Emerging and potential technologies for facilitating shrimp peeling: A review

Ready-to-eat shrimp processing is challenging due to the complex biological design with the shell tightly connected to the meat. Several techniques have been developed to weaken or loosen this connection, thus facilitating the subsequent peeling. The loosening process is typically undertaken by maturing the shrimps on ice or in brine, which requires several days, consequently risking loss in food quality and safety. To overcome those issues, developing novel technologies that not only assist the shell loosening but also retain the meat quality, safety and yield, is of paramount importance. This article reviews some essential characteristics of shrimp, the current methods of maturation, the use of the emerging technologies (high pressure, microwave, ultrasound, and enzyme) to facilitate the peeling of foods and clarify the potential of using them in shrimp shell removal. Industrial relevance During the production of peeled products, the shrimp processing industry has suffered from drawbacks of the traditional ice/brine maturations - a step facilitating the peeling. The drawbacks include yield loss, reduction of organoleptic quality, risk of microorganisms, time consuming issue and discontinuous process due to a long time soaking in maturing tanks. Therefore the need for seeking alternative methods to replace the traditional long maturations has grown, that address the future trends in sustainable processing of ready-to-eat shrimps. Emerging technologies e.g. high pressure, enzyme, ultrasound and microwave can potentially become the alternatives since they have strong peeling effects on lobsters, crabs, bivalve mollusks, eggshells, human skin, fruits and vegetables. Also these technologies offer benefits such as short process time, retained nutritional and sensorial characteristics, energy and water efficiency which all promise higher profits for the shrimp industry.
Discovery, cloning and characterisation of proline specific prolyl endopeptidase, a gluten degrading thermo-stable enzyme from Sphaerobacter thermophiles

Gluten free products have emerged during the last decades, as a result of a growing public concern and technological advancements allowing gluten reduction in food products. One approach is to use gluten degrading enzymes, typically at low or ambient temperatures, whereas many food production processes occur at elevated temperature. We present in this paper, the discovery, cloning and characterisation of a novel recombinant thermostable gluten degrading enzyme, a proline specific prolyl endoprotease (PEP) from Sphaerobacter thermophiles. The molecular mass of the prolyl endopeptidase was estimated to be 77 kDa by using SDS-PAGE. Enzyme activity assays with a synthetic dipeptide Z-Gly-Pro-p-nitroanilide as the substrate revealed that the enzyme had optimal activity at pH 6.6 and was most active from pH 5.0-8.0. The optimum temperature was 63 °C and residual activity after one hour incubation at 63 °C was higher than 75 %. The enzyme was activated and stabilized by Co2+ and inhibited by Mg2+, K+ and Ca2+ followed by Zn2+, Na+, Mn2+, Al3+, and Cu2+. The Km and kcat values of the purified enzyme for different substrates were evaluated. The ability to degrade immunogenic gluten peptides (PQPQLPYPQPQLPY (a-gliadin) and SQQQFPQPQQPFPQQP (γ-hordein)) was also confirmed by enzymatic assays and mass spectrometric analysis of cleavage fragments. Addition of the enzyme during small scale mashing of barley malt reduced the gluten content. The findings here demonstrate the potential of enzyme use during mashing to produce gluten free beer, and provide new insights into the effects of proline specific proteases on gluten degradation.

General information
State: Published
Organisations: National Food Institute, Research Group for Microbial Biotechnology and Biorefining, Research Group for Food Production Engineering, Department of Biotechnology and Biomedicine, Leibniz-Institut DSMZ, University of Mysore
Authors: Shetty, R. (Intern), Vestergaard, M. (Intern), Jessen, F. (Intern), Hägglund, P. (Intern), Knorr, V. (Ekstern), Koehler, P. (Ekstern), Prakash, H. (Ekstern), Hobley, T. J. (Intern)
Number of pages: 7
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Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed yes
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Scopus rating (2016): CiteScore 2.83 SJR 0.759 SNIP 1.025
Web of Science (2016): Indexed yes
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Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.061 SNIP 1.214 CiteScore 3.12
Web of Science (2014): Indexed yes
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Scopus rating (2013): SJR 1.165 SNIP 1.376 CiteScore 3.2
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
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Muscle Protein Profiles Used for Prediction of Texture of Farmed Salmon (Salmo salar L.)

A soft texture is undesired in Atlantic salmon as it leads to downgrading and reduced yield, yet it is a factor for which the cause is not fully understood. This lack of understanding highlights the need for identifying the cause of the soft texture and developing solutions by which the processing industry can improve the yield. Changes in muscle protein profiles can occur both pre- and postharvest and constitute an overall characterization of the muscle properties including texture. The aim of this study was to investigate this relationship between specific muscle proteins and the texture of the salmon fillet. Samples for 2D-gel-based proteomics were taken from the fillet above the lateral line at the same position as where the texture had been measured. The resulting protein profiles were analyzed using multivariate data analysis. Sixteen proteins were found to correlate to the measured texture, showing that it is possible to predict peak force based on a small subset of proteins. Additionally, eight of the 16 proteins were identified by tandem mass spectrometry including serum albumin, dipeptidyl peptidase 3, heat shock protein 70, annexins, and a protein presumed to be a titin fragment. It is contemplated that the identification of these proteins and their significance for the measured texture will contribute to further understanding of the Atlantic salmon muscle texture.

General information

State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, Novo Nordisk Foundation Center for Biosustainability, CHO Core, iLoop, University of Iceland
Antioxidant activity of cod (Gadus morhua) protein hydrolysates: Fractionation and characterisation of peptide fractions

This study aimed to characterise peptide fractions (>5 kDa, 3–5 kDa and <3 kDa) with antioxidative activity obtained from a cod protein hydrolysate. The free amino acids in all fractions were dominated by Ala, Gly, Glu and Ser. The total amino acid composition had high proportions of Lys, Ala and Glu. The 3–5 kDa and <3 kDa fractions were further fractionated by size exclusion chromatography. All sub-fractions showed high Fe²⁺ chelating activity. The DPPH radical-scavenging activity of the 3–5 kDa fraction was exerted mainly by one sub-fraction dominated by peptides with masses below 600 Da. The DPPH radical-scavenging activity of the <3 kDa fraction was exerted by sub-fractions with low molecular weight. The highest reducing power was found in a sub-fraction containing peptides rich in Arg, Tyr and Phe. Both free amino acids and low molecular weight peptides thus seemed to contribute to the antioxidative activity of the peptide fractions, and Tyr seemed to play a major role in the antioxidant activity.
Bioactive compounds in commercial nitrite-cured cooked pork products

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, Research Group for Analytical Food Chemistry
Authors: Pedersen, S. T. (Intern), Duedahl-Olesen, L. (Intern), Jessen, F. (Intern)
Number of pages: 1
Biological variation of the raw material and processing conditions affect the yield and quality of fast-marinated herring

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering
Authors: Ekgreen, M. H. (Intern), Jørgensen, B. M. (Intern), Martinez Lopez, B. (Intern), Frosch, S. (Intern), Jessen, F. (Intern)
Number of pages: 1
Publication date: 2016
Event: Poster session presented at First Food Chemistry Conference - Shaping the Future of Food Quality, Health and Safety, Amsterdam, Netherlands.
Main Research Area: Technical/natural sciences
Electronic versions:
Poster_Sabrine_ver3.pdf
Source: PublicationPreSubmission
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Publication: Research - peer-review › Poster – Annual report year: 2016

Effect of sodium bicarbonate and varying concentrations of sodium chloride in brine on the liquid retention of fish (Pollachius virens L.) muscle: High quality low salt saithe muscle

BACKGROUND Negative health effects associated with excessive sodium (Na) intake have increased the demand for tasty low-Na products (<2% NaCl) rather than traditional heavily salted fish products (~20% NaCl). This study investigates the causes of improved yield and liquid retention of fish muscle brined with a combination of salt (NaCl) and sodium bicarbonate (NaHCO3).

RESULTS Water characteristics and microstructure of saithe (Pollachius virens L.) muscle brined in solutions of NaCl and NaHCO3 or NaCl alone were compared using low-field nuclear magnetic resonance (LF-NMR) T2 relaxometry, microscopy, salt content, liquid retention and colorimetric measurements. Saithe muscle was brined for 92 h in 0, 30, 60, 120 or 240 g kg−1 NaCl or the respective solutions with added 7.5 g kg−1 NaHCO3. NaHCO3 inclusion improved the yield in solutions ranging from 0 to 120 g kg−1 NaCl, with the most pronounced effect being observed at 30 g kg−1 NaCl. The changes in yield were reflected in water mobility, with significantly shorter T2 relaxation times in all corresponding brine concentrations. Salt-dependent microstructural changes were revealed by light microscopy, where NaHCO3 supplementation resulted in greater intracellular space at 30 and 60 g kg−1 NaCl. CONCLUSION Sodium bicarbonate addition to low-salt solutions can improve yield and flesh quality of fish muscle owing to altered water mobility and wider space between the muscle cells

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, Norwegian University of Life Sciences, Nofima AS
Authors: Åsli, M. (Ekstern), Ofstad, R. (Ekstern), Böcker, U. (Ekstern), Jessen, F. (Intern), Einen, O. (Ekstern), Mørkøre, T. (Ekstern)
Pages: 1252-1259
Publication date: 2016
Main Research Area: Technical/natural sciences

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Journal: Journal of the Science of Food and Agriculture
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ISSN (Print): 0022-5142
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Web of Science (2017): Indexed Yes
Growth promotion in pigs by oxytetracycline coincides with down regulation of serum inflammatory parameters and of hibernation-associated protein HP-27
The growth promoting effect of supplementing animal feed with antibiotics like tetracycline has traditionally been attributed to their antibiotic character. However, more evidence has been accumulated on their direct anti-inflammatory effect during the last two decades. Here we used a pig model to explore the systemic molecular effect of feed supplementation with subtherapeutic levels of oxytetracycline (OTC) by analysis of serum proteome changes. Results showed that OTC promoted growth, coinciding with a significant down regulation of different serum proteins related to inflammation, oxidation and lipid metabolism, confirming the anti-inflammatory mechanism of OTC. Interestingly, apart from the classic acute phase reactants also down regulation was seen of a hibernation associated plasma protein (HP-27), which is to our knowledge the first description in pigs. Although the exact function in non-hibernators is unclear, down regulation of HP-27 could be consistent with increased appetite, which is possibly linked to the anti-inflammatory action of OTC. Given that pigs are good models for human medicine due to their genetic and physiologic resemblance, the present results might also be used for rational intervention in human diseases in which inflammation plays an important role such as obesity, type 2 diabetes and cardiovascular diseases.

**General information**

State: Published  
Organisations: National Food Institute, Research Group for Food Production Engineering, KU Leuven, University of Veterinary Medicine, University of Murcia  
Authors: Soler, L. (Ekstern), Miller, I. (Ekstern), Hummel, K. (Ekstern), Razzazi-Fazeli, E. (Ekstern), Jessen, F. (Intern), Escribano, D. (Ekstern), Niewold, T. (Ekstern)  
Pages: 1277-1286  
Publication date: 2016  
Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed yes  
BFI (2016): BFI-level 1  
Scopus rating (2016): CiteScore 2.64 SJR 0.85 SNIP 0.777  
Web of Science (2016): Indexed yes  
BFI (2015): BFI-level 1  
Scopus rating (2015): SJR 0.851 SNIP 0.825 CiteScore 2.53  
BFI (2014): BFI-level 1  
Scopus rating (2014): SJR 1.056 SNIP 0.892 CiteScore 2.88  
BFI (2013): BFI-level 1  
Scopus rating (2013): SJR 1.154 SNIP 0.992 CiteScore 3.13  
ISI indexed (2013): ISI indexed yes  
Web of Science (2013): Indexed yes  
BFI (2012): BFI-level 1  
Scopus rating (2012): SJR 1.368 SNIP 0.983 CiteScore 3.24  
ISI indexed (2012): ISI indexed yes  
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BFI (2011): BFI-level 1  
Scopus rating (2011): SJR 1.525 SNIP 0.923 CiteScore 3.17  
ISI indexed (2011): ISI indexed yes  
Web of Science (2011): Indexed yes  
BFI (2010): BFI-level 1  
Scopus rating (2010): SJR 1.591 SNIP 0.932  
Web of Science (2010): Indexed yes  
BFI (2009): BFI-level 1  
Scopus rating (2009): SJR 1.481 SNIP 1.014  
Web of Science (2009): Indexed yes  
BFI (2008): BFI-level 1
Interactions between Surfactants in Solution and Electrospun Protein Fibers: Effects on Release Behavior and Fiber Properties

Intermolecular interaction phenomena occurring between endogenous compounds, such as proteins and bile salts, and electrospun compounds are so far unreported, despite the exposure of fibers to such biorelevant compounds when applied for biomedical purposes, e.g., tissue engineering, wound healing, and drug delivery. In the present study, we present a systematic investigation of how surfactants and proteins, as physiologically relevant components, interact with insulin-loaded fish sarcoplasmic protein (FSP) electrospun fibers (FSP-Ins fibers) in solution and thereby affect fiber properties such as accessible surface hydrophilicity, physical stability, and release characteristics of an encapsulated drug. Interactions between insulin-loaded protein fibers and five anionic surfactants (sodium taurocholate, sodium taurodeoxycholate, sodium glycocholate, sodium glycodeoxycholate, and sodium dodecyl sulfate), a cationic surfactant (benzalkonium chloride), and a neutral surfactant (Triton X-100) were studied. The anionic surfactants increased the insulin release in a concentration-dependent manner, whereas the neutral surfactant had no significant effect on the release. Interestingly, only minute amounts of insulin were released from the fibers when benzalkonium chloride was present. The FSP-Ins fibers appeared dense after incubation with this cationic surfactant, whereas high fiber porosity was observed after incubation with anionic or neutral surfactants. Contact angle measurements and staining with the hydrophobic dye 8-anilino-1-naphthalenesulfonic acid indicated that the FSP-Ins fibers were hydrophobic, and showed that the fiber surface properties were affected differently by the surfactants. Bovine serum albumin also affected insulin release in vitro, indicating that also proteins may affect the fiber performance in an in vivo setting.
Non-invasive volume estimation of fish fillets/cutlets using structured light

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering
Authors: Skytte, J. L. (Intern), Ekgreen, M. H. (Intern), Jessen, F. (Intern)
Number of pages: 1
Publication date: 2016
Event: Poster session presented at 46th conference of the West European Fish Technologists' Association (46th WEFTA), Split, Croatia.
Main Research Area: Technical/natural sciences
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Peelability and quality changes during ice maturation of shrimp (Pandalus borealis)

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, University of Copenhagen, Royal Greenland A/S, Launis A/S
Authors: Gringer, N. (Intern), Skytte, J. L. (Intern), Dang, T. T. (Ekstern), Olsen, K. (Ekstern), Bøknæs, N. (Ekstern), Schlippe-Steffensen, K. (Ekstern), Orlien, V. (Ekstern), Jessen, F. (Intern)
Number of pages: 1
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Event: Poster session presented at 46th conference of the West European Fish Technologists' Association (46th WEFTA), Split, Croatia.
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Protein changes in shell and epidermis of shrimp (Pandalus borealis) after maturation on ice or in salt

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, University of Copenhagen, Launis A/S, Royal Greenland A/S
Authors: Gringer, N. (Intern), Thi Dang, T. (Ekstern), Olsen, K. (Ekstern), Bøknæs, N. (Ekstern), Schlippe-Steffensen, K. (Ekstern), Orlien, V. (Ekstern), Jessen, F. (Intern)
Number of pages: 1
Publication date: 2016
Event: Poster session presented at 46th conference of the West European Fish Technologists' Association (46th WEFTA), Split, Croatia.
Main Research Area: Technical/natural sciences
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Bioactive protein-based nanofibers interact with intestinal biological components resulting in transepithelial permeation of a therapeutic protein

Proteins originating from natural sources may constitute a novel type of material for use in drug delivery. However, thorough understanding of the behavior and effects of such a material when processed into a matrix together with a drug is crucial prior to further development into a drug product. In the present study the potential of using bioactive electrospun fish sarcoplasmic proteins (FSP) as a carrier matrix for small therapeutic proteins was demonstrated in relation to the interactions with biological components of the intestinal tract. The inherent structural and chemical properties of FSP as a biomaterial facilitated interactions with cells and enzymes found in the gastrointestinal tract and displayed excellent biocompatibility. More specifically, insulin was efficiently encapsulated into FSP fibers maintaining its conformation, and subsequent controlled release was obtained in simulated intestinal fluid. The encapsulation of insulin into FSP fibers provided protection against chymotrypsin degradation, and resulted in an increase in insulin transport to around 12% without compromising the cellular viability. This increased transport was driven by interactions upon contact between the nanofibers and the Caco-2 cell monolayer leading to the opening of the tight junction proteins. Overall, electrospun FSP may constitute a novel material for oral delivery of biopharmaceuticals.

General information
State: Published
Organisations: National Food Institute, Research Group for Nano-Bio Science, Research Group for Food Production Engineering, University of Copenhagen
Authors: Boutrup Stephansen, K. (Intern), García-Díaz, M. (Ekstern), Jessen, F. (Intern), Chronakis, I. S. (Intern), Nielsen, H. (Ekstern)
Design and characterization of self-assembled fish sarcoplasmic protein-alginate nanocomplexes

Macrostructures based on natural polymers are subject to large attention, as the application range is wide within the food and pharmaceutical industries. In this study we present nanocomplexes (NCXs) made from electrostatic self-assembly between negatively charged alginate and positively charged fish sarcoplasmic proteins (FSP), prepared by bulk mixing. A concentration screening revealed that there was a range of alginate and FSP concentrations where stable NCXs with similar properties were formed, rather than two exact concentrations. The size of the NCXs was 293 +/- 3 nm, and the zeta potential was -42 +/- 0.3 mV. The NCXs were stable in water, gastric buffer, intestinal buffer and HEPES buffered glycose, and at all pH values from 2 to 9 except pH 3, where they aggregated. When proteolytic enzymes were present in the buffer, the NCXs were degraded. Only at high concentrations the NCXs caused a decreased viability in HeLa and U2OS cell lines. The simple processing procedure and the high stability of the NCXs, makes them excellent candidates for use in the food and pharmaceutical industry. (C) 2015 Elsevier B.V. All rights reserved.

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Organisations: National Food Institute, Research Group for Nano-Bio Science, Research Group for Food Production Engineering, Technical University of Denmark, University of Copenhagen, University of Munster
Authors: Boutrup Stephansen, K. (Intern), Mattebjerg, M. A. (Intern), Wattjes, J. (Ekstern), Milisavljevic, A. (Ekstern), Jessen, F. (Intern), Qvortrup, K. (Ekstern), Goycoolea, F. M. (Ekstern), Chronakis, I. S. (Intern)
Number of pages: 7
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Main Research Area: Technical/natural sciences

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Scopus rating (2016): CiteScore 3.84 SJR 0.872 SNIP 1.288
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BFI (2015): BFI-level 1
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Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.861 SNIP 1.325 CiteScore 3.13
Web of Science (2014): Indexed yes
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Scopus rating (2013): SJR 0.849 SNIP 1.452 CiteScore 3.48
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.796 SNIP 1.313 CiteScore 2.77
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.689 SNIP 1.21 CiteScore 2.73
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Growth hormone transgenesis influences muscle proteome of Coho salmon (Oncorhynchus kisutch)

General information
State: Published
Organisations: National Food Institute, Research Group for Food Production Engineering, University of Aberdeen, Fisheries and Oceans Canada
Authors: Jessen, F. (Intern), Causey, D. R. (Ekstern), Macqueen, D. J. (Ekstern), Devlin, R. H. (Ekstern)
Number of pages: 1
Publication date: 2015
Event: Poster session presented at 5th Trans-Atlantic Fisheries Technology conference (45th WEFTA meeting), Nantes, France.
Main Research Area: Technical/natural sciences
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Interactions between electrospun fibers and the surrounding biological environment; cells and small molecules

General information
State: Published
Organisations: National Food Institute, Research Group for Nano-Bio Science, Research Group for Food Production Engineering, University of Copenhagen
Authors: Stephansen, K. (Intern), García-Díaz, M. (Ekstern), Jessen, F. (Intern), Nielsen, H. M. (Ekstern), Chronakis, I. S. (Intern)
Number of pages: 1
Publication date: 2015

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Title of host publication: Book of Abstracts, DTU's Sustain Conference 2015
The effects of eating marine- or vegetable-fed farmed trout on the human plasma proteome profiles of healthy men

Most human intervention studies have examined the effects on a subset of risk factors, some of which may require long-term exposure. The plasma proteome may reflect the underlying changes in protein expression and activation, and this could be used to identify early risk markers. The aim of the present study was to evaluate the impact of regular fish intake on the plasma proteome. We recruited thirty healthy men aged 40 to 70 years, who were randomly allocated to a daily meal of chicken or trout raised on vegetable or marine feeds. Blood samples were collected before and after 8 weeks of intervention, and after the removal of the twelve most abundant proteins, plasma proteins were separated by two-dimensional gel electrophoresis. Protein spots <66 kDa with a pI >4·3 visualised by silver staining were matched by two-dimensional imaging software. Within-subject changes in spots were compared between the treatment groups. Differentially affected spots were identified by matrix-assisted laser desorption ionisation-time of flight/time of flight MS and the human Swiss-Prot database. We found 23/681 abundant plasma protein spots, which were up- or down-regulated by the dietary treatment (P<0·05, q<0·30), and eighteen of these were identified. In each trout group, ten spots differed from those in subjects given the chicken meal, but only three of these were common, and only one spot differed between the two trout groups. In both groups, the affected plasma proteins were involved in biological processes such as regulation of...
vitamin A and haem transport, blood fibrinolysis and oxidative defence. Thus, regular fish intake affects the plasma proteome, and the changes may indicate novel mechanisms of effect.
Triton X-114 cloud point extraction to subfractionate blood plasma proteins for two-dimensional gel electrophoresis
A simple and reproducible procedure for enrichment of a plasma protein subfraction suitable for two-dimensional polyacrylamide gel electrophoresis (2DE) was developed, using a Triton X-114-based cloud point extraction (CPE). Appropriate conditions for such a CPE procedure were found by SDS-PAGE to be a plasma protein concentration of about 10mg/ml in 3% (w/v) Triton X-114. 2DE of proteins obtained by CPE of 400μl of human plasma revealed about 200 spots constituting a spot pattern very different from the pattern of total plasma. The CPE procedure only had a limited contribution to the technical variation. Identification of about 60 spots, representing only 22 proteins, revealed that several proteins in the obtained subfraction were present in more isoforms or modifications. Among these were apolipoproteins (A-1, D, E, L1, and M), haptoglobin-related protein, phosphatidylcholine-sterol acyltransferase, serum amyloid A, and serum paraoxonase/arylesterase 1, which are proteins of a hydrophobic nature, as in plasma they relate to lipoprotein particles. Thus, Triton X-114-based CPE is a simple plasma prefractionation tool, attractive for detailed 2DE studies of hydrophobic plasma proteins and their isoforms or modifications.
Antioxidant activity of Cod (Gadus morhua) protein hydrolysates: In vitro assays and evaluation in 5% fish oil-in-water emulsion

Cod protein hydrolysates were fractionated according to the molecular mass into three fractions of >5kDa, 3–5kDa and 2D electrophoresis, Cloud point extraction, TX-114, Prefractionation, Lipoproteins, Serum amyloid A

Original language: English

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Source: FindIt
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**General information**

State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Marinova A/S
Pages: 326-334
Publication date: 2014
Main Research Area: Technical/natural sciences
Bioactive electrospun fish sarcoplasmic proteins as a drug delivery system

Nano-microfibers were made from cod (Gadus morhua) sarcoplasmic proteins (FSP) (M\textsubscript{w} < 200 kDa) using the electrospinning technique. The FSP fibers were studied by scanning electron microscopy, and the fiber morphology was found to be strongly dependent on FSP concentration. Interestingly, the FSP fibers were insoluble in water. However, when exposed to proteolytic enzymes, the fibers were degraded. The degradation products of the FSP fibers proved to be inhibitors of the diabetes-related enzyme DPP-IV. The FSP fibers may have biomedical applications, among others as a delivery system. To demonstrate this, a dipeptide (Ala-Trp) was encapsulated into the FSP fibers, and the release properties were investigated in gastric buffer and in intestinal buffer. The release profile showed an initial burst release, where 30% of the compound was released within the first minute, after which an additional 40% was released (still exponential) within the next 30 min (gastric buffer) or 15 min (intestinal buffer). The remaining 30% was not released in the timespan of the experiment.© 2014 Elsevier B.V. All rights reserved.
**Characterization of process induced changes in matjes herring, using 2D gel electrophoresis**

**General information**

State: Published
Organizations: National Food Institute, Division of Industrial Food Research, NOFIMA
Authors: Skåra, T. (Ekstern), Jessen, F. (Intern), Nielsen, H. H. (Intern), Rotabakk, B. T. (Ekstern)
Number of pages: 1
Publication date: 2014
Event: Poster session presented at 44th WEFTA meeting, Bilbao, Spain.
Main Research Area: Technical/natural sciences

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**Chilling and freezing of fish**

**General information**

State: Published
Organizations: National Food Institute, Division of Industrial Food Research, National Institute of Aquatic Resources, Public Sector Consultancy
Authors: Jessen, F. (Intern), Nielsen, J. (Intern), Larsen, E. (Intern)
Pages: 33-61
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Publisher: Wiley-Blackwell
Editor: Boziaris, I. S.
ISBN (Print): 978-1-118-34621-1
Chapter: 3
Main Research Area: Technical/natural sciences
Discovery and characterization of novel bioactive peptides from marine secondary products

There is an increasing interest in bioactive peptides from marine secondary products, as they offer a great potential for incorporation into functional food and for medical purposes. Bioactive peptides from marine sources have been found to display a wide range of physiological functions including antioxidative, antihypertensive, antimicrobial, immunomodulatory, anticancer and diabetes 2 effects among others. However, majority of the research has been focusing on the peptides derived from hydrolysis with commercial industrial enzymes and the usefulness of these hydrolysates it could be interesting whether digestion of fish secondary tissue with gastrointestinal proteases generates peptides, which also have these health promoting properties either in relation to gastrointestinal digestion or as an alternative to the use of industrial proteases. Furthermore, as a bioactive defense system against the bacterial load in the water, fish is expected to possess bio-components as small peptides. It could therefore be relevant whether these naturally occurring peptides exhibit other functional and health promoting bioactive properties. On this background the overall goal of the present PhD research was to discover and characterize novel bioactive peptides from marine secondary products. The research was divided into two more specific objectives in different parts. Part I was to investigate naturally occurring peptides for bioactivities as radical scavenging activity, Angiotensin I-converting enzyme (ACE) and intestinal dipeptidyl peptidase (DPP-IV) inhibiting properties and protease inhibiting activity in tissue of secondary products such as gills, belly flap muscle and skin from salmon (Salmo salar). This was conducted in extracts from untreated and heat treated tissue by using in vitro assays. Furthermore, if any detected, an aim was to characterize the corresponding candidate bioactive molecules. Part II was to investigate peptides in hydrolysates from salmon (Salmo salar) belly flap muscle and skin generated by gastrointestinal proteases for radical scavenging activity, DPP-IV and ACE inhibiting properties. Furthermore it was the aim to study the stability and mechanism of the muscle hydrolysates towards ACE and DPP-IV activity. Also, the corresponding candidate bioactive molecules, if any, in selected hydrolysates should be characterized. For the naturally occurring peptides investigated in part I, radical scavenging activity was detected in <10 kDa extracts of gills, belly flap muscle and skin with EC50 values of 39, 82 and 100 μg/mL, respectively. No ACE and DPP-IV inhibiting activity could be detected. Mass spectrometry analysis of dominating compounds in active fractions from size exclusion chromatography showed that families of related compounds were found in several fractions from different tissues but most pronounced in gills. One family was defined according to content of a specific amino acid sequence (PW). Three families were defined by the m/z value of the smallest compound reported in each family (219, 434 and 403). The three latter families did not contain standard unmodified amino acids, indicating peptides with modified amino acids or other kinds of molecules. For the peptides in the hydrolysates generated by gastrointestinal proteases investigated in part II, analysis of <10 kDa hydrolysates showed that gastrointestinal proteases generated peptides with clear radical scavenging activity and DPP-IV and ACE inhibiting activity as well. Hydrolysates from pepsin digestion exhibited the lowest EC50 values for radical scavenging activity and ACE inhibition, whereas EC50 increased in hydrolysates after subsequent digestion with pancreatic and mucosal proteases. Interestingly, EC50 values for the DPP-IV inhibition were hardly affected by sequential digestion. Inhibition modes for the muscle hydrolysates were both competitive and non-competitive, but prolonged incubation showed that the inhibitory properties unstable, and therefore properly digested as competitive substrates by gastrointestinal proteases. When fractionated by size exclusion chromatography, radical scavenging activity was found in all obtained hydrolysates, though hydrolysates from belly flap muscle showed a much stronger activity compared to skin hydrolysates. DPP-IV and ACE inhibiting activity was observed in nearly all fractionated hydrolysates, only in the pepsin generated hydrolysates no pronounced (or maybe none) DPP-IV inhibitory effect was observed. This is notable, as it was not in agreement with the obtained results from EC50 values for the three-fold dilution curves. However, it is interesting, as it might be due to a synergy effect only present in the main hydrolysates, which vanishes when the hydrolysates are separated into fractions. Finally, mass spectrometry analysis of dominating compounds in active fractions from size exclusion chromatography from belly flap muscle and skin hydrolysat generated from pancreatin/mucosa digestion, showed that many compounds were present in several fractions. Currently it has not been possible to identify candidate bioactive compounds responsible for a certain bioactivity, as a more thorough analysis and characterization is required as a more thorough analysis and characterization is required. Overall, this PhD research clearly showed a potential for bioactive peptides with health promoting properties from fish secondary tissues, especially when generated with gastrointestinal proteases, both in relation to gastrointestinal digestion and as an alternative to the use of industrial proteases.

General information
State: Published
Organisations: National Food Institute
Authors: Falkenberg, S. S. (Intern), Nielsen, H. H. (Intern), Jessen, F. (Intern), Stagsted, J. (Ekstern), Joensen, H. (Ekstern)
Number of pages: 181
Publication date: 2014
Effect of Gastrointestinal Protease Digestion on Bioactivity of Marine Peptides

Focus in nutritional science has turned towards components in, or added to, foods that may possess health beneficial activities beyond the classical nutritional value, namely functional food. Bioactive peptides are examples of such components. In vitro studies on bioactivities have mainly been executed without concerning subsequent digestion after intake and the aim of this work was hence to investigate how the in vitro antioxidative, antihypertensive and caspase activating activities of peptides are affected by digestion with gastrointestinal (GI) proteases. Five different fish protein hydrolysates were chosen to study the effect of in vitro digestion on bioactivity. The protein concentration decreased in all samples during digestion and the molecular weight distribution of the peptides shifted towards lower values. Thus, in vitro digestion with GI proteases resulted in a further degradation of the peptides obtained by hydrolysis. The antihypertensive effect increased in all samples after digestion with GI proteases whereas the antioxidative capacity decreased. The effect on the caspase activity depended on the proteases used in the preparation of hydrolysates. In conclusion, the caspase activity and antihypertensive activity are maintained during digestion with GI proteases, while the antioxidative capacity seems to be reduced.

Electrospun fish protein fibers as a biopolymer-based carrier – implications for oral protein delivery

Purpose: Protein-based electrospun fibers have emerged as novel nanostructured materials for tissue engineering and drug delivery due to their unique structural characteristics, biocompatibility and biodegradability. The aim of this study was to explore the use of electrospun fibers based on fish sarcoplasmic proteins as an oral delivery platform for biopharmaceuticals, using insulin as a model protein. Methods: Fish sarcoplasmic proteins (FSP) were isolated from fresh cod and electrospun into nanomicrofibers using insulin as a model payload. The morphology of FSP fibers was characterized using scanning electron microscopy (SEM), and the conformational stability of insulin was confirmed by circular dichroism (CD). The in vitro release and enzymatic degradation of encapsulated insulin was measured in different buffers and quantified using RP-HPLC. The permeability of released insulin across differentiated Caco-2 cell monolayers was followed by RP-HPLC and ELISA, and the transepithelial electrical resistance (TEER) was measured before and after the experiment. Cell viability was assessed by the MTS/PMS assay. Results: Insulin was encapsulated in the electrospun FSP fibers with high efficiency, high loading and without any effect on fiber morphology. The morphology of FSP fibers was characterized using scanning electron microscopy (SEM), and the conformational stability of insulin was confirmed by circular dichroism (CD). In the in vitro release and enzymatic degradation of encapsulated insulin was measured in different buffers and quantified using RP-HPLC. The permeability of released insulin across differentiated Caco-2 cell monolayers was followed by RP-HPLC and ELISA, and the transepithelial electrical resistance (TEER) was measured before and after the experiment. Cell viability was assessed by the MTS/PMS assay. Results: Insulin was encapsulated in the electrospun FSP fibers with high efficiency, high loading and without any effect on fiber morphology. Release of insulin in vitro was 75% after 3 h in simulated intestinal fluid. The secondary structure of insulin was preserved after release, and insulin functionality was confirmed by ELISA. Insulin permeability across Caco-2 cell monolayers was significantly enhanced when administered encapsulated in FSP fibers. The TEER was decreased after 4 h incubation, and no negative effect on cell viability was observed at any time. Conclusion: In this work we present electrospun FSP fibers as a novel oral drug delivery system for biopharmaceuticals. The electrospinning process did not affect the functionality of the encapsulated insulin and it provided controlled release kinetics. The epithelial permeability enhancing effect and biocompatibility of the FSP fibers provide evidence for further investigating protein-based electrospun nanofibers for delivery of proteins and peptides.
**Protein markers for the salting and ripening process in Herring production**

**General information**

State: Published
Organisations: National Food Institute, Division of Industrial Food Research, NOFIMA
Authors: Jessen, F. (Intern), Skåra, T. (Ekstern), Nielsen, H. H. (Intern)
Number of pages: 1
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Event: Poster session presented at 10th Siena Meeting From Genome to Proteome, Siena, Italy.
Main Research Area: Technical/natural sciences
Electronic versions:
   FLJ_Siena_2014_poster_final.pdf
Source: PublicationPreSubmission
Source-ID: 103565000
Publication: Research - peer-review › Poster – Annual report year: 2014

**Species determination of pine nuts in commercial samples causing pine nut syndrome**

Consumption of pine nuts from the species of Pinus armandii has been reported to cause dysgeusia, commonly known as pine mouth, or pine nut syndrome (PNS). However, the number of reports on pine nut consumptions of the different species and PNS is limited. This leaves open the possibility that other pine species than P. armandii could be involved in PNS as well. This study investigated 18 samples involved in PNS and received at the Danish Veterinary and Food Administration in 2011 through 2012. Samples were subjected to gas chromatographic analysis of fatty acids. The content of 11 individual fatty acids was used together with the diagnostic index and the sum of Δ5-fatty acids as diagnostic parameters. Diagnostic parameters from samples were then compared to reference material and literature data to determine the species. In a limited number of samples, the diagnostic parameters matched neither our reference materials nor literature data. However, the morphology, the fatty acid analysis, and externally obtained DNA sequencing data suggest a P. armandii subspecies or a variety. With these possible P. armandii subspecies, P. armandii was identified in all analyzed samples. The application of principal component analysis (PCA) to the data set showed a satisfactory separation of the majority of the 13 pine species included in the study.

**General information**

State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Danish Veterinary and Food Administration
Authors: Mikkelsen, A. Æ. (Ekstern), Jessen, F. (Intern), Ballin, N. Z. (Ekstern)
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   Web of Science (2017): Indexed yes
   BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.86 SJR 1.462 SNIP 1.719
The impact of students' knowledge levels on the performances in a Design-Build project

Today an important part of teaching at the university level is group work relying on the Learning pyramid (NTL), where teaching one another is much more beneficial for students than lecturing. In group work students are either put in groups of their own choice (mostly relying on social behavior) or put into predesigned groups. In this paper we have reflected on the consequences of the composition of the predesigned group and tried to evaluate the outcome based on marks given for assignments delivered as reports and oral exams. Preliminary findings indicate that the composition of the group could have an influence on the intended learning outcome.
(ILO - here tested by marks and knowledge of student performance); and if group composition is highly diverse (by including both students with reflective learning and superficial learning), preliminary findings presented here indicate that the ILO can be lower compared with the best individual student in the group. This finding in some ways contradicts the common perception that both reflective and superficial students will benefit from working together, however, further observations on a larger number of students are needed to verify these initial findings.

General information
State: Published
Organisations: National Food Institute, Division of Food Microbiology, Division of Industrial Food Research, Office for Study Programmes and Student Affairs
Authors: Jensen, L. B. (Intern), Jessen, F. (Intern), Andersson, P. H. (Intern)
Number of pages: 6
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Group work, Group composition, Intended learning outcome (ILO), CDIO standards 7 & 8
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Publication: Research - peer-review › Article in proceedings – Annual report year: 2015

Authentication of Fish Products by Large-Scale Comparison of Tandem Mass Spectra
Authentication of food is a major concern worldwide to ensure that food products are correctly labeled in terms of which animals are actually processed for consumption. Normally authentication is based on species recognition by comparison of selected sequences of DNA or protein. We here present a new robust, proteome-wide tandem mass spectrometry method for species recognition and food product authentication. The method does not use or require any genome sequences or selection of tandem mass spectra but uses all acquired data. The experimental steps were performed in a simple, standardized workflow including protein extraction, digestion, and data analysis. First, a set of reference spectral libraries was generated using unprocessed muscle tissue from 22 different fish species. Query tandem mass spectrometry data sets from “unknown” fresh muscle tissue samples were then searched against the reference libraries. The number of matching spectra could unambiguously identify the origin of all fresh samples. A number of processed samples were also analyzed to further test the robustness and applicability of the method. The results clearly show that the method is also able to correctly identify heavily processed samples.

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Division of Toxicology and Risk Assessment, Leiden University
Authors: Wulff, T. (Intern), Nielsen, M. E. (Intern), Deelder, A. M. (Ekstern), Jessen, F. (Intern), Palmblad, M. (Ekstern)
Pages: 5253-5259
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Main Research Area: Technical/natural sciences

Publication information
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.34 SJR 1.705 SNIP 1.002
Web of Science (2016): Indexed yes
Tandem mass spectrometry for species recognition and phenotyping in fish

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Division of Toxicology and Risk Assessment, Leiden University
Authors: Wulff, T. (Intern), Jessen, F. (Intern), Palmblad, M. (Ekstern), Nielsen, M. E. (Intern)
Pages: 71-74
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Editors: Almeida, A. D., Eckersall, D., Bencurova, E., Dolinska, S., Mlynarcik, P., Vincova, M., Bhide, M.
ISBN (Print): 978-90-8686-222-1
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Comparative analysis of inflamed and non-inflamed colon biopsies reveals strong proteomic inflammation profile in patients with ulcerative colitis

Background: Accurate diagnostic and monitoring tools for ulcerative colitis (UC) are missing. Our aim was to describe the proteomic profile of UC and search for markers associated with disease exacerbation. Therefore, we aimed to characterize specific proteins associated with inflamed colon mucosa from patients with acute UC using mass spectrometry-based proteomic analysis. Methods: Biopsies were sampled from rectum, sigmoid colon and left colonic flexure from twenty patients with active proctosigmoiditis and from four healthy controls for proteomics and histology. Proteomic profiles of whole colonic biopsies were characterized using 2D-gel electrophoresis, and peptide mass fingerprinting using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) was applied for identification of differently expressed protein spots. Results: A total of 597 spots were annotated by image analysis and 222 of these had a statistically different protein level between inflamed and non-inflamed tissue in the patient group. Principal component analysis clearly grouped non-inflamed samples separately from the inflamed samples indicating that the proteomic signature of colon mucosa with acute UC is strong. Totally, 43 individual protein spots were identified, including proteins involved in energy metabolism (triosephosphate isomerase, glycerol-3-phosphate-dehydrogenase, alpha enolase and L-lactate dehydrogenase B-chain) and in oxidative stress (superoxide dismutase, thioredoxins and selenium binding protein). Conclusions: A distinct proteomic profile of inflamed tissue in UC patients was found. Specific proteins involved in energy metabolism and oxidative stress were identified as potential candidate markers for UC.
Dietary Tools To Modulate Glycogen Storage in Gilthead Seabream Muscle: Glycerol Supplementation

The quality and shelf life of fish meat products depend on the skeletal muscle's energetic state at slaughter, as meat decomposition processes can be exacerbated by energy depletion. In this study, we tested dietary glycerol as a way of replenishing muscle glycogen reserves of farmed gilthead seabream. Two diets were tested in duplicate (n = 42/tank). Results show 5% inclusion of crude glycerol in gilthead seabream diets induces increased muscle glycogen, ATP levels and firmness, with no deleterious effects in terms of growth, proximate composition, fatty acid profile, oxidative state, and organoleptic properties (aroma and color). Proteomic analysis showed a low impact of glycerol-supplementation on muscle metabolism, with most changes probably reflecting increased stress coping capacity in glycerol-fed fish. This suggests inclusion of crude glycerol in gilthead seabream diets (particularly in the finishing phase) seems like a viable strategy to increase glycogen deposition in muscle without negatively impacting fish welfare and quality.

General information
State: Published
Organisations: Department of Systems Biology, National Food Institute, Division of Industrial Food Research, University of Algarve, University of Porto, Unity of Innovation of Fish and Aquaculture Products
Authors: Silva, T. S. (Ekstern), Matos, E. (Ekstern), Cordeiro, O. D. (Ekstern), Colen, R. (Ekstern), Wulff, T. (Intern), Sampaio, E. (Ekstern), Sousa, V. (Ekstern), Valente, L. M. P. (Ekstern), Gonçalves, A. (Ekstern), Silva, J. M. G. (Ekstern), Bandarra, N. (Ekstern), Nunes, M. L. (Ekstern), Dinis, M. T. (Ekstern), Dias, J. (Ekstern), Jessen, F. (Intern), Rodrigues, P. M. (Ekstern)
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Main Research Area: Technical/natural sciences

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BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
Fish welfare is an important concern in aquaculture, not only due to the ethical implications but also for productivity and quality-related reasons. The purpose of this study was to track soluble proteome expression in post-mortem gilthead seabream muscle...
seabream muscle and to observe how pre-slaughter stress affects these post-mortem processes. For the experiment, two groups of gilthead seabream (n = 5) were subjected to distinct levels of pre-slaughter stress, with three muscle samples being taken from each fish. Proteins were extracted from the muscle samples, fractionated, and separated by 2DE. Protein identification was performed by MALDI-TOF-TOF MS. Analysis of the results indicates changes on several cellular pathways, with some of these changes being attributable to oxidative and proteolytic activity on sarcoplasmic proteins, together with leaking of myofibrillar proteins. These processes appear to have been hastened by pre-slaughter stress, confirming that it induces clear post-mortem changes in the muscle proteome of gilthead seabream.
Proteome Analysis of Pyloric Ceca: A Methodology for Fish Feed Development?

Changing the protein source of fish feed from fish meal to alternative sources of protein will affect traits such as fish growth, quality, and feed utilization. The present investigation was initiated to introduce a two-dimensional gel electrophoresis based proteomic workflow as a tool to investigate feed effects on fish by analyzing protein changes in the fish gut. The workflow was used to study the effect of substituting fish meal in fish feed by alternative sources of protein. Rainbow trout divided into five groups were fed for 72 days with feeds varying in protein composition. By two-dimensional gel electrophoresis proteins extracted from the pyloric ceca were separated, making it possible to measure the abundance of more than 440 protein spots. The expression of 41 protein spots was found to change due to differences in feed composition. By mass spectrometry 31 of these proteins were identified, including proteins involved in digestion (trypsinogen, carboxylic ester hydrolase, and aminopeptidase). The many expression changes indicated that the trout, when adapting to differences in feed formulation, alter the protein composition of the gut.

General information
State: Published
Organisations: Department of Systems Biology, Enzyme and Protein Chemistry, National Food Institute, Division of Industrial Food Research, University of Southern Denmark, Aller Aqua A/S
Authors: Wulff, T. (Intern), Petersen, J. (Ekstern), Nørrelykke, M. R. (Ekstern), Jessen, F. (Intern), Nielsen, H. H. (Intern)
Pages: 8457-8464
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Journal: Journal of Agricultural and Food Chemistry
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
Proteomics as a tool to understand fish stress in aquaculture

General information
State: Published
Organisations: Department of Systems Biology, Enzyme and Protein Chemistry, National Food Institute, Division of Industrial Food Research, Centro de Ciências do Mar do Algarve
Authors: Silva, T. S. (Ekstern), Rodrigues, P. M. (Ekstern), Matos, E. (Ekstern), Wulff, T. (Intern), Cordeiro, O. D. (Ekstern)
Pages: 198-200
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Source: dtu
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PROTEOMICS in aquaculture: Applications and trends
Over the last forty years global aquaculture presented a growth rate of 6.9% per annum with an amazing production of 52.5 million tonnes in 2008, and a contribution of 43% of aquatic animal food for human consumption. In order to meet the world's health requirements of fish protein, a continuous growth in production is still expected for decades to come. Aquaculture is, though, a very competitive market, and a global awareness regarding the use of scientific knowledge and emerging technologies to obtain a better farmed organism through a sustainable production has enhanced the importance of proteomics in seafood biology research. Proteomics, as a powerful comparative tool, has therefore been increasingly used over the last decade to address different questions in aquaculture, regarding welfare, nutrition, health, quality, and safety. In this paper we will give an overview of these biological questions and the role of proteomics in their investigation, outlining the advantages, disadvantages and future challenges. A brief description of the proteomics technical approaches will be presented. Special focus will be on the latest trends related to the aquaculture production of fish with defined nutritional, health or quality properties for functional foods and the integration of proteomics techniques in addressing this challenging issue. This article is part of a Special Issue entitled: Farm animal proteomics.

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Universidade do Algarve
Authors: Rodrigues, P. M. (Ekstern), Silva, T. S. (Ekstern), Dias, J. (Ekstern), Jessen, F. (Intern)
Pages: 4325-4345
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Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
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Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Quality of frozen fish

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research
Authors: Goncalves, A. A. (Ekstern), Nielsen, J. (Intern), Jessen, F. (Intern)
Pages: 479-509
Publication date: 2012

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Quality of frozen seafood Goncalves Jette Flemming.pdf
Standardized and simple sub-fractionation of human plasma reveals enrichment of many low abundant hydrophobic proteins

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Department of Systems Biology
Authors: Jessen, F. (Intern), Wulff, T. (Intern)
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Time-dependent changes in protein expression in rainbow trout muscle following hypoxia

Adaptation to hypoxia is a complex process, and individual proteins will be up- or down-regulated in order to address the main challenges at any given time. To investigate the dynamics of the adaptation, rainbow trout (Oncorhynchus mykiss) was exposed to 30% of normal oxygen tension for 1, 2, 5 and 24h respectively, after which muscle samples were taken. The successful investigation of numerous proteins in a single study was achieved by selectively separating the sarcoplasmic proteins using 2-DE. In total 46 protein spots were identified as changing in abundance in response to hypoxia using one-way ANOVA and multivariate data analysis. Proteins of interest were subsequently identified by MS/MS following tryptic digestion. The observed regulation following hypoxia in skeletal muscle was determined to be time specific, as only a limited number of proteins were regulated in response to more than one time point. The cellular response to hypoxia included regulation of proteins involved in maintaining iron homeostasis, energy levels and muscle structure. In conclusion, this proteome-based study presents a comprehensive investigation of the expression profiles of numerous proteins at four different time points. This increases our understanding of timed changes in protein expression in rainbow trout muscle following hypoxia.

General information
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Organisations: Section for Aquatic Protein Biochemistry, National Food Institute, Division of Industrial Food Research, National Institute of Aquatic Resources, Section for Aquaculture, Technical University of Denmark
Authors: Wulff, T. (Intern), Jokumsen, A. (Intern), Højrup, P. (Forskerdatabase), Jessen, F. (Intern)
Pages: 2342-2351
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.05 SJR 1.383 SNIP 1.055
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
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Vegetable based fish feed changes protein expression in muscle of rainbow trout (Oncorhynchus mykiss)

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research, Department of Systems Biology, Enzyme and Protein Chemistry, Technical University of Denmark
Authors: Jessen, F. (Intern), Wulff, T. (Intern), Bach Mikkelsen, J. (Ekstern), Hyldig, G. (Intern), Nielsen, H. H. (Intern)
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Main Research Area: Technical/natural sciences
Conference: 3rd Managing Committee Meeting and 2nd Meeting of Working Groups 1, 2 & 3 of COST Action FA1002, Algarve, Portugal, 12/04/2012 - 12/04/2012
Antioxidant Activity of Fish Protein Hydrolysates in in vitro Assays and in Oil-in-Water Emulsions.

The aim of this study was to screen different protein hydrolysates with respect to their antioxidative properties in order to select the most promising extracts for further evaluation in oil-in-water emulsions. Three fractions of protein hydrolysates (Crude, >5kDa and 5kDa, 3-5kDa and

Dietary Tools To Modulate Glycogen Storage In Fish Muscle: A Proteomic Assessment

Post-mortem flesh deterioration is dependent on the energy reserves present at the time of death. Early depletion of muscle glycogen leads to the buildup of lactate and to the early onset of rigor mortis, resulting in the activation of endogenous proteases and the degradation of myofibrillar proteins, and consequent muscle softening. The purpose of this study was to modulate the energy status of the muscle at the time of death through the use of dietary muscle buffering compounds, namely glycerol and maslinic acid. Four fish groups of gilthead seabream (in duplicate) were fed for three months with four different diets. The four diets were obtained by starting from a commercial diet formulation and applying a 2x2 factorial design, with two levels of glycerol supplementation (0 and 5%) and two levels of maslinic acid supplementation (0 and 0,025%). The diets were formulated to be isonitrogenous and isolipidic. Fish were slaughtered by immersion in ice-salt water slurry and muscle samples were immediately obtained from three fish of each tank, for a total of six muscle samples per treatment. Sarcoplasmic proteins were extracted from each muscle sample, separated/quantified by 2D-DIGE and identified by peptide fragment fingerprinting using MALDI-TOF MS. Preliminary analysis of the results shows an effect of the diets on muscle parameters such as measured pH and onset of rigor mortis. At the proteome level, the addition of glycerol and maslinic acid to the diets seemed to have affected the abundance of proteins related to oxidative stress (HSC70, HSC71, peroxiredoxin, transferrin), aldehyde toxification (ALDH1A2, ALDH6A1, ALDH7A1), energy homeostasis (adenylate kinase, nucleoside-diphosphate kinase), cytoskeleton (cofilin-2) and signalling (phosphohistidine phosphatase).
Differences in fish feed composition influence protein expression in the pyloric caeca in rainbow trout

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State: Published
Organisations: Division of Industrial Food Research, National Food Institute, Danish Technological Institute
Authors: Wulff, T. (Intern), Petersen, J. (Ekstern), Nørrelykke, M. R. (Ekstern), Jessen, F. (Intern), Nielsen, H. H. (Intern)
Event: Poster session presented at Proteomic Forum, Berlin, Germany.
Main Research Area: Technical/natural sciences

Effect of a dietary supplementation of glycerol and maslinic acid on the muscle proteome of gilthead seabream

General information
State: Published
Organisations: Division of Industrial Food Research, National Food Institute, Universidade do Algarve, Technical University of Denmark
Authors: Silva, T. S. (Ekstern), Matos, E. (Ekstern), Cordeiro, O. (Ekstern), Wulff, T. (Intern), Dias, J. (Ekstern), Jessen, F. (Intern), Rodrigues, P. (Ekstern)
Event: Poster session presented at Proteomic Forum, Berlin, Germany.
Main Research Area: Technical/natural sciences

Feed based on vegetable materials changes the muscle proteome of the carnivore rainbow trout

Feed production for aquaculture of carnivore fish species relies heavily on protein and lipid from the limited resources of wild fish and other sea living organisms. Thus the development of alternative feeds replacing fish meal and oil with components of vegetable origin is important for a sustainable production of fish from aquaculture. However, such a change in feed will have an effect on the fish composition and metabolism and may also affect eating quality as well as different health and nutritional properties. A proteomic approach was taken to compare the muscle protein profile of rainbow trout fed two different diets identical in protein and oil content, but with diet C based on fish meal and oil and diet V based on rapeseed oil and vegetable proteins. In addition to the proteomic investigation the textural properties of the fish were analysed by sensory profiling. Protein expression profiles were achieved by 2- dimensional gel electrophoresis. The result showed that 40 spots were significantly (p
Effect of Protein Hydrolysates on Pancreatic Cancer Cells

Effect of Fish Protein Hydrolysates on Pancreatic Cancer Cells

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2Technical University of Denmark (DTU), National Food Institute, Denmark

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A large number of bioactive peptides have been identified in and isolated from various food sources. Milk seems to be a particularly rich source but also different fish species have been found to yield bioactive peptides. Bioactive peptides, usually consisting of 3 to 20 amino acids, can be released from proteins upon degradation by proteolytic enzymes, e.g. in the intestinal tract. The numerous described bioactivities include antihypertensive, anticancerous, antimicrobial, and immunomodulating effects. Here, we investigate the effect of fish protein hydrolysates obtained by enzymatic hydrolysis on cancer cell proliferation. Skin and belly flap muscle from trout were hydrolysed with the unspecific proteases Alcalase, Neutrase, or UE1 (all from Novozymes, Bagsværd, Denmark) to a hydrolysis degree of 1-15%. The hydrolysates were tested for biological activities affecting cell proliferation and ability to modulate caspase activity in pancreatic cancer cells COLO357 and BxPC-3 in vitro. A number of the hydrolysates showed caspase promoting activity; in particular products containing muscle tissue, i.e. belly flap, were able to stimulate caspase activity. Selected hydrolysate products were further fractionated by ultrafiltration into molecular sizes above and below 5 kDa and their activity and dose-dependence was tested.
Post-mortem sarcoplasmic proteomic profile of gilthead seabream is affected by pre-slaughter stress levels.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Division of Seafood Research, National Food Institute
Authors: Silva, T. S. (Intern), Dias, J. (Ekstern), Jessen, F. (Intern), Cordeiro, O. (Ekstern), Matos, E. (Ekstern), Rodrigues, P. (Ekstern)
Publication date: 2010
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 271637
Publication: Research - peer-review › Poster – Annual report year: 2010

Purification and Characterization of Bioactive Peptides from Fish Protein Hydrolysates

General information
State: Published
Organisations: National Food Institute, Division of Industrial Food Research
Authors: Andersen, L. L. (Intern), Nielsen, H. H. (Intern), Jessen, F. (Intern)
Publication date: 2010
Event: Poster session presented at Protein.DTU Workshop, Kgs. Lyngby, Denmark.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 264638
Publication: Research › Poster – Annual report year: 2010

Reproducibility of a fractionation procedure for fish muscle proteomics

General information
State: Published
Organisations: National Institute of Aquatic Resources, Division of Seafood Research, Centro de Ciências do Mar do Algarve
Authors: Silva, T. S. (Intern), Cordeiro, O. (Ekstern), Jessen, F. (Intern), Dias, J. (Ekstern), Rodrigues, P. M. (Ekstern)
Pages: 8-13
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: American Biotechnology Laboratory
Volume: 28
Issue number: 4
ISSN (Print): 0749-3223
Ratings:
Scopus rating (2013): SJR 0.108 SNIP 0.017
Scopus rating (2012): SJR 0.129 SNIP 0.208
Scopus rating (2011): SJR 0.103 SNIP 0.064
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.133 SNIP 0.147
Web of Science (2010): Indexed yes
Scopus rating (2009): SJR 0.125 SNIP 0.106
Scopus rating (2008): SJR 0.12 SNIP 0.092
Scopus rating (2007): SJR 0.144 SNIP 0.137
Scopus rating (2006): SJR 0.124 SNIP 0.071
Scopus rating (2005): SJR 0.141 SNIP 0.094
Scopus rating (2004): SJR 0.137 SNIP 0.075
Scopus rating (2003): SJR 0.13 SNIP 0.116
Scopus rating (2002): SJR 0.145 SNIP 0.128
Scopus rating (2001): SJR 0.143 SNIP 0.26
**Time-dependent effect of pre-slaughter stress levels on the post-mortem sarcoplasmic proteomic profile of Sparus aurata muscle**

**General information**
- State: Published
- Organisations: National Institute of Aquatic Resources, Division of Seafood Research, National Food Institute
- Authors: Silva, T. S. (Intern), Dias, J. (Ekstern), Matos, E. (Ekstern), Wulff, T. (Intern), Jessen, F. (Intern), Rodrigues, P. (Ekstern)
- Publication date: 2010
- Main Research Area: Technical/natural sciences
- Source: orbit
- Source-ID: 271635
- Publication: Research - peer-review › Journal article – Annual report year: 2010

Using a cross-model loadings plot to identify protein spots causing 2-DE gels to become outliers in PCA

The multivariate method PCA is an exploratory tool often used to get an overview of multivariate data, such as the quantified spot volumes of digitized 2-DE gels. PCA can reveal hidden structures present in the data, and thus enables identification of potential outliers and clustering. Based on PCA, we here present an approach for identification of protein spots causing 2-DE gels to become outliers. The approach can potentially obviate analytical exclusion of entire 2-DE gels.

**General information**
- State: Published
- Organisations: Department of Systems Biology, Enzyme and Protein Chemistry, Division of Seafood Research, National Institute of Aquatic Resources
- Authors: Kristiansen, L. C. (Intern), Jacobsen, S. (Intern), Jessen, F. (Intern), Jørgensen, B. (Intern)
- Pages: 1721-1723
- Publication date: 2010
- Main Research Area: Technical/natural sciences
- Source: orbit
- Source-ID: 271643
- Publication: Research - peer-review › Poster – Annual report year: 2010

**Publication information**
- Journal: Proteomics
- Volume: 10
- Issue number: 8
- ISSN (Print): 1615-9853
- Ratings:
  - BFI (2018): BFI-level 1
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 1
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 1
  - Scopus rating (2016): CiteScore 3.85 SJR 1.492 SNIP 0.89
  - Web of Science (2016): Indexed yes
  - BFI (2015): BFI-level 1
  - Scopus rating (2015): SJR 1.464 SNIP 0.978 CiteScore 3.7
  - BFI (2014): BFI-level 1
  - Scopus rating (2014): SJR 1.436 SNIP 0.981 CiteScore 3.73
  - BFI (2013): BFI-level 1
  - Scopus rating (2013): SJR 1.48 SNIP 0.985 CiteScore 3.88
  - ISI indexed (2013): ISI indexed yes
  - Web of Science (2013): Indexed yes
Wound healing effect on tissue composition: facing interindividual variability

General information
State: Published
Organisations: Division of Seafood Research, National Food Institute
Authors: Wulff, T. (Intern), Jessen, F. (Intern), Nielsen, M. E. (Intern)
Publication date: 2010
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 262682
Publication: Research - peer-review › Journal article – Annual report year: 2010

Wound healing effect on tissue composition: facing interindividual variability

2 D gel based analysis of biological variability of the human plasma proteome

Human blood plasma is a valuable specimen for the biomarker discovery process, since it is easily accessible and contains proteins that are synthesised, secreted or lost from cells and tissue. In this way, changes in plasma proteome reflect the current state of the organism. The analysis of plasma proteome is yet challenging due to the huge dynamic range of protein abundance. When evaluating a potential biomarker, stable basal level of the protein is needed before it can be considered a functional biomarker. However, basal level differences of plasma proteins are naturally occurring between individuals and within an individual changes will also happen over time (e.g. after meal intake). Thus, the aim of
the present study was to examine the inter-individual variability of plasma protein levels in humans after meal intake. Five subjects consumed three single meals in a randomised order separated by one-week interval. Blood samples were drawn before the meal intake and five times during 24 hours for proteome analysis. Plasma was fractionated by use of IgY-12 spin column depleting the 12 highly abundant proteins and further processed for two-dimensional gel electrophoresis. The plasma proteome profiling was visualized by silver staining and analysed by the software Samespots. The inter-individual variability of the plasma proteome was demonstrated by multivariate data analysis (principal component analysis and partial least squares regression) on normalised spot volumes.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Rentsch, M. L. (Intern), Jessen, F. (Intern)
Publication date: 2009
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252796
Publication: Research › Poster – Annual report year: 2009

Contribution of cathepsins B, L and D to muscle protein profiles correlated with texture in rainbow trout (Oncorhynchus mykiss)
Post-mortem softening of fish tissue often results in low yield and decreased product quality. In this study, proteolytic profiles of trout stored 5 days oil ice were obtained by SDS-PAGE. The link between protein hand intensities and firmness of trout fillets was examined through a correlation Study. In parallel, trout extracts were incubated with cathepsin B, cathepsin L and cathepsin D, alone or in combination, in order to evaluate the effect of each cathepsin on the texture-related proteins. Proteins from both myofibrillar (alpha-actinin, actin, MLC1, MLC2, and N-terminal 70 kDa MHC fragment) and sarcoplasmic (glycogen phosphorylase, creatine kinase, and TPI) fractions correlated closely with firmness. Cathepsins D, B and L affected, respectively, 10, 9 and 4 out of the 17 protein bands correlating with firmness, and most changes induced by cathepsin D were unfavourable to firmness. This implies that cathepsin D is likely to be involved in textural change of trout, due to breakdown of the muscle structure.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology, Section for Aquatic Protein Biochemistry
Authors: Godiksen, H. (Intern), Morzel, M. (Ekstern), Hyldig, G. (Intern), Jessen, F. (Intern)
Pages: 889-896
Publication date: 2009
Main Research Area: Technical/natural sciences
Publication information
Journal: Food Chemistry
Volume: 113
Issue number: 4
ISSN (Print): 0308-8146
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.85 SJR 1.706 SNIP 2.091
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.597 SNIP 1.962 CiteScore 4.31
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.595 SNIP 2.027 CiteScore 3.92
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.548 SNIP 2.069 CiteScore 3.87
ISI indexed (2013): ISI indexed yes
Multivariate data analysis of 2 DE data: Time dependent changes in protein expression in rainbow trout following hypoxia

In the last decade there has been a growing understanding of the health benefits of fish consumption. This has lead to an increased interest in studies examining which parameters will affect eating quality of fish grown in fish farms. Especially increased softening of fish muscle is a major problem since it significantly reduces the quality of the major edible part of the fish. One important stressor affecting quality is hypoxia which will occur in fish farms, when the trout is collected for transport before slaughter. In order to explore the biochemical mechanisms responsible for the changes seen in trout muscle following hypoxia, a proteome study was conducted. This will greatly aid the aquaculture industry when evaluating the type of stressors mostly affecting food quality, allowing the industry to optimise handling of the rainbow trout accordingly. In the present study a number of rainbow trout were kept in tanks where hypoxia, (30% of normal oxygen) when introduced, was the only stressor. The fish were sacrificed at different time points (1, 2, 5 and 24 hours) after the onset of hypoxia and muscle samples were taken from each individual fish. Protein expression profiles of the samples were achieved by 2-DE. Protein spots, which individually or in combination with other spots varied according to hypoxia were found by multivariate data analysis (partial least squares regression) on group scaled data (normalised spot volumes) followed by selection of significant spots by jack-knifing. Tandem mass spectrometry was used to identify protein spots of interest.
On the Reproducibility of a Fractionation Procedure for Fish Muscle Proteomics

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Rodrigues, P. (Ekstern), Silva, T. S. (Intern), Jessen, F. (Intern), Dias, J. (Ekstern)
Pages: S19-S19
Publication date: 2009
Main Research Area: Technical/natural sciences
Publication information
Journal: Molecular and Cellular Proteomics
ISSN (Print): 1535-9476
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 6.3
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 5.78
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 5.12
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 5.4
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 6
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 7.9
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Web of Science (2008): Indexed yes
Web of Science (2007): Indexed yes
Web of Science (2006): Indexed yes
Original language: English
Source: orbit
Source-ID: 248867
PEPFISH: Utilisation of Bioactive Peptides from Fish Processing – Upgrading the Value of Secondary Products

General information
State: Published
Organisations: National Food Institute, Novozymes A/S, University of Tromsø, Lund University, Marinova A/S, Biofac A/S, Copenhagen University Hospital, University of Copenhagen
Publication date: 2009
Event: Poster session presented at 3rd Joint Trans-Atlantic Fisheries Technology Conference, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 255920
Publication: Research › Poster – Annual report year: 2009

Purification and Characterization of Peptides from Fish Protein Hydrolysates

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Food Institute
Authors: Andersen, L. L. (Intern), Nielsen, H. H. (Intern), Jessen, F. (Intern)
Publication date: 2009
Event: Poster session presented at 3rd Joint Trans-Atlantic Fisheries Technology Conference, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 255922
Publication: Research › Poster – Annual report year: 2009

Two-dimensional gel electrophoresis

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Jessen, F. (Intern)
Pages: 301-317
Publication date: 2009

Host publication information
Title of host publication: Fishery Products. Quality, safety and authenticity
Publisher: Blackwell Publishing Ltd
Editors: Rehbein, H., Oehlenschläger, J.
ISBN (Print): 9781405141628
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 252925
Publication: Research - peer-review › Book chapter – Annual report year: 2009

Acute single meal effects of trout and poultry on the human plasma proteome

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Rentsch, M. L. (Intern), Nielsen, H. H. (Intern), Lauritzen, L. (Ekstern), Lametsch, R. (Ekstern), Jessen, F. (Intern)
Publication date: 2008
Event: Poster session presented at 8th Siena Meeting From Genome to Proteome, Siena, Italy.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 229072
Publication: Research › Poster – Annual report year: 2008
A molecular approach to pre-harvest impact on post-harvest quality of trout

Fish meat quality is influenced by many biological and physical factors like e.g. rearing, feeding, slaughtering, processing and storage. Observations from the commercial aquaculture industry indicate that infections in e.g. salmon caused by Moritella viscosus or Pancreas Disease (PD) results in downgrading of fish quality and subsequent a reduction in prize. Despite this, the impact of infectious diseases on the meat quality and the mechanisms behind are poorly investigated. Wound repair is a dynamic, interactive response to tissue injury that involves a complex interaction and cross talk of various cell types, extracellular matrix molecules, soluble mediators and cytokines. In order to describe the molecular mechanisms and processes of wound repair, a panel of genes covering immunological factors and tissue regeneration were used to measure changes at the mRNA level following mechanical tissue damage in rainbow trout (Oncorhynchus mykiss). Needle disrupted muscle tissue was sampled at different time points and subject to real-time RT-PCR for measuring the expression of the genes IL-1ß, IL-8, IL-10, TGF-ß, Myostatin-1ab, MMP-2, CTGF, Collagen-1alfa, VEGF, iNOS, Arg-2 and FGF. The results showed an initial phase with up-regulation of immune-related genes followed by a regenerative phase with regulation of genes coding for muscle growth and synthesis of connective tissue.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology
Authors: Nielsen, M. E. (Intern), Hyldig, G. (Intern), Nielsen, H. H. (Intern), Jessen, F. (Intern), Ingerslev, H. (Intern)
Publication date: 2008
Event: Poster session presented at International Conference on Fish Diseases and Fish Immunology, Reykjavik, Iceland.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232679
Publication: Research - peer-review › Poster – Annual report year: 2008

A short-term intervention trial with selenate, selenium-enriched yeast and selenium-enriched milk: effects on oxidative defence regulation

General information
State: Published
Organisations: Division of Toxicology and Risk Assessment, National Food Institute, Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources, Division of Food Chemistry
Publication date: 2008
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 235394
Publication: Research › Poster – Annual report year: 2008

Combination of statistical approaches for analysis of 2-DE data gives complementary results

Five methods for finding significant changes in proteome data have been used to analyze a two-dimensional gel electrophoresis data set. We used both univariate (ANOVA) and multivariate (Partial Least Squares with jackknife, Cross Model Validation, Power-PLS and CovProc) methods. The gels were taken from a time-series experiment exploring the changes in metabolic enzymes in bovine muscle at five time-points after slaughter. The data set consisted of 1377 protein
spots, and for each analysis, the data set were preprocessed to fit the requirements of the chosen method. The generated results were one list from each analysis method of proteins found to be significantly changed according to the experimental design. Although the number of selected variables varied between the methods, we found that this was dependent on the specific aim of each method. CovProc and P-PLS focused more on getting the minimum necessary subset of proteins to explain properties of the samples. These methods ended up with less selected proteins. There was also a correlation between level of significance and frequency of selection for the selected proteins.

General information
State: Published
Organisations: Section for Aquatic Process and Product Technology, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry, Center for Microbial Biotechnology, Department of Systems Biology, Enzyme and Protein Chemistry
Pages: 5119-5124
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Proteome Research
Volume: 7
Issue number: 12
ISSN (Print): 1535-3893
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.34 SJR 1.705 SNIP 1.002
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.934 SNIP 1.092 CiteScore 4.45
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.945 SNIP 1.185 CiteScore 4.64
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.002 SNIP 1.256 CiteScore 5.16
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.027 SNIP 1.328 CiteScore 5.12
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.119 SNIP 1.267 CiteScore 5.12
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.93 SNIP 1.246
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.959 SNIP 1.206
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.993 SNIP 1.122
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.921 SNIP 1.108
Web of Science (2007): Indexed yes
Comparison of two anoxia models in rainbow trout cells by a 2-DE and MS/MS-based proteome approach

In the literature, a variety of ways have been used to obtain anoxia, and most often results are compared between studies without taking into consideration how anoxia has been obtained. Here, we provide a comprehensive study of two types of anoxia, using a proteomics approach to compare changes in protein expression. The two investigated situations were 30 min of chemical anoxia (10 mM NaN3) followed by reoxygenation overnight (CR) and 2 h of N-2-induced anoxia (achieved by flushing with N-2) followed by reoxygenation, overnight (NR), after which samples were resolved by 2-DE. Forty-five protein spots changed their abundance in response to CR and 35 protein spots changed their abundance in response to NR, but only six proteins changed their abundance in response to both stimuli. By the means of MS/MS, 40 protein spots were identified including proteins involved in processes like cell protection and protein synthesis. It was also revealed that the level of a number of keratins was down-regulated. This study therefore provides a valuable comparison of two different anoxia models and shows that great care should be taken when comparing the effects of anoxia in studies that have used different types and durations of anoxia.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Wulff, T. (Intern), Hoffmann, E. (Ekstern), Roepstorff, P. (Ekstern), Jessen, F. (Intern)
Pages: 2035-2044
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Proteomics
Volume: 8
Issue number: 10
ISSN (Print): 1615-9853
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.85 SJR 1.492 SNIP 0.89
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.464 SNIP 0.978 CiteScore 3.7
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.436 SNIP 0.981 CiteScore 3.73
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.48 SNIP 0.985 CiteScore 3.88
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.489 SNIP 1.099 CiteScore 4.1
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.677 SNIP 1.182 CiteScore 4.49
Effects of tetracycline administration on the proteomic profile of pig muscle samples (L. dorsi)

Effect of tetracycline (TC) administration on the proteomic profile of pig muscle was evaluated by 2D electrophoresis and MALDI-TOF mass spectrometry. The TC content at slaughter was determined in L. dorsi samples by HPLC-DAD. Mean residual concentration of TC in the muscle of treated animals, calculated as the sum of TC and epi-TC was 126.3 μg/kg, indicating a rapid elimination of TC in this tissue. Several differential spots (n = 54, p < 0.05) were observed in protein profiles from control and treated animals. MALDI-TOF identification gave a positive match for 5 differential spots, that is, glycerol-3-phosphate dehydrogenase 1 (G3PD1), phosphoglycerate kinase 1, novel protein (0610037L13Rik), leucine aminopeptidase 3 (LAP), and hypothetical protein isoform 2. Results show that proteomics could be a useful tool to reveal pharmacological treatments with TC, even if the possible uses of differential spots as biomarkers to detect illegal administration of TC require further studies. Different spot patterns as a consequence of TC treatments seem to be another interesting issue for the consequences on tissue metabolism and meat quality.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Gratacos-Cubarsi, M. (Ekstern), Castellari, M. (Ekstern), Hortos, M. (Ekstern), Garcia-Regueiro, J. (Ekstern), Lametsch, R. (Ekstern), Jessen, F. (Intern)
Pages: 9312-9316
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 56
Issue number: 19
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.423 SNIP 1.479 CiteScore 3.44
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.43 SNIP 1.471 CiteScore 3.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.384 SNIP 1.446 CiteScore 3.1
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.408 SNIP 1.392
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.317 SNIP 1.303
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.361 SNIP 1.324
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.249 SNIP 1.439
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.358 SNIP 1.418
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.286 SNIP 1.521
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.316 SNIP 1.496
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.158 SNIP 1.479
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.236 SNIP 1.537
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.066 SNIP 1.255
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.091 SNIP 1.312
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.859 SNIP 1.256

Original language: English
glycerol 3-phosphate dehydrogenase, proteomics, residue determination, tetracycline, pig

DOIs:
10.1021/jf801390z
Fiskerester bliver functional foods

General information
State: Published
Organisations: Division of Food Production Engineering, National Food Institute, National Institute of Aquatic Resources
Authors: Jørgensen, S. B. (ed.) (Intern), Jessen, F. (Intern)
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: FoodDTU Midt i Ugen
Original language: Danish
Source: orbit
Source-ID: 258510
Publication: Communication › Journal article – Annual report year: 2008

Long term anoxia in rainbow trout investigated by 2-DE and MS/MS
Twenty-four hours of N-2 induced anoxia induced global perturbations on protein expression in rainbow trout hypodermal fibroblasts cell line. Anoxia was obtained by depleting the medium of O-2 by flushing with N-2, and protein changes were studied by 2-DE coupled with MS providing quantitative measurements of a large number of proteins in one single study. The anoxic insult changed the level of 33 protein spots: 22 of these were up-regulated compared to the control situation and 11 were down-regulated. Using MS/MS sequencing 19 of the 33 protein spots that changed were identified, corresponding to a success rate of more than 50%. The identified proteins included two proteins involved in energy metabolism namely phosphoglycerate mutase and isocitrate dehydrogenase. In addition we observed the up-regulation of a cluster of proteins that contribute to cytoskeleton function. These are calpain, EB1, and Rho GDP dissociation inhibitor (GDI). The up-regulation of Rho GDI was shown to develop in a time dependent manner with no significant increase for up to 8 h of anoxia. In conclusion, this study provides a thorough investigation of the effect of anoxia in a cell line from rainbow trout.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Wulff, T. (Intern), Jessen, F. (Intern), Roepstorff, P. (Ekstern), Hoffmann, E. (Ekstern)
Pages: 1009-1018
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Proteomics
Volume: 8
Issue number: 5
ISSN (Print): 1615-9853
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.85 SJR 1.492 SNIP 0.89
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.464 SNIP 0.978 CiteScore 3.7
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.436 SNIP 0.981 CiteScore 3.73
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.48 SNIP 0.985 CiteScore 3.88
ISI indexed (2013): ISI indexed yes
Multivariate data analysis of two-dimensional gel electrophoresis protein patterns from few samples

One application of 2D gel electrophoresis is to reveal differences in protein pattern between two or more groups of individuals, attributable to their group membership. Multivariate data analytical methods are useful in pinpointing the spots relevant for discrimination by focusing not only on single spot differences, but on the covariance structure between proteins. However, their outcome is dependent on data scaling, and they may fail in producing valid multivariate models due to the much higher number of "irrelevant" spots present in the gels. The case where only few gels are available and where the aim is to find as many as possible of the group-dependent proteins seems particularly difficult to handle. The present paper investigates such a case regarding the effect of scaling and of prefiltering by univariate nonparametric statistics on the selection of spots. Besides, a modified ‘autoscaling’ of the full data set based on within-group standard deviations is introduced and shown to be advantageous in revealing potential group-dependent proteins additional to those found by prefiltering.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry, Section for Aquatic Process and Product Technology
Authors: Jensen, K. N. (Intern), Jessen, F. (Intern), Jørgensen, B. (Intern)
Pages: 1288-1296
Publication date: 2008
Main Research Area: Technical/natural sciences
Protein and lipid oxidation in frozen rainbow trout

General information
State: Published
Organisations: Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Stress induced alteration in the proteome of farmed trout: investigation of the mechanism behind changes in sensory properties

Acute effects of trout on cardiovascular risk markers and plasma proteome

A short-term intervention trial, with selenate, Se-enriched yeast and Se-enriched milk: effects on plasma proteins

Healthy, nutritious and tasty fish for the future
Multivariate analysis of 2-DE protein patterns - Practical approaches

Practical approaches to the use of multivariate data analysis of 2-DE protein patterns are demonstrated by three independent strategies for the image analysis and the multivariate analysis on the same set of 2-DE data. Four wheat varieties were selected on the basis of their baking quality. Two of the varieties were of strong baking quality and hard wheat kernel and two were of weak baking quality and soft kernel. Gliadins at different stages of grain development were analyzed by the application of multivariate data analysis on images of 2-DEs. Patterns related to the wheat varieties, harvest times and quality were detected on images of 2-DE protein patterns for all the three strategies. The use of the multivariate methods was evaluated in the alignment and matching procedures of 2-DE gels. All the three strategies were able to discriminate the samples according to quality, harvest time and variety, although different subsets of protein spots were selected. The explorative approach of using multivariate data analysis and variable selection in the analyses of 2-DEs seems to be promising as a fast, reliable and convenient way of screening and transforming many gel images into spot quantities.
Protein and lipid oxidation during frozen storage of rainbow trout (Oncorhynchus mykiss)

General information
State: Published
Organisations: Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Department of Systems Biology, Section for Aquatic Protein Biochemistry
Authors: Baron, C. (Intern), Kjærsgård, I. V. H. (Intern), Jessen, F. (Intern), Jacobsen, C. (Intern)
Pages: 8118-8125
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 55
Issue number: 20
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.423 SNIP 1.479 CiteScore 3.44
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.43 SNIP 1.471 CiteScore 3.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.384 SNIP 1.446 CiteScore 3.1
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.408 SNIP 1.392
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.317 SNIP 1.303
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.361 SNIP 1.324
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.249 SNIP 1.439
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.358 SNIP 1.418
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.286 SNIP 1.521
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.316 SNIP 1.496
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.158 SNIP 1.479
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.236 SNIP 1.537
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.066 SNIP 1.255
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.091 SNIP 1.312
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.859 SNIP 1.256
Original language: English
DOIs:
Protein and lipid oxidation in frozen rainbow trout

General information
State: Published
Organisations: Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Baron, C. (Intern), Kjærsgård, I. V. H. (Intern), Jessen, F. (Intern), Jacobsen, C. (Intern)
Publication date: 2007

Host publication information
Title of host publication: European Congress of Chemical Engineering (ECCE-6), Copenhagen, 16-20 September 2007
Main Research Area: Technical/natural sciences
Conference: European Congress of Chemical Engineering - 6, Copenhagen, Denmark, 16/09/2007 - 16/09/2007

Bibliographical note
Abstract and Poster
Source-ID: 224859
Publication: Research › Conference abstract in proceedings – Annual report year: 2007

Quality of frozen fish

General information
State: Published
Organisations: Section for Aquatic Process and Product Technology, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Nielsen, J. (Intern), Jessen, F. (Intern)
Number of pages: 744
Pages: 577-586
Publication date: 2007

Host publication information
Title of host publication: Handbook of meat, poultry & seafood quality
Volume: VII:44
Place of publication: Oxford
Publisher: Blackwell Publishing Ltd
ISBN (Print): 08-13-82446-X
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226868
Publication: Research - peer-review › Book chapter – Annual report year: 2007

Sensory characterization of different families of farmed rainbow trout

General information
State: Published
Organisations: Section for Aquatic Process and Product Technology, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry, Section for Aquaculture
Authors: Hyldig, G. (Intern), Leth, N. (Ekstern), Jessen, F. (Intern), Lund, I. (Ekstern), Jokumsen, A. (Intern)
Publication date: 2007

Host publication information
Title of host publication: 23rd NJF-congress, Copenhagen, 27th-29 June
Main Research Area: Technical/natural sciences

Bibliographical note
Abstract
Variable selection in the analysis of proteome data. Removal of irrelevant variables prior to a Jack-knife procedure

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry, Section for Aquatic Process and Product Technology
Authors: Jensen, K. N. (Intern), Jessen, F. (Intern), Jørgensen, B. (Intern)
Publication date: 2007
Main Research Area: Technical/natural sciences

Bibliographical note

Changes in cod muscle proteins during frozen storage revealed by proteome analysis and multivariate data analysis
Multivariate data analysis has been combined with proteomics to enhance the recovery of information from 2-DE of cod muscle proteins during different storage conditions. Proteins were extracted according to 11 different storage conditions and samples were resolved by 2-DE. Data generated by 2-DE was subjected to principal component analysis (PCA) and discriminant partial least squares regression (DPLSR). Applying PCA to 2-DE data revealed the samples to form groups according to frozen storage time, whereas differences due to different storage temperatures or chilled storage in modified atmosphere packing did not lead to distinct changes in protein pattern. Applying DPLSR to the 2-DE data enabled the selection of protein spots critical for differentiation between 3 and 6months frozen storage with 12months frozen storage. Some of these protein spots have been identified by MS/MS, revealing myosin light chain 1, 2 and 3, triose-phosphate isomerase, glyceraldehyde-3-phosphate dehydrogenase, aldolase A and two ?-actin fragments, and a nuclelease diphosphate kinase B fragment to change in concentration, during frozen storage. Application of proteomics, multivariate data analysis and MS/MS to analyse protein changes in cod muscle proteins during storage has revealed new knowledge on the issue and enables a better understanding of biochemical processes occurring.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Kjærsgård, I. V. H. (Intern), Nørrelykke, M. (Ekstern), Jessen, F. (Intern)
Pages: 1606-1618
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Proteomics
Volume: 6
Issue number: 5
ISSN (Print): 1615-9853
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.85 SJR 1.492 SNIP 0.89
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.464 SNIP 0.978 CiteScore 3.7
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.436 SNIP 0.981 CiteScore 3.73
BFI (2013): BFI-level 1
Changes in fish muscle proteins during frozen storage revealed by proteomics combined with multivariate data analysis

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Kjærsgård, I. V. H. (Intern), Nørrelykke, M. (Ekstern), Jessen, F. (Intern)
Publication date: 2006
Event: Poster session presented at Dansk konference om Molekylær Biologi og Bioteknologi, Vejle, Danmark, juni, .
Main Research Area: Technical/natural sciences

Bibliographical note
Poster
Source: orbit
Source-ID: 226235
Publication: Research › Poster – Annual report year: 2006
**Hvad sker der, når vi fryser torskøn?**

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Kjærsgård, I. V. H. (Intern), Nørrelykke, M. R. (Ekstern), Jessen, F. (Intern)
Pages: 42-56
Publication date: 2006
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Fisk og Hav
Issue number: 61
ISSN (Print): 0105-9211
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Links:
http://www.aqua.dtu.dk/Publikationer/Fisk-og-hav.aspx
Source: orbit
Source-ID: 226236
Publication: Research › Journal article – Annual report year: 2006

**Identification of carbonylated proteins in frozen rainbow trout (Oncorhynchus mykiss) fillets and development of protein oxidation during frozen storage**

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Lipids and Oxidation, Section for Aquatic Protein Biochemistry
Authors: Kjærsgård, I. V. H. (Intern), Nørrelykke, M. (Ekstern), Baron, C. (Intern), Jessen, F. (Intern)
Pages: 9437-9446
Publication date: 2006
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Journal of Agricultural and Food Chemistry
Volume: 54
Issue number: 25
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.423 SNIP 1.479 CiteScore 3.44
ISI indexed (2013): ISI indexed yes
Investigation of two different anoxia models by 2-dimensional gel electrophoresis

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Wulff, T. (Intern), Jessen, F. (Intern), Hoffmann, E. (Ekstern)
Pages: A1433-A1433
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: FASEB Journal
Volume: 20
Issue number: 5
ISSN (Print): 0892-6638
Kvallitetsforskelle i opdrætsørred - kan de forudsiges?
Protein and lipid oxidation during frozen storage of rainbow trout

Stress induced changes in sensory properties and proteome of farmed trout

Proteomics combined with multivariate data analysis
Use of multivariate analysis in the transformation of 2D gel images into relevant spot quantity data

General information
State: Published
Organisations: Section for Aquatic Process and Product Technology, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Jensen, K. (Ekstern), Søndergaard, I. (Ekstern), Jacobsen, S. (Ekstern), Jørgensen, B. (Intern), Jessen, F. (Intern)
Publication date: 2006
Event: Poster session presented at 7th Siena meeting from genome to proteome, September 3rd - 7th, Siena, Italy.
Main Research Area: Technical/natural sciences

Bibliographical note
Poster
Source: orbit
Source-ID: 225531
Publication: Research › Poster – Annual report year: 2006

Effect of age and temperature on amino acid composition and the content of different protein types of juvenile cod (Gadus morhua L.) otoliths

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Hüssy, K. (Intern), Mosegaard, H. (Intern), Jessen, F. (Intern)
Pages: 1012-1020
Publication date: 2004
Main Research Area: Technical/natural sciences

Publication information
Journal: Canadian Journal of Fisheries and Aquatic Sciences
Volume: 61
Issue number: 6
ISSN (Print): 0706-652X
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.56 SJR 1.322 SNIP 1.163
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.256 SNIP 1.051 CiteScore 2.22
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.443 SNIP 1.379 CiteScore 2.6
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.421 SNIP 1.081 CiteScore 2.25
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.324 SNIP 1.196 CiteScore 2.29
Two-dimensional gel electrophoresis detection of protein oxidation in fresh and tainted rainbow trout muscle

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Kjærsgård, I. V. H. (Intern), Jessen, F. (Intern)
Pages: 7101-7107
Publication date: 2004
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 52
Issue number: 23
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
Proteome analysis elucidating post mortem changes in cod (Gadus morhua) muscle proteins
Sarcoplasmic reticulum Ca^{2+}-ATPase and cytochrome oxidase as indicators of frozen storage in cod (Gadus morhua)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology, Section for Aquatic Protein Biochemistry
Authors: Godiksen, H. (Intern), Hyldig, G. (Intern), Jessen, F. (Intern)
Pages: 2579-2585
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Science
Volume: 68
Issue number: 8
ISSN (Print): 0022-1147
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.77 SNIP 1.013 CiteScore 1.92
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.83 SNIP 0.985 CiteScore 1.97
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.937 SNIP 1.11 CiteScore 2.07
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.011 SNIP 1.079 CiteScore 2.24
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.978 SNIP 1.086 CiteScore 1.98
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.934 SNIP 1.058 CiteScore 1.9
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.047 SNIP 1.101
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
ATP, IMP, and glycogen in cod muscle at onset and during development of rigor mortis depend on the sampling location

Variation in glycogen, ATP, and IMP contents within individual cod muscles were studied in ice stored fish during the progress of rigor mortis. Rigor index was determined before muscle samples for chemical analyzes were taken at 16 different positions on the fish. During development of rigor, the contents of glycogen and ATP decreased differently in relation to rigor index depending on sampling location. Although fish were considered to be in strong rigor according to the rigor index method, parts of the muscle were not in rigor as high ATP concentrations were found in dorsal and tall muscle.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Cappeln, G. (Intern), Jessen, F. (Intern)
Pages: 991-995
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Science
Volume: 67
Issue number: 3
ISSN (Print): 0022-1147
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes

BFI (2016): BFI-level 1
Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1
Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.937 SNIP 1.11 CiteScore 2.07
Extracting information from two-dimensional electrophoresis gels by partial least squares regression

Two-dimensional gel electrophoresis (2-DE) produces large amounts of data and extraction of relevant information from these data demands a cautious and time consuming process of spot pattern matching between gels. The classical approach of data analysis is to detect protein markers that appear or disappear depending on the experimental conditions. Such biomarkers are found by comparing the relative volumes of individual spots in the individual gels. Multivariate statistical analysis and modelling of 2-DE data for comparison and classification is an alternative approach utilising the combination of all proteins/spots in the gels. In the present study it is demonstrated how information can be extracted by multivariate data analysis. The strategy is based on partial least squares regression followed by variable selection to find proteins that individually or in combination with other proteins vary informatively in relation to the experimental conditions. Finding of such coherent protein patterns leads to identification of potential relations between the involved proteins, and will be useful for focusing further investigation of proteins that relate to the chosen experimental conditions.

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology
Authors: Jessen, F. (Intern), Lametsch, R. (Ekstern), Bendixen, E. (Ekstern), Kjærsgård, I. V. H. (Intern), Jørgensen, B. (Intern)
God og dårlig frossen fisk - hvorfor er der en forskel?

**General information**

**State:** Published  
**Organisations:** Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology  
**Authors:** Jessen, F. (Intern), Nielsen, J. (Intern)  
**Pages:** 16-25  
**Publication date:** 2002  
**Main Research Area:** Technical/natural sciences

**Publication information**

**Journal:** Fisk og Hav  
**Issue number:** 54  
**ISSN (Print):** 0105-9211  
**Ratings:**  
ISI indexed (2013): ISI indexed no  
ISI indexed (2012): ISI indexed no  
ISI indexed (2011): ISI indexed no  
**Original language:** Danish  
**Links:**  
**Source:** orbit  
**Source-ID:** 226042  
**Publication:** Research › Journal article – Annual report year: 2002

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**Temperature and Ca2+-dependence of the sarcoplasmic reticulum Ca2(+-)ATPase in haddock, salmon, rainbow trout and zebra cichlid**

Temperature dependence of Ca2+-ATPase from the sarcoplasmic reticulum (SR) in rabbit muscle has been widely studied, and it is generally accepted that a break point in Arrhenius plot exist at approximately 20 degreesC. Whether the break point arises as a result of temperature dependent changes in the enzyme or its membrane lipid environment is still a matter of discussion. In this study we compared the temperature dependence and Ca2+-dependence of SR Ca2+-ATPase in haddock (Melanogrammus aeglefinus), salmon (Salmo salar), rainbow trout (Oncorhynchus mykiss) and zebra cichlid (Cichlasoma nigrofasciatum). The Arrhenius plot of zebra cichlid showed a break point at 20 degreesC, and the haddock Arrhenius plot was non-linear with pronounced changes in slope in the temperature area, 6-14 degreesC. In Arrhenius plot from both salmon and rainbow trout a plateau exists with an almost constant SR Ca2+-ATPase activity. The temperature range of the plateau was 14-21 and 18-25 degreesC in salmon and rainbow trout, respectively. Ca2+-dependence in the four different fish species investigated was very similar with half maximal activation (K-0.5) between 0.2 and 0.6 muM and half maximal inhibition (I-0.5) between 60 and 250 muM. Results indicated that interaction between SR Ca2+-ATPase and its lipid environment may play an important role for the different Arrhenius plot of the different types of fish species investigated. (C) 2002 Elsevier Science Inc. All rights reserved.

**General information**

**State:** Published  
**Organisations:** National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry  
**Authors:** Godiksen, H. (Intern), Jessen, F. (Intern)  
**Pages:** 35-44  
**Publication date:** 2002  
**Main Research Area:** Technical/natural sciences

**Publication information**

**Journal:** Comparative Biochemistry and Physiology B-Biochemistry & Molecular Biology  
**Volume:** 133  
**Issue number:** 1  
**ISSN (Print):** 1096-4959  
**Ratings:**  
BFI (2018): BFI-level 1  
Web of Science (2018): Indexed yes  
BFI (2017): BFI-level 1  
Web of Science (2017): Indexed Yes
ATP and glycogen content related to gaping in pre rigor cod (Gadus morhua) frozen in blocks at sea

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Cappeln, G. (Intern), Jessen, F. (Intern)
Pages: 49-62
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Aquatic Food Product Technology
Volume: 10
ISSN (Print): 1049-8850
Ratings:
BFI (2018): BFI-level 1
Chilling and freezing of fish and fishery products

General information
Cytochrome oxidase as an indicator of ice storage and frozen storage

The potential of cytochrome oxidase as an indicator of ice storage and frozen storage of fish was investigated. Optimal assay conditions for cytochrome oxidase in a crude homogenate from cod muscle were studied. Maximal cytochrome oxidase activity was found at pH 6.5-7.5 and an assay temperature of 30 degreesC. Maximal activation by Triton X-100 was obtained in a range of 0.62-1.25 mM Triton X-100. The specificity of the assay was high, as cytochrome oxidase was inhibited 98% by 33 muM of the specific inhibitor sodium azide. The coefficient of variation of cytochrome oxidase activity in different cods was 21%, and the coefficient of variation of different analyses on the same homogenate was 5%. It was shown that ice storage of muscle samples before they were frozen and thawed resulted in a major freezing-induced activation of cytochrome oxidase activity. The enzyme may therefore be used as an indicator of frozen fish to determine if the fish has been stored on ice before freezing. Cytochrome oxidase activity showed also potential as an indicator of frozen storage, as it was possible to distinguish between the frozen storage temperatures -9, -20, and -40 degreesC.
Degradation of ATP and glycogen in cod (Gadus morhua) muscle during freezing
Changes in ATP, IMP, lactate and glycogen contents in the muscle of cod were followed during freezing at temperatures of -20°C and -45°C. ATP degradation was accompanied by a corresponding increase in IMP content. Simultaneous measurement of temperature showed that at both freezing rates, the greatest decrease in ATP content was observed when the temperature reached -0.8°C. Glycolysis occurred during freezing of cod as indicated by an increase in lactate content. The changes found in all measured metabolites were more pronounced when freezing was performed at a slow rate compared to a fast rate due to the thermal arrest time at about 0.8°C.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Cappeln, G. (Intern), Jessen, F. (Intern)
Pages: 555-567
Publication date: 2001
Main Research Area: Technical/natural sciences
Glycolysis and ATP degradation in cod (Gadus morhua) at subzero temperatures in relation to thaw rigor

Glycolysis was shown to occur during freezing of cod of decrease in glycogen and an increase in lactate. In addition, the ATP content decreased during freezing. Synthesis of ATP was measured as degradation of glycogen. During storage at -9 and -12 degreesC it was found that degradation of ATP was faster than synthesis of ATP. This was leading to presence of glycogen even at low ATP concentrations. The ATP and glycogen degradation rates and lactate formation rate reached an optimum (both in small samples as well as in whole fish) when stored at -9 degreesC compared to -12 degreesC. Evidence of ATP synthesis at 0 degreesC during thawing was obtained in samples as well as in whole fish. Reduction or elimination of thaw rigor effects (shrinkage and drip loss) during a period of frozen storage were examined. When thawing at 5 degreesC, fillets stored at -9 degreesC showed significantly less shrinkage than fillets stored at -40 degreesC.
addition, pre-rigor fillets (-40 degreesC) showed significantly the smallest drip loss compared with fillets stored at -9 degreesC. (C) 2001 Academic Press.
Sarcoplasmic reticulum CA 2+ ATPase activity in cod (Gadus morhua) muscle measured in crude homogenates

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Godiksen, H. (Intern), Jessen, F. (Intern)
Pages: 343-358
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Biochemistry
Volume: 25
Issue number: 4
ISSN (Print): 0145-8884
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.394 SNIP 0.602 CiteScore 1.09
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.421 SNIP 0.585 CiteScore 1.13
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.409 SNIP 0.555 CiteScore 0.9
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.426 SNIP 0.613 CiteScore 1.03
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.449 SNIP 0.7 CiteScore 0.89
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.442 SNIP 0.492 CiteScore 0.92
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.474 SNIP 0.754
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.618 SNIP 0.769
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.542 SNIP 0.633
Scopus rating (2007): SJR 0.45 SNIP 0.98
Scopus rating (2006): SJR 0.349 SNIP 0.694
Scopus rating (2005): SJR 0.377 SNIP 0.828
Scopus rating (2004): SJR 0.445 SNIP 0.674
Scopus rating (2003): SJR 0.318 SNIP 0.488
Scopus rating (2002): SJR 0.484 SNIP 0.541
Scopus rating (2001): SJR 0.692 SNIP 0.99
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.325 SNIP 0.609
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.468 SNIP 0.646
Original language: English
Source: orbit
Source-ID: 225529
Publication: Research - peer-review › Journal article – Annual report year: 2001
The effect of ice storage and freeze/thaw cycles on CA 2+ -ATPase and Cytochrome oxidase activity in salmon (Salmo salar)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Protein Biochemistry
Authors: Godiksen, H. (Intern), Jessen, F. (Intern)
Pages: 151-159
Publication date: 2001
Conference: 30th West European Fish Technologist's Association Plenary Meeting, Torshavn, Faroe Islands, 19/06/2000 - 19/06/2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Annales Societatis Scientiarum Færoensis Supplementum
Volume: XXVIII
ISSN (Print): 0356-6772
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
BFI (2016): BFI-level 1
BFI (2015): BFI-level 1
BFI (2014): BFI-level 1
BFI (2013): BFI-level 1
ISI indexed (2013): ISI indexed no
BFI (2012): BFI-level 1
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1
BFI (2009): BFI-level 1
BFI (2008): BFI-level 1
Original language: English
Source: orbit
Source-ID: 225533
Publication: Research › Conference article – Annual report year: 2001

Identification of fish species after cooking by SDS-PAGE and Urea IEF: a collaborative study

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Pages: 2653-2658
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 48
Issue number: 7
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Species identification of smoked and gravad fish products by sodium dodecylsulphate polyacrylamide gel electrophoresis, urea isoelectric focusing and native isoelectric focusing: a collaborative study

A collaborative study on the use of sodium dodecylsulphate polyacrylamide gel electrophoresis (SDS-PAGE), urea-iseoelectric focusing (urea-IEF) and native isoelectric focusing for the identification of species of smoked salmonids, gravad salmonids and smoked eels was carried out by eight laboratories. With SDS-PAGE, minor changes took place in the profiles of the processed salmonid species making it impossible or very difficult to identify closely related species. With urea-IEF, there were fewer changes in the profiles due to processing and the system generally had greater species-discriminating power for the processed salmonids than SDS-PAGE. The profiles of the eel species as obtained on SDS-PAGE or urea-IEF were not affected by smoking. Urea-IEF had greater species-discriminating power than SDS-PAGE for the eel species. Native IEF was useful in providing supplementary identification on species difficult to identify by SDS-PAGE or by urea-IEF in the case of cold smoked products. (C) 2000 Elsevier Science Ltd. All rights reserved.
A standarized method of identification of raw and heat-processed fish by urea isoelectric focusing: A collaboratory study

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Etienne, M. (Ekstern), Jerome, M. (Ekstern), Fleurence, J. (Ekstern), Rehbein, H. (Ekstern), Kundiger, R. (Ekstern), Yman, I. (Ekstern), Ferm, M. (Ekstern), Craigh, A. (Ekstern), Mackie, I. (Ekstern), Jessen, F. (Intern), Smelt, A. (Ekstern), Luten, J. (Ekstern)
Pages: 1923-1933
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Electrophoresis
Volume: 20
Issue number: 10
Development of a sodium dodecyl sulfate-polyacrylamide gel electrophoresis reference method for the analysis and identification of fish species in raw and heat-processed samples: A collaborative study

A collaborative study was carried out in seven European labs with the aim of achieving a sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) standard operation procedure to identify fish species in raw and cooked samples. Urea and SDS-containing solutions were evaluated as extractants. Several pre-electrophoretic operations - such as treatment with RNase/DNase, ultrafiltration and desalting - and up to ten types of gels and three SDS-PAGE systems were considered. The SDS-containing solution allowed a higher protein extractability than urea. Unlike urea extraction, SDS extraction seemed not to be influenced so much by the state of the sample (raw, cooked at 60 degrees C, cooked at 85 degrees C). Desalting, ultrafiltration or treatment with RNase/DNase did not improve the discriminatory power of the protein patterns. Commercial homogeneous 15% ExcelGels, especially when they were silver stained, yielded good results and afforded higher reproducibility, thus allowing a better matching of results among the laboratories participating in this collaborative study. Under the optimized technical conditions described above, all the fish species tested, either raw and cooked, yielded reproducible and discriminant species-specific protein patterns.

General information

State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Pages: 1425-1432
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication Information

Journal: Electrophoresis
Volume: 20
Issue number: 7
ISSN (Print): 0173-0835
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.64 SJR 0.85 SNIP 0.777
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.851 SNIP 0.825 CiteScore 2.53
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.056 SNIP 0.892 CiteScore 2.88
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.154 SNIP 0.992 CiteScore 3.13
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.368 SNIP 0.983 CiteScore 3.24
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.525 SNIP 0.923 CiteScore 3.17
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.591 SNIP 0.932
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.481 SNIP 1.014
Web of Science (2009): Indexed yes
Species identification of cooked fish by urea isoelectric focusing and sodium dodecylsulfate polyacrylamide gel electrophoresis: a collaborative study

The suitability and reliability of urea IEF and SDS-PAGE for the identification of cooked fish flesh was tested by a collaborative study among nine laboratories. Urea IEF was performed with CleanGels as well as with ImmobilineGels, and ExcelGels were used for SDS-PAGE, enabling all three types of gels to be run in the same flat bed electrophoresis chamber. By strictly following optimised standard operation procedures (SOPs), five unknown cooked samples had to be identified with each technique using a set of 10 raw reference samples. With urea IEF, only one out of 35 identifications was incorrect, and with SDS-PAGE a similar result was obtained. It was concluded that methods, as now developed, are suitable for checking the species declaration of fishery products. (C) 1999 Elsevier Science Ltd. All rights reserved

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Pages: 333-339
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Food Chemistry
Volume: 67
Issue number: 4
ISSN (Print): 0308-8146
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.85 SJR 1.706 SNIP 2.091
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.597 SNIP 1.962 CiteScore 4.31
Web of Science (2015): Indexed yes
Synthesis and degradation of adenosine triphosphate in cod (Gadus morhua) at subzero temperatures

This study has demonstrated that the extraction step is very important when analysing ATP and its degradation products. An important factor is whether the sample is fresh, frozen or thawed when homogenised since thawing of the sample will lead to rapid loss of ATP. During frozen storage it was found that ATP in cod (Gadus morhua) was stable at -40 degrees C in small samples for at least 12 weeks. At -20 degrees C it was found that ATP content increases initially and thereafter falls. It was demonstrated that degradation of ATP in small samples occurs faster at 0 degrees C than at -2 and -5 degrees C. Furthermore, it was found that in whole cod ATP could be synthesised at a significant rate at -7 degrees C. (C) 1999 Society of Chemical Industry.

General information
State: Published
Factors affecting the quality of frozen meat and fish

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology
Authors: Archer, G. (Ekstern), Evans, J. (Ekstern), Jessen, F. (Intern), Nielsen, J. (Intern), James, S. (Ekstern)
Pages: 17-25
Publication date: 1998

Host publication information
Place of publication: Leeds
Publisher: University of Leeds
Editors: Kennedy, C., Archer, G.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 224822
Publication: Research - peer-review › Book chapter – Annual report year: 1998

Freeze denaturation of fish proteins investigated by DSC

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Jessen, F. (Intern), Geirsdottir, M. (Ekstern)
Publication date: 1998

Host publication information
Title of host publication: Contribution at the concerted action: The preservation of frozen food quality and safety throughout the distribution chain
Main Research Area: Technical/natural sciences

Bibliographical note
Portomeeting, 10-13 September 1998
Source: orbit
Source-ID: 226040
Publication: Research › Book chapter – Annual report year: 1998

Relation between TMAOase activity and content of formaldehyde in fillet minces and bellyflap mince from gadoid fishes

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquatic Process and Product Technology, Section for Aquatic Protein Biochemistry
Pages: 114-118
Publication date: 1997
Main Research Area: Technical/natural sciences
Relation between TMAOase activity and content of formaldehyde in fillet minces and bellyflap minces from gadoid fishes

General information
State: Published
Organisations: National Institute of Aquatic Resources
Pages: 114-118
Publication date: 1997
Main Research Area: Technical/natural sciences

Fish quality - role of biological membranes

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Jessen, F. (Intern)
Publication date: 1995

Influence of variation in methodology on reliability of the isoelectric focusing method of fish species identification

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Rehbein, H. (Ekstern), Etienne, M. (Ekstern), Jerome, M. (Ekstern), Hattula, T. (Ekstern), Knudsen, L. (Ekstern), Jessen, F. (Intern), Luten, J. (Ekstern), Bouquet, W. (Ekstern), Mackie, I. (Ekstern), Ritchie, A. (Ekstern), Martin, R. (Ekstern), Mendes, R. (Ekstern)
Pages: 193-197
Publication date: 1995
Main Research Area: Technical/natural sciences
Partial purification and characterization of a cellular acidic phospholipase A2 from cod (Gadus morhua) muscle

General information
State: Published
Organisations: Section for Aquatic Protein Biochemistry, National Institute of Aquatic Resources
Authors: Aaen, B. (Ekstern), Jessen, F. (Intern), Jensen, B. (Ekstern)
Pages: 547-554
Publication date: 1995
Main Research Area: Technical/natural sciences

Publication information
Journal: Comparative Biochemistry and Physiology. Part B: Biochemistry & Molecular Biology
Volume: 110
ISSN (Print): 1096-4959
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.607 SNIP 0.787 CiteScore 1.7
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.736 SNIP 0.775 CiteScore 1.69
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.734 SNIP 0.745 CiteScore 1.87
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.717 SNIP 0.979 CiteScore 2.11
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.678 SNIP 0.948 CiteScore 2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.74 SNIP 0.91 CiteScore 2.14
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.631 SNIP 0.896
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.591 SNIP 0.775
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.577 SNIP 0.809
Scopus rating (2007): SJR 0.674 SNIP 0.845
Scopus rating (2006): SJR 0.632 SNIP 0.818
Scopus rating (2005): SJR 0.674 SNIP 0.824
Scopus rating (2004): SJR 0.71 SNIP 0.867
Scopus rating (2003): SJR 0.605 SNIP 0.827
Scopus rating (2002): SJR 0.458 SNIP 0.675
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.433 SNIP 0.639
Global population growth and increase in living standards will push up the demand for fish-derived protein in the future. However, resource scarcity (feed, water and energy), environmental impacts, and changes in climate and growing conditions can seriously hamper aquaculture that supplies a significant proportion of human food. New sustainable protein and lipid sources and improved technologies to increase bio-availability of existing sources will be needed to ensure adequate supply of aquafeeds to ensure growth of aquaculture. On the other hand, the growth of the industry has caused environmental concerns. Interestingly, aquaculture effluents can be an excellent medium for algal growth, although they are not usually reused since they contain residual organic compounds, minerals and other micro-pollutants.

MARINALGAE4aqua is an innovative research project that targets the development of strategies to increase efficiency of important European farmed fish species (Atlantic salmon and European sea bass) and reduce the environmental impact using micro- & macro-algal biomass as feed ingredients by: I. Culturing marine algae under optimized technological processes to remove organic compounds and minerals from fish farm effluents, and producing high value products for aquafeeds while recycling nutrients; thus improving the water body quality and reducing the environmental impact. II. Identifying novel feed additives to improve fish digestive capacity and nutrient metabolism upon using the selected algae. III. Improving fish growth and end product quality, reducing time to slaughter and providing a safe and healthy food item.
with wide consumer acceptance. MARINALGAE4aqua aims to tackle the sustainability challenges of the aquafeed industry by developing cost-effective and resource-efficient alternatives to FM and FO by providing: a) efficient new processes to valorise selected marine algae that could reduce EU imports of protein and lipid sources and minimize over-exploitation of wild fish stocks, loss of biodiversity and environmental burden and b) high sensory quality, acceptable fish products that meet food safety standards and dietary needs for a healthy life. MARINALGAE4aqua will exploit cost-efficient and environmentally sustainable production and processing technologies to produce algal biomass suitable for inclusion in aquafeeds. MARINALGAE4aqua is innovative and cutting edge - it adopts a multidisciplinary approach, integrating molecular (genomics, proteomics) and traditional tools to address physiological, nutritional and environmental challenges in modern aquaculture – providing state-of-the-art knowledge to identify strategies to increase efficiency of farming important European fish species.

National Food Institute
Research Group for Food Production Engineering
Period: 01/06/2016 → 31/05/2019
Number of participants: 1
Acronym: MARINALGAE4Aqua
Project participant: Jessen, Flemming (Intern)

Sustainable technologies for optimization of resources and quality in shrimp production
Peeling of shrimp is a challenge to the industry and the mechanisms involved in shell loosening are unknown. Today a storage period of several days is required before the shrimp can be peeled with a satisfactory yield and with only few shell remains. Using non-thermal technologies as high pressure, microwaves, ultrasound, and treatment with enzymes the aim of the project is to optimize the shell loosening process facilitating peeling as fast as possible after catch.

National Food Institute
Research Group for Food Production Engineering
Research Group for Analytical and Predictive Microbiology
Period: 01/01/2015 → 30/06/2018
Number of participants: 4
Acronym: TECHSHELL
Project participant: Jessen, Flemming (Intern)
Gringer, Nina (Intern)
Dalgaard, Paw (Intern)
Koukou, Ioulia (Intern)

Identification and quantification of antimicrobial and antioxidant peptides formed during processing of nitrite cured cooked pork products (IQ-Pork)

National Food Institute
Period: 15/11/2014 → 15/05/2018
Number of participants: 5
Phd Student: Pedersen, Sabrine Tauber (Intern)
Supervisor: Baron, Caroline P. (Intern)
Duedahl-Olesen, Lene (Intern)
Koch, Anette Granly (Ekstern)
Main Supervisor: Jessen, Flemming (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Project: PhD
**High value protein products in seaweed**
The overall aim of the project is to develop new technologies that will ensure full utilization of the seaweed raw materials used for carrageenan production. More specifically, the aim is to develop new technologies to extract proteins from the seaweed either before or after extraction of carrageenan. Different mechanical and enzymatic technologies will be evaluated. The protein composition and the quality of the carrageenan fraction after extraction of proteins will be determined. The process will be scaled up to pilot scale if promising results are obtained in lab scale.

National Food Institute

Research Group for Bioactives – Analysis and Application

Research Group for Food Production Engineering

Period: 20/10/2014 → 31/01/2016
Number of participants: 5
Acronym: HIT
Project participant:
Jacobsen, Charlotte (Intern)
Holdt, Susan Løvstad (Intern)
Naseri, Alireza (Intern)
Kryger, Karsten (Intern)
Jessen, Flemming (Intern)

**Financing sources**
Source: Private funding (private)
Name of research programme: KP Pedersen og Hustru Fond
Amount: 800,000.00 Danish Kroner

**Rapid methods for determination of enzyme activity and degree of ripeness - herring (pelagic)**
In this Norwegian project on alternative production of matjes (herring) the National Food Institute participates on a part concerning protein changes occurring in the herring muscle during the ripening process. By 2D-gel based proteome analysis we will identify these changing proteins in order to define candidate protein markers for establishment of a process control system and also to create knowledge of the ripening process at the molecular level.

National Food Institute

Division of Industrial Food Research

Period: 01/10/2014 → 31/05/2015
Number of participants: 4
Project participant:
Christensen, Line Bach (Ekstern)
Skåra, Ragnhild (Ekstern)
Jessen, Flemming (Intern)

Project Manager, academic:
Skåra, Torstein (Ekstern)

**Financing sources**
Source: Public research council
Name of research programme: Fiskeri- og havbruksnæringens forskningsfond (FHE), Norge
Web address: http://www.fhf.no/about-fhf/
Amount: 356,059.00 Danish Kroner

**New analytical process programs- and technologies for optimasation of acid marinated herring production**

National Food Institute

Period: 01/05/2014 → 17/05/2018
Number of participants: 5
Phd Student:
Laub-Ekgreen, Maria Helbo (Intern)

Supervisor:
Frosch, Stina (Intern)
Jørgensen, Bo Munk (Intern)
Martinez Lopez, Brais (Intern)

Main Supervisor:
Jessen, Flemming (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Project: PhD

Udvikling af bæredygtige innovative fødevareingredienser på basis af ørredrestprodukter

National Food Institute
Research Group for Bioactives – Analysis and Application
Research Group for Food Production Engineering
Research Group for Nano-Bio Science
Period: 01/01/2014 → 31/12/2015
Number of participants: 12
Acronym: DANFOMEGA
Project participant:
Barlach, Anders (Ekstern)
Honold, Philipp (Intern)
Sørensen, Ann-Dorit Moltke (Intern)
Nouard, Marie-Louise (Intern)
Jessen, Flemming (Intern)
Sloth, Jens Jørgen (Intern)
Rasmussen, Rie Romme (Intern)
Berner, Lis (Intern)
Vu, Thi Thu Trang (Intern)
D. Hansen, Erik (Ekstern)
Ørum, Poul (Ekstern)
Project Manager, academic:
Jacobsen, Charlotte (Intern)

Financing sources
Source: Public research programme (public)
Name of research programme: Grønt Udviklings- og DemonstrationsProgram (GUDP)
Amount: 10,940,907.00 Danish Kroner
Project

Muscle-specific stability of pork packaged in modified atmosphere during refrigerated storage

National Food Institute
Period: 01/11/2012 → 21/04/2016
Number of participants: 8
Phd Student:
Spanos, Dimitrios (Intern)
Supervisor:
Baron, Caroline P. (Intern)
Christensen, Mette (Ekstern)
Tørnsgren, Mari Ann (Ekstern)
Main Supervisor:
Jacobsen, Charlotte (Intern)
Examiner:
Jessen, Flemming (Intern)
Ertbjerg, Per (Ekstern)
Lund, Marianne Nissen (Ekstern)
Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU) Samf.
Project: PhD

Functional nano-microstructures for food and bioengineering applications
National Food Institute
Period: 01/03/2012 → 02/07/2015
Number of participants: 3
Phd Student:
Jørgensen, Lars (Intern)
Supervisor:
Jessen, Flemming (Intern)
Main Supervisor:
Chronakis, Ioannis S. (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Forskningsrådsfinansiering
Project: PhD

Development and characterization of nano-microstructures as carrier for bioactive compounds
National Food Institute
Period: 01/10/2011 → 02/09/2015
Number of participants: 6
Phd Student:
Boutrup Stephansen, Karen (Intern)
Supervisor:
Chronakis, Ioannis S. (Intern)
Main Supervisor:
Jessen, Flemming (Intern)
Examiner:
Sloth, Jens Jørgen (Intern)
Fojan, Peter (Ekstern)
Sarmento, Bruno (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Forskningsrådsfinansiering
Project: PhD

Functional Electrospun Nanostructures and Microstructures for Food and Bioengineering Applications
The objectives of this project is to generate the scientific and technological basis to: (i) develop new nano-microcarrier systems for bioactive compounds using electrospun nano-microstructures for their immobilization, (ii) develop new nano-micodelivery systems utilizing enzyme functionality and molecular imprinted polymers for controlled delivery/release of bioactives, (iii) study the structural and functional properties of nano-microstructures (NMS) as novel components of food and bioengineered products, (iv) evaluate their bioavailability and degradation/digestion in-vitro and in-vivo.

The overall aim is to create new functional systems that have a potential usage in foods/healthy foods, as nutritional supplements, as pharmaceutical products and for a range of other bioengineering applications. The project's ambition is also to contribute to research training in research institutes and industrial companies as well as education of industrial employees. We expect that the obtained knowledge will strengthen the Danish industry’s potential to emerging nanomicrotechnologies and technologies of bioactives.

National Food Institute
Division of Industrial Food Research
Department of Chemical and Biochemical Engineering
Center for BioProcess Engineering
Period: 01/05/2011 → 31/10/2015
Number of participants: 10
Acronym: FENAMI
Project participant:
Meyer, Anne S. (Intern)
Qvortrup, Klaus (Ekstern)
Ye, Lei (Ekstern)
Goycoolea, F.M. (Ekstern)
Nielsen, Kent Albin (Ekstern)
Jessen, Flemming (Intern)
Boutrup Stephansen, Karen (Intern)
Jørgensen, Lars (Intern)
Mendes, Ana Carina Loureiro (Intern)
Project Manager, academic:
Chronakis, Ioannis S. (Intern)

Financing sources
Source: Public research council
Name of research programme: Danish Research Council/Programme Commission for “Sundhed, Fødevarer og Velfærd”
Amount: 14,866,637.00 Danish Kroner

Relations
Activities:
FENAMI Project Course : Advances in Bioinspired Nanomaterials and Approaches in Life Sciences
Project

Discovery and characterization of novel bioactive peptides from marine secondary products
National Food Institute
Period: 01/03/2010 → 02/07/2014
Number of participants: 7
Phd Student:
Falkenberg, Susan Skanderup (Intern)
Supervisor:
Jessen, Flemming (Intern)
Stagsted, Jan (Ekstern)
Main Supervisor:
Nielsen, Henrik Hauch (Intern)
Examiner:
Jørgensen, Bo Munk (Intern)
Kristensson, Hordur G. (Ekstern)
Rustad, Turid (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU) Samf.
Project: PhD

Screening the redox-, glyco- and phosphoproteomes in lactobacillus acidophilus NCFM and related bacteria
Department of Systems Biology
Period: 01/09/2009 → 03/02/2014
Number of participants: 6
Phd Student:
Dedvisitsakul, Plaipol (Intern)
Supervisor:
Jacobsen, Susanne (Intern)
Main Supervisor:
Svensson, Birte (Intern)
Examiner:
Financing sources
Source: Internal funding (public)
Name of research programme: Stipendie fra udlandet
Project: PhD

Aquatic Resources as a Source of Potential Natural Antioxidants for Food Industry

It is well documented that long-chain polyunsaturated omega-3 fatty acids (omega-3 PUFA) have a range of beneficial health effects such as reducing atherosclerosis, prevention and treatment of numerous disorders like cardiovascular disease, cancer, diabetics, mental illness etc.

At the same time they are very susceptible to lipid oxidation that not only causes deterioration of food sensory quality, but also contributes to carcinogenesis, atherosclerosis and aging processes in humans. Hence, the oxidative instability of omega-3 fatty acids often limits their use as nutritionally beneficial lipids in fish oil enriched foods. Addition of antioxidants that scavenge free radicals and control pro-oxidative metals is used to retard lipid oxidation.

Many of the most commonly used antioxidants are synthetic compounds, which have been reported to possess carcinogenic effect in humans and there is, therefore a need to find potent and safer natural antioxidants.

Many living organisms in the marine environment are rich in omega-3 PUFA. Our hypothesis is therefore that these marine organisms are rich in natural antioxidants that are able to protect them against lipid oxidation and that these antioxidants can be used to protect foods against oxidation.

Objectives
The overall goal of the project is to identify natural compounds with antioxidant activity from aquatic resources such as marine algae, bacteria, fungi, peptides isolated from fish waste and to evaluate potential applications of these novel compounds to enhance oxidative stability, flavor quality and nutritional value of foods enriched with omega-3 fatty acids and seafood based products.

This will be achieved by:

Screening extracts from aquatic resources like marine algae, bacteria, fungi and peptides isolated from fish waste for their antioxidative mechanisms and properties and identifying the most promising sources of antioxidants.

Evaluating the antioxidant properties of the most promising antioxidant sources in different foods systems enriched with omega-3 fatty acids such as milk, dressing and seafood.

Project financing:
Danish research council for Technology and production (FTP)
National Food Institute
Division of Industrial Food Research
Department of Systems Biology
Bacterial Ecophysiology and Biotechnology
Metabolomics Platform
Period: 01/01/2009 → 31/12/2012
Number of participants: 6
Acronym: Potential natural antioxidants
Contact person:
Jacobsen, Charlotte (Intern)
Project participant:
Gram, Lone (Intern)
Jessen, Flemming (Intern)
Nielsen, Henrik Hauch (Intern)
Nielsen, Kristian Fog (Intern)
Project Manager, organisational:
Farvin Habebullah, Sabeena (Intern)
Utilisation of bioactive peptides from fish processing - Upgrading the value of secondary products.

Fish and seafood products contain bioactive peptides with different health promoting effects on e.g. blood pressure, immune system, cancer, diabetes, obesity and ulcer. Some bioactive peptides are present per se in the fish whereas most are only formed by degradation of the proteins. The aim of the project was to find bioactive peptides in enzymatic hydrolysed fish parts or whole fish not used for human consumption. We have found many peptide preparations with positive effects on the enzyme regulating blood tension (ACE) and with antioxidative effects, but also several that inhibit or kill pancreatic cancer cells in culture and some that strongly inhibit the adhesion of ulcer forming bacteria (Helicobacter pylori) to stomach cells in culture. Especially the effects on cancer cells and bacteria have interesting perspectives if the peptides show up to function in whole organisms, including human, because they would then have potential as future anticancer and antibacterial drugs.

National Food Institute
Division of Industrial Food Research
Division of Toxicology and Risk Assessment
Period: 01/04/2008 → 31/12/2012
Number of participants: 10
Acronym: PEPFISH
Project participant:
Nielsen, Henrik Hauch (Intern)
Andersen, Lisa Lystbæk (Intern)
Nielsen, Michael Engelbrecht (Intern)
Hoffmann, Else K. (Ekstern)
Andersen, Leif Percival (Ekstern)
Elvevol, Edel Oddny (Ekstern)
Jakobsen, Greta (Ekstern)
Rørvig, Peter (Ekstern)
Project Manager, academic:
Jessen, Flemming (Intern)
Working partner:
Lynglev, Gitte Budolfson (Ekstern)

Financing sources
Source: Public research council
Name of research programme: Programkomiteen for Sundhed, Fødevarer og Velfærd
Amount: 8,000,000.00 Danish Kroner
Project

Fiskekvalitet og fiskehelse- sygdoms indflydelse på kødkvalitet hos fisk

National Food Institute
Period: 01/10/2007 → 22/09/2010
Number of participants: 6
Phd Student:
Ingerslev, Hans-Christian (Intern)
Supervisor:
Nielsen, Henrik Hauch (Intern)
Main Supervisor:
Nielsen, Michael Engelbrecht (Intern)
Examiner:
Jessen, Flemming (Intern)
Andersen, Leif Percival (Ekstern)
Wiegertjes, Geert Frits (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Offentlig finansiering
Project: PhD
Allergenicity of Peptides from Food Allergens - a Food Allergy Sensitisation Study

National Food Institute
Period: 01/01/2007 → 27/06/2012
Number of participants: 6
Phd Student:
Bøgh, Katrine Lindholm (Intern)
Supervisor:
Barkholt, Vibeke (Intern)
Main Supervisor:
Madsen, Charlotte Bernhard (Intern)
Examiner:
Jessen, Flemming (Intern)
Knippels, Léon M. J. (Ekstern)
Skov, Per Stahl (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: 1/3 DTU-stip, 2/3 FUR/andet
Project: PhD

Healthy, Nutritious and Tasty Fish for the Future

National Food Institute
Period: 01/01/2007 → 21/12/2011
Number of participants: 6
Phd Student:
Rentsch, Maria Louise (Intern)
Supervisor:
Lauritzen, Lotte (Ekstern)
Main Supervisor:
Jessen, Flemming (Intern)
Examiner:
Jørgensen, Bo Munk (Intern)
Højrup, Peter (Ekstern)
Yaqoob, Parveen (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Offentlig finansiering
Project: PhD

Superfrystning af fisk - optimering af kvalitet og økonomi

National Food Institute
Period: 01/03/2006 → 21/04/2010
Number of participants: 5
Phd Student:
Burgaard, Maria Garver (Intern)
Main Supervisor:
Jørgensen, Bo Munk (Intern)
Examiner:
Jessen, Flemming (Intern)
Arason, Sigurjón (Ekstern)
Karlsson, Anders Hans (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Ansat eksternt
Project: PhD
Ultra Lav Temperatur Forsyningskæde for akvakultur produkter baseret på Ørred og Ørredkaviar

National Food Institute

Division of Industrial Food Research
Period: 05/01/2006 → 31/12/2007
Number of participants: 2
Project Manager, organisational:
Priess, Henning (Ekstern)
Project Manager, academic:
Jessen, Flemming (Intern)

Organic Aquaculture - the linkage between sustainable production and superior products
This project will contribute to the successful establishment of organic trout farming in Denmark. It will develop and optimise new recipes for organic fish feeds with high levels of organic vegetable protein of Danish origin. These will be fed to trout to investigate feed quality as digestibility, effects on the environment, feed conversion, and growth. Effects of the feeds upon general health and welfare, and immunocompetence (vaccination efficacy), will be assessed. Objective sensory and biochemical analyses will provide an overall picture of the eating quality of trout raised with the new organic feeds at an organic farm. Consumer preference for trout with pale coloured meat will be explored, plus other market issues for organic trout (supply chain, traceability, export). Results will be disseminated to industry, consumers and regulatory authorities with open workshops. Guidelines will be prepared for optimal rearing and marketing of organic trout.

National Veterinary Institute

National Food Institute
Division of Seafood Research
Division of Industrial Food Research
Danish Institute for Fisheries and Marine Research
Royal Veterinary and Agricultural University
Danish Technological Institute

Dansk Akvakultur
Period: 01/01/2006 → 31/12/2010
Number of participants: 11
Acronym: ORAQUA
Project ID: 22451
Project participant:
Jokumsen, Alfred (Ekstern)
Pedersen, Lars-Flemming (Ekstern)
Dalsgaard, Inger (Intern)
Nielsen, Henrik Hauch (Intern)
Jacobsen, Charlotte Munch (Ekstern)
Jessen, Flemming (Intern)
Larsen, Erling P. (Ekstern)
Nielsen, Michael Engelbrecht (Ekstern)
Kold, John (Ekstern)
Larsen, Villy J. (Ekstern)
Project Manager, organisational:
McKenzie, David J. (Ekstern)

Financing sources
Source: Forskningsprojekter - Fødevareministeriet
Name of research programme: Forskningsprojekter - Fødevareministeriet
Amount: 548,554.00 Danish Kroner
**Prediction of technological and sensory quality of trout**

Manufacturing food of high and uniform quality requires good knowledge of the characteristics of the raw material, and knowledge of how these characteristics vary between different raw materials. It is also necessary to know how suitable a given raw material is for different types of product, and how the interaction between raw materials and production technology affects the sensory quality of the final product.

The most important differences between fish raw materials will be reflected in the pheno type of the fish, irrespective of whether the cause of this is genetic or environmental. Characterization of pheno type will thus be appropriate to identifying the characteristics of the raw material (protein markers) that will be included in a model to predict the technological and sensory quality of the final product.

The project will produce a number of frozen and smoked products from different raw materials. Characterisation of pheno types will take place through proteom analyses, where image analysis of 2DE gels will reveal protein markers that can potentially relate the quality of the final product to the characteristics of the original raw material. These proteins will be identified using mass spectroscopy and antibodies against them will be raised. The antibodies will be used to develop rapid immune chemical methods. The quality of both the different varieties of raw materials and the

National Food Institute
Division of Industrial Food Research
Department of Systems Biology

Enzyme and Protein Chemistry
Period: 01/08/2003 → 30/04/2009
Number of participants: 6
Project participant:
Kjærgård, Inger Vibeke Holst (Intern)
Godiksen, Helene (Intern)
Hyldig, Grethe (Intern)
Barkholt, Vibeke (Intern)
Frekær, Hanne (Intern)
Project Manager, academic:
Jessen, Flemming (Intern)

**Væksthastighed og kvalitet af opdrætsfisk - Effekt af avlsarbejde på regnbueørred**

Department of Systems Biology
Period: 01/02/2002 → 23/10/2006
Number of participants: 4
Phd Student:
Leth, Niels Krarup (Ekstern)
Main Supervisor:
Jessen, Flemming (Intern)
Examiner:
Jacobsen, Susanne (Intern)
Frier, Jens-Ole (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Kandidatstipendium ansat ekste
Project: PhD

**Proteome analysis of muscle tissues: Two dimensional protein mapping of pig and cod muscle.**

Certain aspects of muscle biology such as metabolism, growth and development of muscle cells influence the quality of muscle based foods. In addition, the proteolytic processes that start immediately after slaughter or catch (post mortem metabolism) have major impact on taste and texture of meat from fish and mammals. In order to secure optimal quality, it is important to understand the basic mechanisms of muscle biology as well as to understand the post mortem processes that turn muscle into meat. Hence it is important to characterize the involved proteins and genes, and how they interact with each other and with environmental factors to influence meat quality. Proteome analysis is a new and powerful tool for characterization of cellular protein expression. This method is based on 2 dimensional (2D) electrophoretic separation of the cellular proteins so that each protein can be identified by its specific coordinates in a 2D protein map from which it can be extracted and identified by micro sequencing and mass spectrometry. Our aim is to establish and optimize such 2D
protein maps of muscle tissues from cod and pork. Existing methods of tissue preparation, 2D gel separation and computer assisted image analysis of the 2D maps will be optimized. The established 2D maps will be used to study proteins that are involved in post mortem changes of muscle tissue, in order to find and identify marker proteins that can be used as assays for quality labeling.

National Institute of Aquatic Resources
Danish Institute of Agricultural Sciences
Period: 01/07/1999 → 31/05/2003
Number of participants: 3
Project participant:
Kjærgård, Inger Vibeke Holst (Intern)
Stampe-Villadsen, Hanne Lilian (Intern)
Project Manager, organisational:
Jessen, Flemming (Intern)

Financing sources
Source: Unknown
Name of research programme: Uckendt
Amount: 5,135,000.00 Danish Kroner
Project

Kvalitet af muskelbaserede fiskeprodukter
Department of Systems Biology
Period: 01/10/1998 → 17/05/2004
Number of participants: 7
Phd Student:
Jensen, Kristina Nedenskov (Intern)
Supervisor:
Jørgensen, Bo Munk (Intern)
Martens, Harald (Intern)
Main Supervisor:
Nielsen, Jette (Intern)
Examiner:
Jessen, Flemming (Intern)
Frisvad, Jens Christian (Intern)
Ofstad, Ragni (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Forskerakademiets Samfinansier
Project: PhD

Membranbundne enzymer som fryselagringsindikatorer
Department of Systems Biology
Period: 01/03/1997 → 10/09/2001
Number of participants: 5
Phd Student:
Godiksen, Helene (Intern)
Main Supervisor:
Jessen, Flemming (Intern)
Examiner:
Jørgensen, Bo Munk (Intern)
Nielsen, Robert (Ekstern)
Rehbein, Hartmut (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Program Stipendium-SU, Eksp
Project: PhD
Quality indicators for frozen fish
An important factor for efficient utilisation of the resources of fish is quality assurance in the chain from catch to consumer. Freezing is an effective method for preserving fat and lean fish. In order to reduce the quality loss during processing, storing and distribution it is necessary to obtain better knowledge of the biochemical shelf life indicators of the different species. It is important to create a system of traceability of the fish through the chain for the benefit of the consumer. On the background of the obtained knowledge in the project the objective is to construct a model for labelling of quality, prediction of shelf life and utilisation and to obtain a better freezing stability. The aim is to give guidelines for the optimum handling of fish prior to freezing, the optimum freezing-, storage- and thawing conditions and to collect data necessary for prediction of a production of thawed fish packed in MAP based on raw material frozen-at-sea. The effect of season, catch handling, cold/chilled storage period and temperature is examined.

Advanced methods for identification and quality monitoring of (heat) processed fish
Objectives: -Development of methods for fish species identification, which are tailored for the various types of heated products. -Evaluation of these methods by collaborative studies. -Testing the suitability of image analysis for interpretation and comparison of electrophoresis gels. -Development of a data base containing physical parameters (isoelectric point and/or molecular weight) of proteins for fish species identification. This reference data base will contain data for raw and heated fish and products. -Evaluation of electrophoretic methods to monitor processing parameters (the heating temperature) of fishery products.

2D og 3D objektmåling til styring og kvalitetskontrol i industri
Department of Systems Biology
Period: 01/01/1997 → ...
Number of participants: 3
Phd Student: Gramkow, Claus (Intern)
Main Supervisor: Jessen, Flemming (Intern)
Examiner: Nielsen, Allan Aasbjerg (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Erhvervsforskerordningen
Project: PhD

National Institute of Aquatic Resources
Hoejmarklaboratory
Period: 01/01/1997 → 01/03/2002
Number of participants: 6
Project participant: Jensen, Helle Skov (Intern)
Jørgensen, Bo Munk (Intern)
Jessen, Flemming (Intern)
Jensen, Kristina Nedenskov (Intern)
Godiksen, Helene (Intern)
Project Manager, organisational: Nielsen, Jette (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 9,994,630.00 Danish Kroner
Project

Netherlands Institute for Fisheries Research
Federal Research Centre for Fisheries
IFREMER
Instituto Portugues de Investigacao Maritima
CSIC Instituto de Investigaciónes Mariñas
Rowett Research Institute
National Food Administration

NOFIMA
Swedish Institute for Food Research
Period: 01/11/1996 → 31/01/2000
Number of participants: 11
Project participant:
Stampe-Villadsen, Hanne Lilian (Intern)
Luten, Joop (Ekstern)
Rehbein, Hartmut (Ekstern)
Etienne, Monique (Ekstern)
Mendes, Rogério (Ekstern)
Perez-Martin, Ricardo (Ekstern)
Craig, Anne (Ekstern)
Malmheden-Yman, Ingrid (Ekstern)
Martinez, Iciar (Ekstern)
Åkesson, Göran (Ekstern)

Project Manager, organisational:
Jessen, Flemming (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 500,000.00 Danish Kroner

Purification and characterization of TMAOase of saithe and hake.
The intracellular distribution of the enzyme TMAO aldolase (EC 4.1.2.32) is determined from detergent-treated tissue extracts. The enzyme is isolated and purified by chromatography and its properties are studied. Thereby, greater knowledge is gained of the factor that determines the formation of dimethylamine and formaldehyde in frozen fish. This knowledge forms a basis for the possibility of influencing the process that is considered important for quality deterioration during frozen storage.

National Institute of Aquatic Resources

Universidad de Vigo
Period: 01/04/1995 → 31/03/1998
Number of participants: 6
Project participant:
Nielsen, Michael Krogsgaard (Intern)
Jessen, Flemming (Intern)
Berner, Lis (Intern)
Rehbein, Hartmut (Ekstern)
Gonzalez-Sotelo, Carmen (Ekstern)

Project Manager, organisational:
Jørgensen, Bo Munk (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 1,300,000.00 Danish Kroner

Thaw-rigor

The metabolic processes related to rigor mortis in fish during freezing, frozen storage and thawing can be related to quality deterioration. In this project these processes are studied in dependence of time and temperature. A special interest is on the relation between thaw-rigor and quality deterioration during processing of fish. The project shall determine the extent and importance of gaping as a result of thaw-rigor and investigate the potential for thaw-rigor in frozen industrial cod blocks. Based on these results an optimized thawing procedure will be developed in order to increase quality and yield of thawed raw material.

National Institute of Aquatic Resources

Thorfisk A/S
Period: 01/01/1995 → 31/03/1999
Number of participants: 2
Project participant:
Cappeln, Gertrud (Intern)
Project Manager, organisational:
Jessen, Flemming (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 1,700,000.00 Danish Kroner

Activities:

'The minimum resting period for Atlantic cod (Gadus morhua) to regain pre-stressor status after pumping in a capture-based aquaculture operation'. Abstract and poster presentation at 47th Conference of the West European Fish Technologists' Association, in Dublin, Ireland.
Period: 9 Oct 2017 → 12 Oct 2017
Jonas Steenholdt Sørensen (Other)
Ole Mejlholm (Other)
Paw Dalgaard (Other)
Flemming Jessen (Other)
National Food Institute
Research Group for Analytical and Predictive Microbiology
Research Group for Food Production Engineering

Description
Sørensen, J.S., Mejlholm, O., Dalgaard, P., Jessen, F. (2017). The minimum resting period for Atlantic cod (Gadus morhua) to regain pre-stressor status after pumping in a capture-based aquaculture operation. Abstract and poster at 47th Conference of the West European Fish Technologists' Association, 9-12 October, Dublin, Ireland.
Degree of recognition: International

Related event
47th Conference of the West European Fish Technologists' Association: WEFTA
09/10/2017 → 12/10/2017
Dublin, Ireland
Activity: Talks and presentations › Conference presentations

2DE based proteomics for prediction and understanding of seafood quality
Period: 20 Jun 2012
Flemming Jessen (Lecturer)
National Food Institute
Division of Industrial Food Research
Description
Lecture given at the Ph.D. course in Porto, Portugal:
Proteomics course: gel based protein separation by two-dimensional gel electrophoresis and protein characterization by MALDI-TOF/TOF mass spectrometry.

Organised by
CIIMAR - Centre of Marine and Environmental Research, University of Porto
IPATIMUP - Institute of Molecular Pathology and Immunology of the University of Porto
FCUP - Faculty of Sciences, University of Porto

Related event
Proteomics course: gel based protein separation by two-dimensional gel electrophoresis and protein characterization by MALDI-TOF/TOF mass spectrometry
20/06/2012 → 20/06/2012
Portugal
Activity: Talks and presentations › Guest lectures, external teaching and course activities at other universities