

**University of South Bohemia in České Budějovice
Faculty of Fisheries and Protection of Waters
Institute of Aquaculture**

Branišovská 1645/31a, 370 05 České Budějovice, Czech Republic
☎ +420 389 032 735 e-mail: studijni@frov.jcu.cz VAT: CZ60076658

Confidential

Review of USB FFPW PhD Thesis

Surname of the PhD student: Ing. Jan Mráz	Name of supervisor: Prof. Jana Picková, Ph.D.
Title of PhD thesis: Improvement of fatty acid composition in common carp (Cyprinus Carpio)	

REVIEWER:

Surname: Samples	Institution: Swedish university of Agriculture Sciences, Department of Food Science, Sweden
Name: Sabine	
Titles: Ph.D.	E-mail: sabine.sampels@slu.se
Please describe your professional relationship to the PhD student: None, I was partly payed by SLU for some time but I was working on a project in Norway at the time.	Please describe your field of expertise: Fatty acids in meat an fish, lipid nutritional value of animal foods, effect of feeding and processing, analytics of lipids and antioxidants,

QUESTIONNAIRE

Originality, scientific importance, prospects of the PhD thesis and benefits for basic or applied research

Evaluate its competitiveness in the international context and compare its level with the current state of the art in the field:

The thesis has a high level of scientific importance. The methods used are all at the top of scientific methods. The benefits of the thesis are clearly a higher understanding and knowledge of fatty acid metabolism in carp and the possible use of this in Eastern Europe quiet common species as a potent n-3 rich food item.

Compared in an international context the work is of high quality. There is not much research done on carp yet and among the work published it is a novel aspect to work with bioactive compounds and n-3 rich vegetable sources.

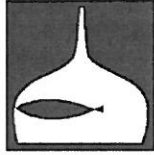
Preparation of the PhD thesis, targets of the work and deliverables

Evaluate the overall level of preparation of the PhD thesis and the originality of the selected approaches; evaluate publications and whether the targets set in the PhD thesis correspond with the declared purpose of the thesis:

The design is of good quality even if I think it would have been more logic to have paper III done before paper II. I think the logic way would have been to first test what difference the adding of n-3 sources like rapeseed and linseed would make and then test if a bioactive component like sesamin would have an additional effect. Also I think the manuscript named in the end about using of finishing feeding quality should have been added. Then instead the one about salmon could have been omitted. The rationale to evaluate factors influencing lipid composition in carp would have been clearer followed than. However the question of the mechanisms and the effect of different bioactive compounds is very interesting and with the results from study II it is understandable that the group wanted to understand especially the effect of sesamin and episesamin. This shows also a great openness and flexibility of the research group that they acted upon the results of their work.

Nevertheless the declared purpose namely to evaluate factors influencing lipid composition in common carp muscle is reached.

The approaches used to reach the goal are generally good and thinking especially of paper II quite original in so to say take 2 steps in one b adding a n-3 rich vegetable source to the feed and a novel bioactive compound. It also shows a great resourcefulness to start to test several compounds on an *in vitro* model before going back to *in vivo* studies again, which I hope the author will get a chance for.



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OVERALL COMMENTARY ON THE PhD THESIS

Please write comments:

The thesis is of high quality and written very clearly and easy to understand. There are a small number of mistakes, but they have no impact on the overall high quality.

As I mentioned before I would have chosen a different order of the work to bring the rationale more to the point. I think it is a pity that the named manuscripts especially the one about finishing feeding strategy are not included. It would have been more towards the declared goals of the thesis than the included paper on salmon hepatocytes. Reading the specific objectives one can assume that the course of work was changed during the work due to the upcoming results. This shows a very positive creativeness, however the salmon paper is a bit outside the original goal. I think it could have been added as an additional outcome.

The author has already two additional publications in preparation, which shows a great engagement. In addition this work seems to be very good designed as one of the manuscripts named is about the effect of carp consumption on patients after cardiovascular revascularisation, which is the next step after improving the n-3 content in carp.

FINAL RECOMMENDATION

- can be recommended for defence of PhD Thesis
- can be recommended with reservations for defence of PhD Thesis
- can not be recommended for defence of PhD Thesis

.....Waldniel, 25th of May 2011...
Date and place

Sabine Sampels.....
Surname and signature



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Review of USB FFPW PhD Thesis

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Title of PhD thesis: Improvement of fatty acid composition in common carp (<i>Cyprinus Carpio</i>)	

REVIEWER:

Surname: Hajšlová	Institution: Vysoká škola chemicko-technologická v Praze (Institute of Chemical Technology in Prague)
Name: Jana	
Titles: prof. Ing., CSc.	E-mail: Jana.Hajslova@vscht.cz
Please describe your professional relationship to the PhD student: I do not have any personal relationship with Mr. Jan Mráz. I met his name on occasion of reading his scientific papers relevant to my field.	Please describe your field of expertise: My background is: food / feed analysis, food chemistry and food safety, environmental monitoring

QUESTIONNAIRE

Originality, scientific importance, prospects of the PhD thesis and benefits for basic or applied research

Studies concerned with the impact of feeding strategies on a quality of common carp, including description of fatty acids profiles, have been already published by several research teams, including those from the Czech Republic. It should be mentioned, however, that none of these studies has been performed in such comprehensive way, addressing a wide range of relevant aspects including the impact of 'non-traditional', biologically active compounds on regulation of molecular mechanisms at different levels of lipids uptake and biotransformation. The originality of results obtained within this thesis is highly appreciated; several challenges for follow up interdisciplinary research on production of 'healthy' carp have been generated.

Evaluate its competitiveness in the international context and compare its level with the current state of the art in the field:

Common carp (*Cyprinus carpio*) represents a widespread fish species, cultured in many countries around the world. Long term tradition together with economic point of view makes carp the most important fish species in the Czech Republic. Thanks to established international collaboration, under supervision of a highly regarded expert in the field of animal food science, Prof. Jana Picková, Ph.D., the research has resulted in several highly interesting outputs which may find practical applications contributing to eventually increase per capita production and consumption

Preparation of the PhD thesis, targets of the work and deliverables

Evaluate the overall level of preparation of the PhD thesis and the originality of the selected approaches; evaluate publications and whether the targets set in the PhD thesis correspond with the declared purpose of the thesis:

This PhD thesis has been prepared at a high professional level. In the introductory Chapter 1, based on the recent scientific knowledge, state of the art in relevant areas is provided. A detailed description / discussion of experimental work is presented in following Chapters 2 – 5. The results are summarized in two published manuscripts (accessible at the Web of Science, Mr. Mráz as the first author) and other two, either submitted (Chapter 4) or prepared for submission (Chapter 5) are presented. The declared purpose of PhD thesis has been fully met, new information on factors influencing lipids content and composition in common carp muscle has been obtained.



OVERALL COMMENTARY ON THE PhD THESIS

Please write comments:

The thesis is concerned with a very challenging topic in the aquaculture sector. The research and development have focused on obtaining novel knowledge on feeding strategies in carp production that may allow to achieve better highly unsaturated fatty acids, HUFA, profile. With regards to low dietary intake of n-3 FA, including EPA and DHA, by Czech population, the availability of 'improved' carp at the market may contribute to some improvement of healthy eating. On occasion of thesis defence, may I propose following points for discussion:

(i) Contrary to many other studies reporting on fatty acids profiles in carp tissues, in this thesis, TLC fractionation of lipids was carried out prior to analysis. On this account, distribution of target biologically active compounds could be better characterized. Nowadays, lipidomics (sub-discipline of 'metabolomics'), is the emerging field of systems-level analysis of lipids and factors that interact with them. What is author's opinion about challenges offered by application of lipidomics in the field of his scientific interest? Which modern analytical tools are foreseen for this type of research?

(ii) Rape seed was used as a component of supplementary feed. Compared to wheat, rather lower weight gain in rapeseed supplemented fish groups was observed. Since *Brassicaceae* plants, like rape seeds, contain glucosinolates, my question is whether the intake of some toxic products originated through their degradation products of these plant secondary metabolites (such as isothiocyanates and vinyl thio-oxazolidone) might have some deleterious effect on fish growth performance. Of course, toxic effects depend on the exposure dose...

(iii) In the Chapter 4, the use of rape seed / linseed mixture for fish feed supplementation is reported as very promising in terms of favourable fatty acids composition. It is not clear in which form the linseed was used. As far as it were seeds, then also a range of natural biologically active compounds become a component of feed. Among them, phytoestrogens such secoisolariciresinol and matairesinol; carotenoid lutein; cyanogenic glycosides such as linustatin, neolinustatin, linamarin are the most abundant. Is there any conceivable impact of these compounds on fish? On the other hand, the use of pure (highly unsaturated) linseed oil might become an oxidative stability issue....In this context, also discussion concerned with antioxidants intake and autoxidation processes in 'improved' carp could be interesting...

FINAL RECOMMENDATION

- can be recommended for defence of PhD Thesis
 can be recommended with reservations for defence of PhD Thesis
 can not be recommended for defence of PhD Thesis

1.6.2011 PRAHE

Date and place

HARŠILO Hajný

Surname and signature