

The effects of dietary long chain essential fatty acids on growth and stress tolerance in pikeperch larvae (*Stizostedion lucioperca* L.)

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Experimental setup



T. 6

T. 1

Treatment 1 – 100 % Fish oil

T. 5

T. 2

Treatment 2 – 100 % Olive oil

T. 4

T. 3

Treatment 3 – 49% Olive oil, 20% ARA, 20% EPA

T. 3

T. 4

Treatment 4 – 49% Olive oil, 20% ARA, 20% DHA

T. 2

T. 5

Treatment 5 – 49% Olive oil, 20% EPA, 20%DHA

T. 1

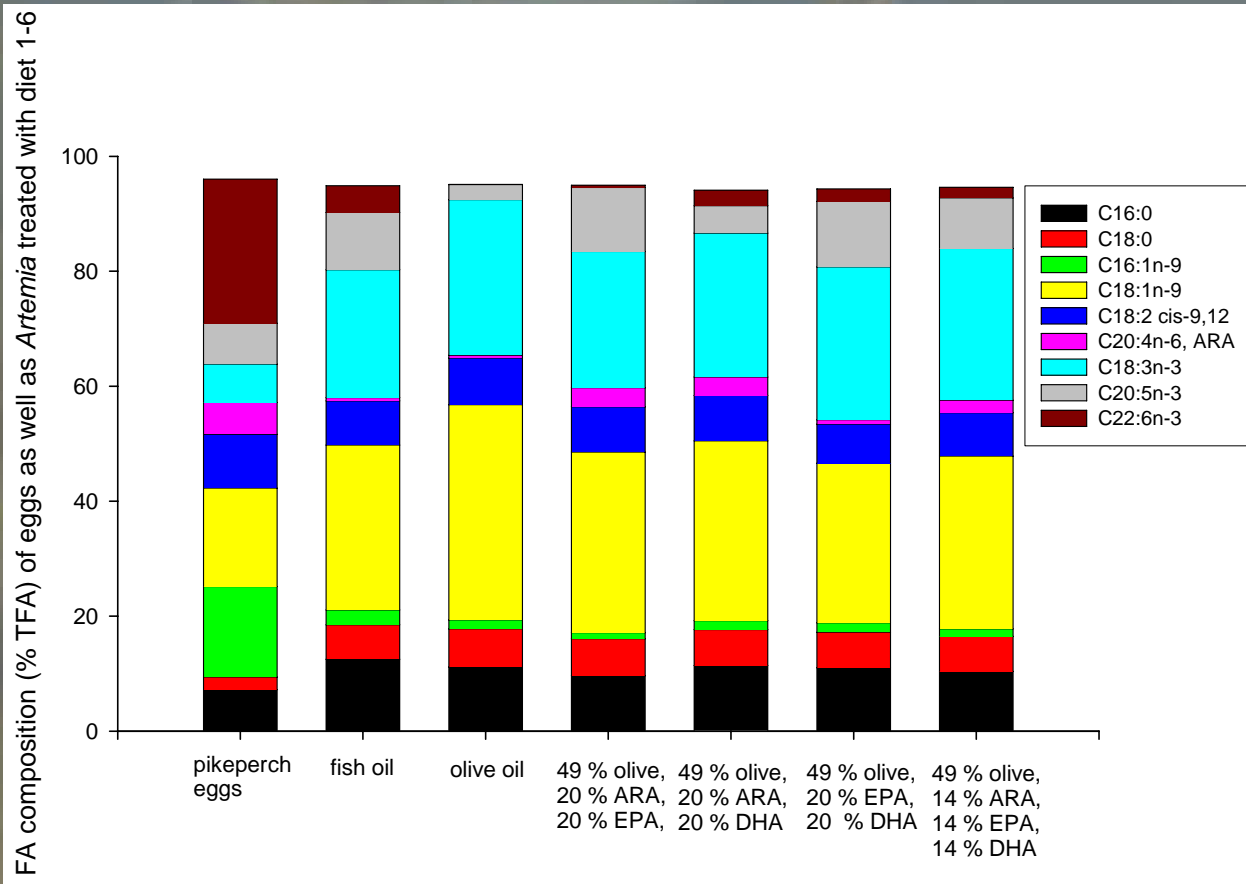
T. 6

Treatment 6 – 49% Olive oil, 14% ARA, 14%EPA, 14%DHA



Results

Fatty acid composition of eggs and live feed

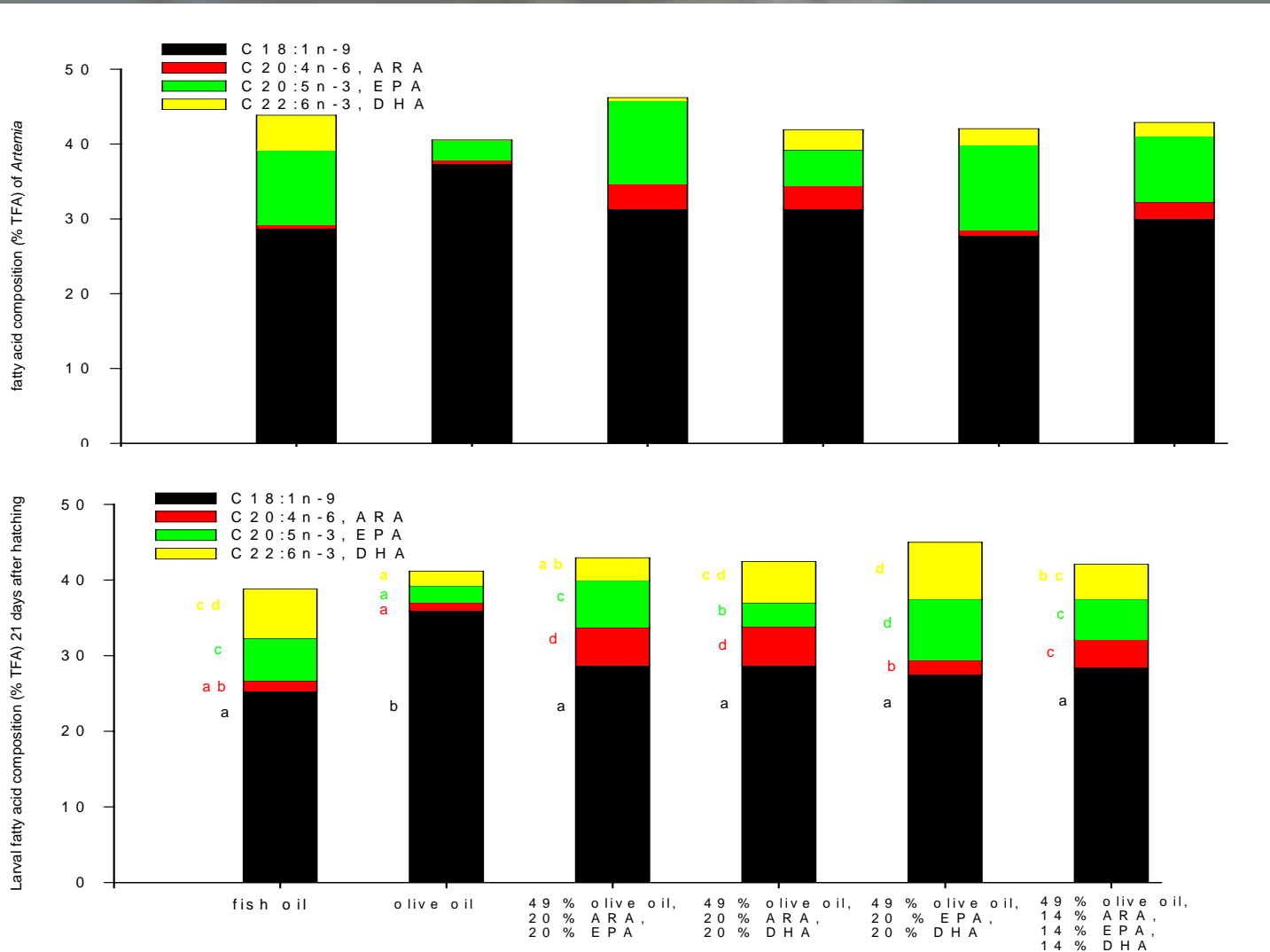


- Relatively high level of DHA in eggs
- Live feed FA compositions were quite different from the composition of eggs



Results

Contents of central fatty acids in enriched Artemia and larvae



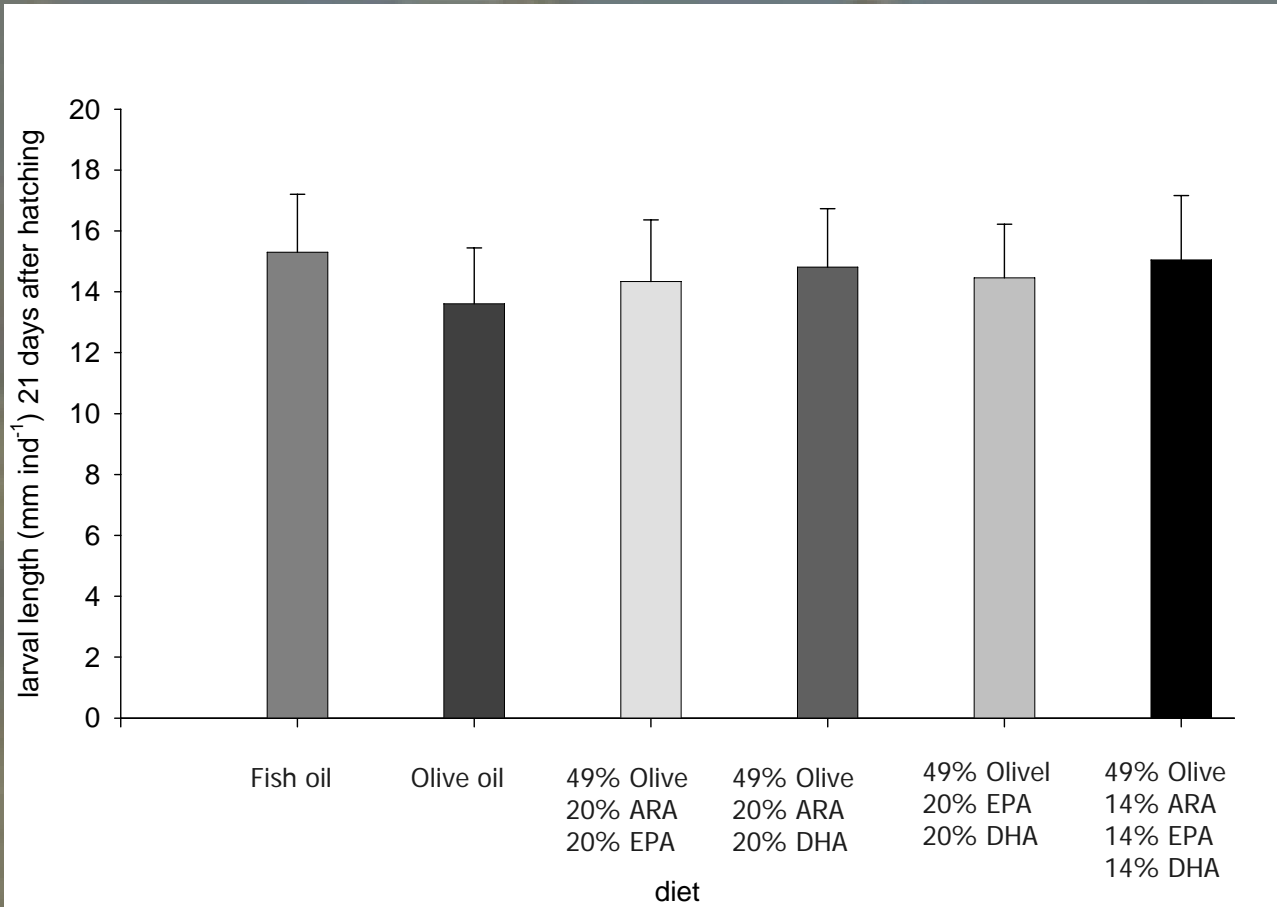
- Larval fatty acid composition did reflect dietary contents

- Significant Differences between Larval fatty Acid contents were Present on day 21



Results

Larval lengths on day 21 after hatching

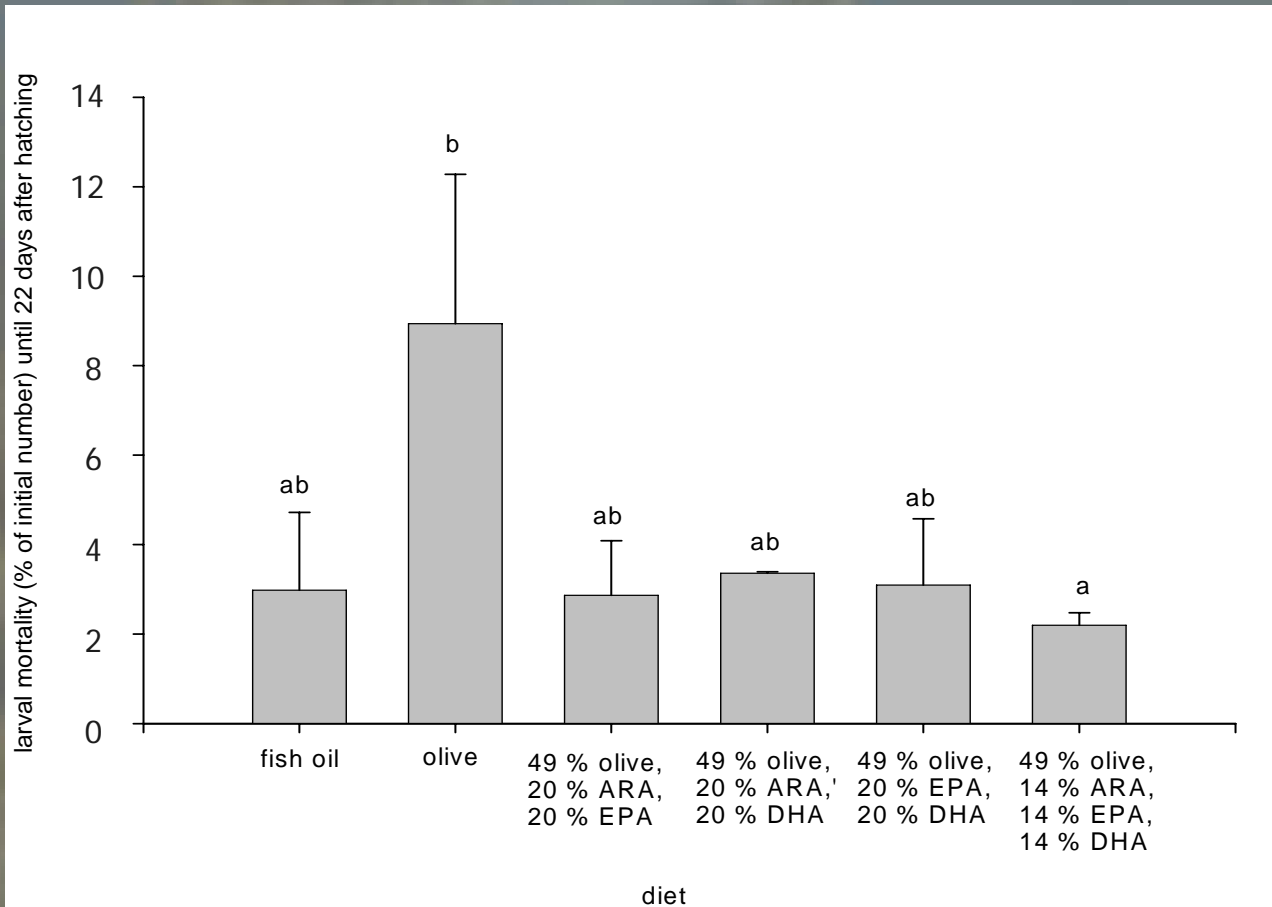


• Larval lengths on day 21 were not different and Therefore not affected by dietary contents of fatty acids



Results

Larval mortality pattern till day 22 after hatching

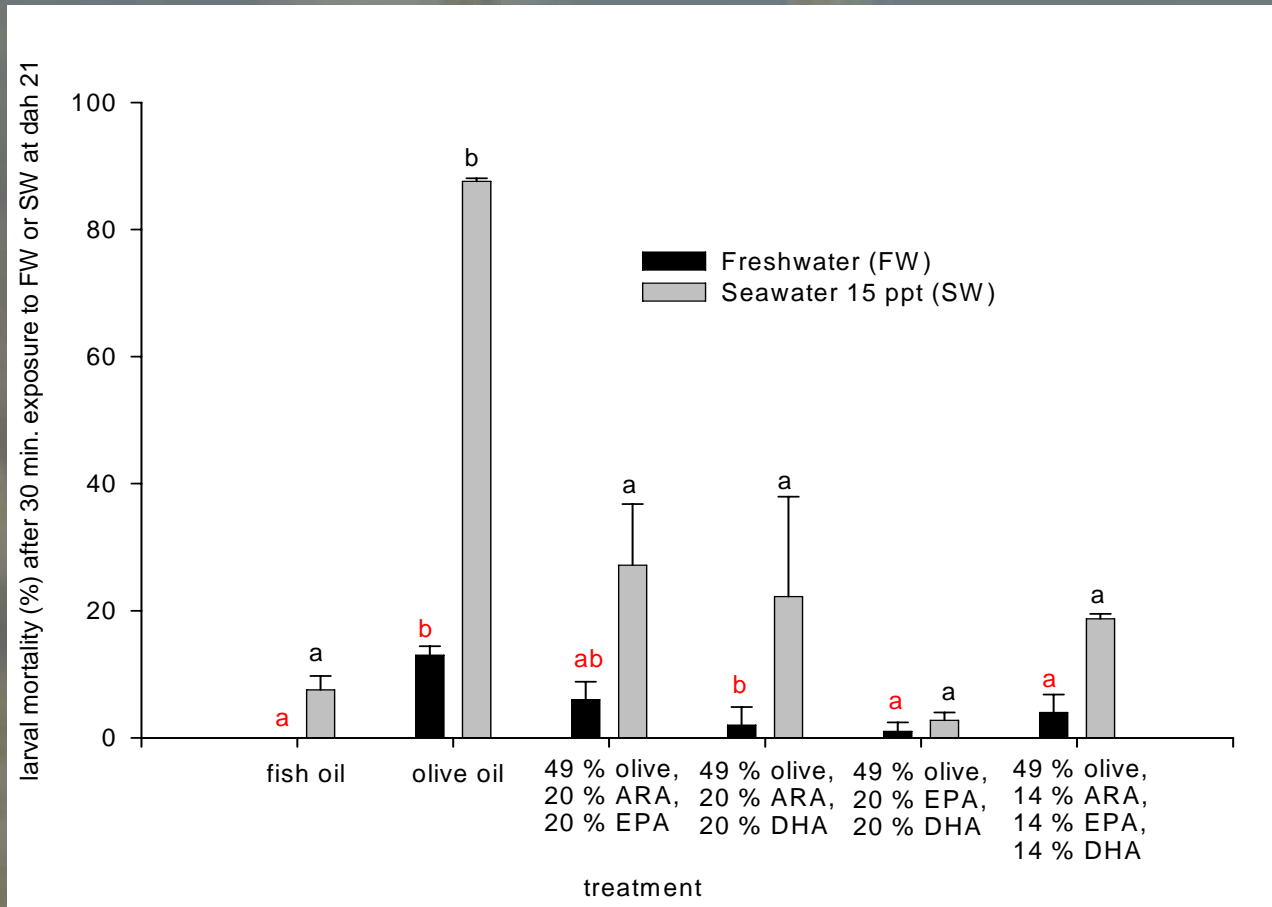


- Mortality till day 22 seemed higher in larvae fed Artemia enriched by olive oil



Results

Larval mortality during stress tests

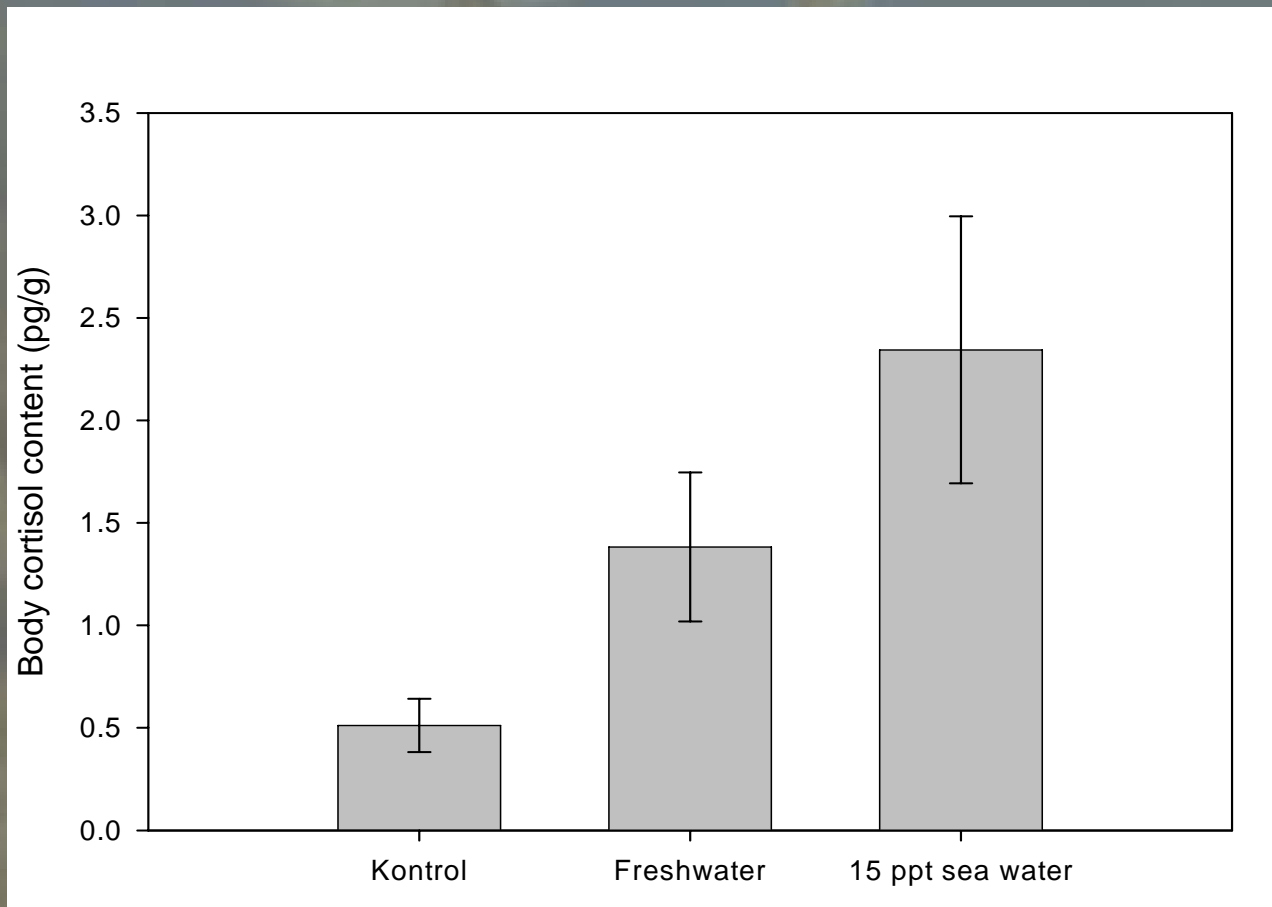


- Mortality in the 15 ppt salinity stress test was highest (and very high), in the Larval group fed Artemia Enriched by olive oil



Results

Whole body cortisol contents in stress treatments

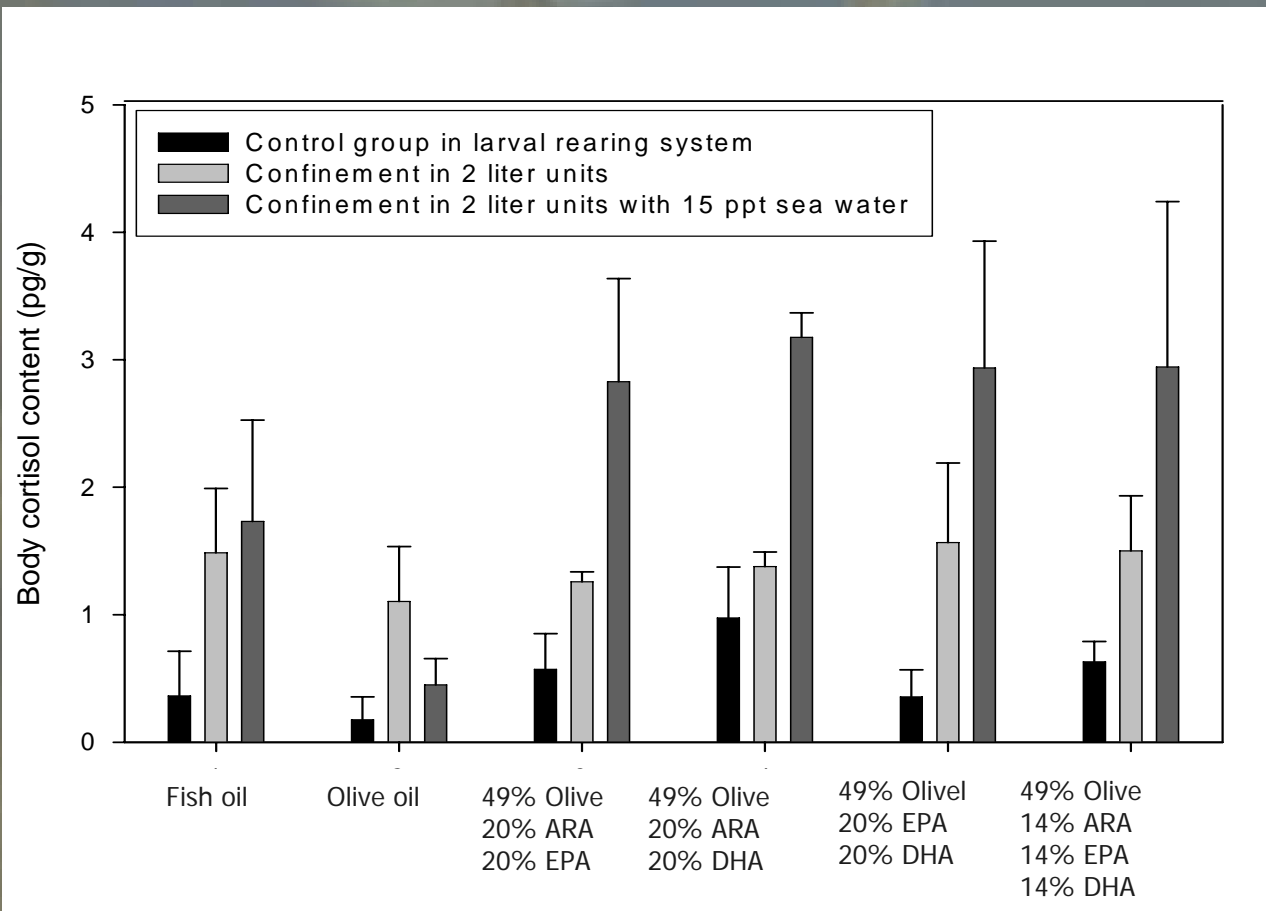


- Cortisol contents was increased by confinement in 2 litre units; and further Increased by confined in 15 ppt sea water



Results

Whole body cortisol contents in larvae in relation to diet



- Body cortisol content was only different in the group fed Artemia enriched By olive oil; and stressed in the 15 ppt stress test

- Body cortisol content was lowest in fish fed Artemia enriched with olive oil



Conclusion

- Pikeperch larvae seems not to have high nutritional demands, compared to marine fish species
- Dietary contents of essential HUFAs in diets were reflected in larvae
- Larval growth was not affected by dietary compositions of essential fatty acids
- Larval mortality was affected by enrichment by olive oil, both in the larval rearing tanks and in the salinity stress test
- Whole body cortisol content did increase when larvae were confined in 2 litre units, and was highest when confined in 2 litre units with 15 ppt sea water
- Cortisol content seemed lowest in the fish fed Artemia enriched by olive oil; indicating a more complex relationship between diet and cortisol release

DTU

National Institute for Aquatic Resources

Section for Aquaculture



Danish Technical University





Scope of the experiment

- The overall Danish strategy of pikeperch larval rearing, is to implement the methodology of larval rearing techniques, used in rearing of marine larvae
- Much effort is put into fulfilment of nutritional demands of marine fish larvae – We did this experiment as a sort of screening experiment; to see if changes in HUFA compositions would affect pikeperch larvae
- Fatty acid analysis were used to support evaluation of the data
- The effects were measured as:
 - Growth and survival in the larval rearing system
 - Stress tolerance after confinement in 2 litres units with culture water or with 15 ppt sea water
 - Stress tolerance was measured as
 - Survival after 30 minutes
 - Body cortisol content after 30 minutes



Introduction



Scope of the experiment



Experimental setup



Results



Conclusion



Introduction

- Production of new species is on the agenda in Denmark
- A target has been set:
An annual production of 10.000 t. new species should be established by year 2015
- The Danish producers organisation (Danish Aquaculture) has recently selected Pikeperch as the most promising species, to base a research/development effort on.
- DTU-Aqua is currently involved in a project on pikeperch in cooperation with Aquapri A/S
- The following is a presentation of results from this first rearing trial at DTU-Aqua's facilities at the North Sea Center in Hirtshals

2D Graph 2

