** **Nutrition, food composition and analysis, oxidation changes of fats**

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 theme of reviewed PhD thesis is original, has high scientific importance in the international context and high impact of results for basic and applied research as well. The obtained results of research, namely the proposal of feeding strategy for the production of common carp with tailored flesh fatty acids composition, are very useful and when applied to farming of common carp can contribute to increasing of EPA and DHA intake by Czech population, which is low due to very low seawater fish consumption. The consumption of such fish with tailored fatty acid composition is useful not only for cardiovascular diseases prevention and treatment but for support local fish producers. The further positive factor is usage of rapeseed and linseed pellet as feed supplementation because raw materials are from domestic production.

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, logicality 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 level of elaboration of the reviewed PhD thesis is high. Main part of the PhD thesis present published papers or papers prepared for publication. Two from included papers were published in peer reviewed journals with IF (author of PhD thesis is in one from them as first author). Results described in the papers correspond to objectives of the PhD thesis.

OVERALL COMMENTARY ON THE PhD THESIS

Please write comments in extent of 1-2 pages:

My comments are as follows:

- Pg. 13 - as sources of ALA are named: leafy vegetables, flaxseeds and vegetable oils. Important source of ALA are also nuts. On the other hand some vegetable oils are not source of ALA e.g. sunflower oil, which is consumed in Czech Republic in high quantities and olive oil as well.
- Pg. 13 - consumption of EPA and DHA in Czech Republic should be mention, because some authors do not include Czech Republic into Western countries.
- Why was chosen the method lipid extraction according to Hara & Radin? Why was used the some method for the extraction from fish fillet and feed samples, when the composition of samples is very different (content of water, carbohydrates etc.)?
- Oxidation changes of lipids in the fresh fillets, the fried fillets and the fresh fats and oils were evaluated by TBARS determination. The TBARS determination is not appropriate methods for the oxidative changes determination in frying media, because many arising compounds are not with this method detected e.g. almost all carbonyl compounds, oligomers and polymers of lipids etc. The determination of the anisidine value, conjugated dienes and trienes contents by UV spectrophotometry and polymeric lipids is recommended for evaluation changes in oils after frying and in fat of fried foods.
- In the Czech summary the term "trojobal" or "panada" should be used instead of "strouhanka".
- Were you interested in economic efficiency of new feeding strategy (ratio between quality and costs) as well?
- Will be carps with tailored fatty acids composition on the Czech market?

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FINAL RECOMMENDATION

X PhD Thesis can be recommended for defence
☐ PhD Thesis can be recommended with reservations for defence
☐ PhD Thesis can not be recommended for defence

20.7.2013, Prague, Czech Republic
.....
Date and place

Prof. Jana Dostálová
.....
Name and signature