

Ph.D. course in
Physical and biochemical methods
for analysis of fish as food

17th – 21st November 2008

This course is now announced for the seventh time. The aim of the course is to provide insight into the state of the art laboratory techniques that are recommended for analysis of fish muscle composition and post mortem changes.

The course is arranged by DTU Aqua, The National Institute of Aquatic Resources, at the Technical University of Denmark. It comprises 5 days of [exercises](#), from 17 November at 9:00 to 21 November at 17:00, covering a variety of advanced methods to study fish muscle composition and *post mortem* processes:

- [Water pools and their mobility in fish muscle tissue. Correlation to muscle proteins.](#)
- [Activity of the TMAO aldolase enzyme: Accumulation of formaldehyde and dimethylamine.](#)
- [Lipid and protein oxidation during frozen storage of fatty fish.](#)
- [Proteome analysis of fish muscle.](#)

Participation: The course is preferentially intended for Ph.D. students but open to others in case of vacancy. The number of participants is restricted to 12.

Deadline for application to the course: 26 September 2008.

Teachers:

[Bo M. Jørgensen](#), [Caroline Baron](#), [Henrik Hauch Nielsen](#) and [Flemming Jessen](#)
(DTU Aqua, Department of Seafood Research)

Place:

DTU Aqua, Søtofts Plads, Build. 221, Kgs.Lyngby, Denmark.

Ph.D. course fee: 200 EUR (not including the accommodation).

Preregistration:

To be included on a mailing list for future announcements, information on accommodation and final registration, please e-mail to [Ms. Alice Jensen](#), DTU Aqua.

Points: 3 ECTS

Contact:

Ms. Alice Jensen
DTU Aqua
Dept. of Seafood Research
Søtofts Plads, Building 221
DK-2800 Kgs.Lyngby
Denmark

E-mail: aj@aqua.dtu.dk

Tel: +45 4525 2581; Fax: +45 4588 4774

The exercises:

Water pools and their mobility in fish muscle tissue. Correlation to muscle proteins.

The change in muscle water distribution during storage of cod is studied by low-field ¹H NMR transverse relaxation and multivariate (3-way) data analysis. The amount of bound water is correlated to the amount of muscle protein that can be denatured during heating in a calorimeter.

Methods

- Water pools and relaxation times [Nuclear Magnetic Resonance (NMR) spectrometry]
- Protein denaturation [Differential Scanning Calorimetry (DSC)]
- 2D data analysis [Principal Component Analysis (PCA); Partial Least Squares regression (PLS)]
- 3D data analysis [Parallel Factor Analysis (PARAFAC)]

Activity of the TMAO aldolase enzyme: Accumulation of formaldehyde and dimethylamine.

The dependence of the presence of white muscle trimethylamine-N-oxide aldolase (TMAOase) on the formation of formaldehyde and dimethylamine (DMA) during frozen storage is determined.

Methods

- Preparation of deproteinized extract
- Enzyme activity measurement
- Formaldehyde (“free”) [Nash colour reaction]
- DMA (“total” formaldehyde) [Capillary electrophoresis (CE)]
- TMAO [CE]

Lipid and protein oxidation during frozen storage of fatty fish.

Oxidation is evaluated during storage of fatty fish, and the effect of antioxidants is investigated both on lipid and on protein fractions. The formation of lipid oxidation products (volatiles) and the formation of protein carbonyl groups are determined using western blotting.

Methods

- Oil content [Bligh & Dyer]
- Volatile oxidation products [Dynamic head-space analysis; Gas Chromatography (GC)]
- Fatty acid composition [GC of fatty acid methyl esters (FAME)]
- Protein oxidation [Western blotting]

Proteome analysis of fish muscle.

Changes in muscle protein expression, due to stress before slaughter, will be demonstrated. Two-dimensional gel electrophoresis and image analysis of gels will be carried out.

Methods

- Protein separation [Two-dimensional gel electrophoresis (2DE)]
- Quantification of expression [Image analysis]