Complementary analyses of aging in a commercial LiFePO$_4$/graphite 26650 cell

In this work we investigate the electrode degradation mechanisms in a commercial 2.5 Ah LiFePO$_4$/graphite 26650 cylindrical cell. Aged and fresh electrode samples were prepared by cycling two cells respectively five and 22 k times. Subsequently the cells were disassembled in a glovebox and the electrode samples were prepared for electrochemical testing in a 3-electrode setup, and for characterization with XRD, XPS and low-kV FIB/SEM tomography. A 1 μm thick CEI (cathode electrolyte interface) layer was observed at the electrode/electrolyte interface of the aged LiFePO$_4$ electrode. Relative to the fresh LiFePO$_4$ electrode, the aged electrode exhibited a larger series resistance which indicates the observed degradation layer increases the ionic resistance. In addition, micron-sized agglomerates, probably a mixture of carbonaceous material and decomposition products from the electrolyte, were observed at the electrode/electrolyte interface of the aged graphite electrode. These layers may contribute significantly to the loss of lithium inventory (LLI) in the cell, and to the loss of active material (LAM) in the graphite electrode. Low-voltage FIB/SEM tomography was used to detect local charging effects of graphite particles in the carbon electrode, an effect of poor dissipation of the electric charge to the ground after the sample interaction with the electron beam. The charging effects were primarily observed in the aged electrode and most of the locally charged particles were found to be close to the electrode/electrolyte interface, indicating a poorly percolating graphite network near this interface.

General information
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Organisations: Department of Energy Conversion and Storage, Imaging and Structural Analysis, Electrochemical Materials and Interfaces, Applied Electrochemistry, Aalborg University, Uppsala University
Pages: 454-468
Publication date: 10 Sep 2018
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BFI (2018): BFI-level 2
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Scopus rating (2017): CiteScore 5.01 SJR 1.439 SNIP 1.101
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.74 SJR 1.355 SNIP 1.177
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.321 SNIP 1.324 CiteScore 4.86
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.378 SNIP 1.456 CiteScore 4.59
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.427 SNIP 1.587 CiteScore 4.44
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.644 SNIP 1.574 CiteScore 3.99
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.615 SNIP 1.788 CiteScore 4.15
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.685 SNIP 1.715
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.523 SNIP 1.615
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.524 SNIP 1.458
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.551 SNIP 1.568
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.531 SNIP 1.726
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.484 SNIP 1.516
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.362 SNIP 1.567
Scopus rating (2003): SJR 1.637 SNIP 1.505
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.534 SNIP 1.441
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.312 SNIP 1.376
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.889 SNIP 1.161
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.936 SNIP 1.183

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Cathode electrolyte interface, Degradation mechanisms, Electrochemical impedance spectroscopy, Focused ion beam, Lithium battery

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Erratum to: Genome-wide association and HLA fine-mapping studies identify risk loci and genetic pathways underlying allergic rhinitis (Nature Genetics, (2018), 50, 8, (1072-1080), 10.1038/s41588-018-0157-1)
In the version of this article initially published, in Fig. 3, the y-axis numbering did not match the log scale indicated in the axis label. The error has been corrected in the HTML and PDF version of the article.

General information
State: Published
Organisations: Department of Bio and Health Informatics, National Veterinary Institute, Immunoinformatics and Machine Learning, Department of Mechanical Engineering, Department of Applied Engineering Design and Production, University of Copenhagen, Helmholtz Zentrum Muenchen German Research Center for Environmental Health, University of Manchester, 23andMe Inc., University of Chicago, Hospital Universitario Nuestra Senora de Candelaria, Centros de Investigacion Biomedica en Red - CIBER, Vrije Universiteit Amsterdam, University of Amsterdam, Imperial College London, Instituto de Salud Global de Barcelona, Universitat Pompeu Fabra, University of Greifswald, University of Kiel, University of Arizona, Universitat Politècnica de Catalunya, APH Amsterdam Public Health, Technical University of Denmark, Icahn School of Medicine at Mount Sinai (ISMMS), University of California at San Francisco, University of Southern California, University of Basel, Swiss Tropical Institute, Erasmus University Rotterdam, University of Melbourne, University of Liege, Ludwig-Maximilians-University Munchen, University of Bristol, Henry Ford Health System, Novo Nordisk Foundation Center for Basic Metabolic Research, Universidad de La Laguna, Telethon Kids Institute, University of Oulu, deCODE Genetics, University of Iceland, University Children's Hospital Regensburg (KUNO), University of Helsinki, National Institute for Health and Welfare, Karolinska Institutet, MAX DELBRUCK CENTER FOR MOLECULAR MEDICINE , Charite - Universitätsmedizin Berlin, Broad Institute, Harvard University, University of Southern Denmark, University of Newcastle, Stockholm County Council, University of Western Australia, Institut d'Investigacio Sanitaria Illes Balears (IdiS Ba), ICREA, Queensland Institute of Medical Research, St. George's University of London

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**Publication Information**

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BFI (2018): BFI-level 3
Web of Science (2018): Indexed yes
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Scopus rating (2017): CiteScore 21.12 SJR 22.243 SNIP 5.867
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 20.83 SJR 21.979 SNIP 6.709
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 23.98 SNIP 6.332 CiteScore 22.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 24.193 SNIP 6.287 CiteScore 24.17
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 25.621 SNIP 7.137 CiteScore 27.17
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 25.298 SNIP 7.206 CiteScore 25.75
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 20.87 SNIP 5.222
Experimental investigation on ultimate strength and failure response of composite box beams used in wind turbine blades

This study focuses on the ultimate strength and failure response of composite box beams under three-point bending. The box beams consist of spar caps and shear webs and they are typically used in wind turbine blades as load-carrying members. Different spar cap configurations and loading directions are examined experimentally to investigate structural behavior associated with multiple nonlinearities leading to structural collapse. Global displacements, local strains and video images are recorded throughout the loading history to capture failure initiation, propagation and the strain state contributing to post-collapse characteristics. The failure mechanisms of the box beams involving geometric, material and contact nonlinearities are discussed in detail. The study shows that compressive crushing failure, driven by local buckling of shear webs, determines the ultimate strength of the box beams under flapwise loading, and adhesive joint debonding, initiated by local adhesive cracking and spar cap buckling, is the critical failure mode of the box beams under edgewise loading. The Brazier effect and shear nonlinearity contribute to the initial failure depending on the loading directions. Debonding rather than delamination characterizes post-collapse behavior of all box beams examined in this study.

General information
State: Published
Organisations: Department of Wind Energy, Wind Turbine Structures and Component Design, Chinese Academy of Sciences
Authors: Tang, J. (Ekstern), Chen, X. (Intern)
Pages: 19-34
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Main Research Area: Technical/natural sciences

Publication information
Journal: Composite Structures
Volume: 198
ISSN (Print): 0263-8223
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.52 SJR 1.905 SNIP 1.939
Breakfast in Denmark. Prevalence of Consumption, Intake of Foods, Nutrients and Dietary Quality. A Study from the International Breakfast Research Initiative

Breakfast is considered by many to be the most important meal of the day. This study examined the intake of nutrients and foods at breakfast among Danes and the relation to the overall dietary quality. Data were derived from the Danish National Survey on Diet and Physical Activity 2011-2013, a cross-sectional national food consumption study. A total of 3680 participants aged 6-75 years were included in the analyses of breakfast consumption. The Nutrient Rich Food Index 9.3
method was used to examine the overall dietary quality of the diet. The intake of nutrients and foods at breakfast were compared across dietary quality score tertiles by ANCOVA adjusted for energy and socio economic status. Breakfast was eaten frequently by children and adults and contributed with 18-20% of total energy intake. Breakfast was relatively high in dietary fibre, B vitamins, calcium and magnesium and low in added sugar, total fat, sodium, vitamin A and D. A decrease in the intake of added sugar, total fat and saturated fat and an increase in the intake of dietary fibre and most micronutrients were seen across tertiles of dietary quality scores. Commonly consumed foods provided at breakfast in Denmark included bread, breakfast cereals and dairy products as well as water, coffee and juice, while intakes of fruits, vegetables, cakes and soft drinks were low.

General information
State: Published
Organisations: National Food Institute, Division of Risk Assessment and Nutrition, Department of Applied Mathematics and Computer Science, Statistics and Data Analysis
Authors: Fagt, S. (Intern), Matthiessen, J. (Intern), Thyregod, C. (Intern), Kørup, K. (Intern), Biltoft-Jensen, A. P. (Intern)
Number of pages: 20
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Main Research Area: Technical/natural sciences

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Journal: Nutrients
Volume: 10
Issue number: 8
Article number: 1085
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BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 4.35 SJR 1.557 SNIP 1.403
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.29 SJR 1.543 SNIP 1.411
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.481 SNIP 1.408 CiteScore 4.07
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.392 SNIP 1.289 CiteScore 3.78
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.309 SNIP 1.241 CiteScore 3.86
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): SJR 0.662 SNIP 1.005 CiteScore 2.12
ISI indexed (2012): ISI indexed no
Scopus rating (2011): SJR 0.29 SNIP 0.369 CiteScore 0.8
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.115 SNIP 0.045
Original language: English
Breakfast, Dietary intake, Foods, Nutrition, Dietary quality, NRF 9.3, Index
Electronic versions:
Danish_paper_nutrients_10_01085.pdf
DOIs:
10.3390/nu10081085
Source: PubMed
Source-ID: 30110931
Publication: Research - peer-review › Journal article – Annual report year: 2018

Coherent Manipulation of a Molecular Ln-Based Nuclear Qudit Coupled to an Electron Qubit
We demonstrate that the [Yb(trensal)] molecule is a prototypical coupled electronic qubit-nuclear qudit system. The combination of noise-resilient nuclear degrees of freedom and large reduction of nutation time induced by electron-nuclear mixing enables coherent manipulation of this qudit by radio frequency pulses. Moreover, the multilevel structure of the
qudit is exploited to encode and operate a qubit with embedded basic quantum error correction.

**General information**

State: Published  
Organisations: Department of Chemistry, Organic Chemistry, University of Parma, Rutherford Appleton Laboratory, UdR Parma, University of Copenhagen  
Authors: Hussain, R. (Ekstern), Allodi, G. (Ekstern), Chiesa, A. (Ekstern), Garlatti, E. (Ekstern), Mitcov, D. (Ekstern), Konstantatos, A. (Ekstern), Pedersen, K. S. (Intern), De Renzi, R. (Ekstern), Piligkos, S. (Ekstern), Carretta, S. (Ekstern)  
Publication date: 8 Aug 2018  
Main Research Area: Technical/natural sciences  

**Publication information**

Journal: Journal of the American Chemical Society  
Volume: 140  
Issue number: 31  
ISSN (Print): 0002-7863  
Ratings:  
BFI (2018): BFI-level 2  
Web of Science (2018): Indexed yes  
BFI (2017): BFI-level 2  
Scopus rating (2017): CiteScore 14.05 SJR 8.127 SNIP 2.641  
Web of Science (2017): Indexed yes  
BFI (2016): BFI-level 2  
Scopus rating (2016): CiteScore 13.18 SJR 7.492 SNIP 2.596  
Web of Science (2016): Indexed yes  
BFI (2015): BFI-level 2  
Scopus rating (2015): SJR 6.775 SNIP 2.63 CiteScore 12.81  
Web of Science (2015): Indexed yes  
BFI (2014): BFI-level 2  
Scopus rating (2014): SJR 6.294 SNIP 2.587 CiteScore 11.92  
Web of Science (2014): Indexed yes  
BFI (2013): BFI-level 2  
Scopus rating (2013): SJR 5.993 SNIP 2.466 CiteScore 11.38  
ISI indexed (2013): ISI indexed yes  
Web of Science (2013): Indexed yes  
BFI (2012): BFI-level 2  
Scopus rating (2012): SJR 6.211 SNIP 2.38 CiteScore 10.37  
ISI indexed (2012): ISI indexed yes  
Web of Science (2012): Indexed yes  
BFI (2011): BFI-level 2  
Scopus rating (2011): SJR 5.478 SNIP 2.321 CiteScore 9.94  
ISI indexed (2011): ISI indexed yes  
Web of Science (2011): Indexed yes  
BFI (2010): BFI-level 2  
Scopus rating (2010): SJR 5.167 SNIP 2.138  
Web of Science (2010): Indexed yes  
BFI (2009): BFI-level 2  
Web of Science (2009): Indexed yes  
BFI (2008): BFI-level 2  
Scopus rating (2008): SJR 5.06 SNIP 2.16  
Web of Science (2008): Indexed yes  
Web of Science (2007): Indexed yes  
Scopus rating (2006): SJR 4.662 SNIP 2.252  
Web of Science (2006): Indexed yes
Abundance and diversity of the faecal resistome in slaughter pigs and broilers in nine European countries

Antimicrobial resistance (AMR) in bacteria and associated human morbidity and mortality is increasing. The use of antimicrobials in livestock selects for AMR that can subsequently be transferred to humans. This flow of AMR between reservoirs demands surveillance in livestock and in humans. We quantified and characterized the acquired resistance gene pools (resistomes) of 181 pig and 178 poultry farms from nine European countries, sequencing more than 5,000 Gb of DNA using shotgun metagenomics. We quantified acquired AMR using the ResFinder database and a second database constructed for this study, consisting of AMR genes identified through screening environmental DNA. The pig and poultry resistomes were very different in abundance and composition. There was a significant country effect on the resistomes, more so in pigs than in poultry. We found higher AMR loads in pigs, whereas poultry resistomes were more diverse. We detected several recently described, critical AMR genes, including mcr-1 and optrA, the abundance of which differed both between host species and between countries. We found that the total acquired AMR level was associated with the overall country-specific antimicrobial usage in livestock and that countries with comparable usage patterns had similar resistomes. However, functionally determined AMR genes were not associated with total drug use.

General information
State: Published
Organisations: Research Group for Genomic Epidemiology, National Food Institute, Department of Bio and Health Informatics, Genomic Epidemiology, Utrecht University, Wageningen University & Research, University of Geneva, Universidad Complutense, ANSES - French Agency for Food, Environmental and Occupational Health & Safety, Istituto Zooprofilattico Sperimentale del Lazio e della Toscana, Ghent University, University of Veterinary Medicine Hannover, National Veterinary Research Institute, National Diagnostic Research Veterinary Institute, SAFOSO AG, Intomics A/S, Technical University of Denmark
Pages: 898-908
Publication date: 1 Aug 2018
Main Research Area: Technical/natural sciences
First record of the non-indigenous jellyfish *Blackfordia virginica* (Mayer, 1910) in the Baltic Sea

Marine invasions are of increasing concern for biodiversity conservation worldwide. Gelatinous macrozooplankton contain members, which have become globally invasive, for example the ctenophore *Mnemiopsis leidyi* or the hydromedusae *Blackfordia virginica*. *B. virginica* is characterised by a large salinity tolerance, with a brackish-water habitat preference, and by a metagenic life history strategy with an alternation between sexually reproducing planktonic medusae and asexually reproducing benthic polyps to complete the life cycle. In this study we analysed 8 years of ichthyoplankton survey data (2010-2017) from the Kiel Canal and 14 ichthyoplankton summer surveys in the central Baltic Sea (2008-2017). We report the first presence of *B. virginica* in northern Europe, namely from the southwestern Baltic Sea and the Kiel Canal. In the Kiel Canal, *B. virginica* was first sporadically sighted in 2014 and 2015 and has developed persistent populations since summer 2016. Changes in size-frequency distributions during summer 2016 indicate active recruitment in the Kiel Canal at salinities between 7 and 13 and temperatures > 14 °C. Close vicinity to and direct connection with the southwestern Baltic Sea, where *B. virginica* was observed during 2017, indicate that the Baltic Sea and other brackish-water habitats of Northern Europe are at risk for colonisation of this non-indigenous species. Our results highlight that monitoring activities should consider gelatinous macrozooplankton for standard assessments to allow for the detection of non-indigenous species at an early stage of their colonisation.
Parasites in Myodes glareolus and their association with diet assessed by stable isotope analysis

Vertebrates are hosts to numerous parasites, belonging to many different taxa. These parasites differ in transmission, being through either direct contact, a faecal-oral route, ingestion of particular food items, vertical or sexual transmission, or by a vector. Assessing the impact of diet on parasitism can be difficult because analysis of faecal and stomach content are uncertain and labourious; and as with molecular methods, do not provide diet information over a longer period of time. We here explored whether the analysis of stable isotopes in hair provides insight into the impact of diet and the presence of parasites in the rodent Myodes glareolus. Twenty-one animals were examined for parasites and their hair analysed for stable isotopes (C and N). A positive correlation between δ15N and one species of intestinal parasite was observed in females. Furthermore, several ectoparasites were negatively correlated with δ15N, indicating that infections are further associated with foraging habits (size and layout of the home range, length and timing of foraging, interaction with other rodents, etc.) that set the rodents in direct contact with infected hosts. Although a limited number of animals were included, it seemed that the isotope values allowed for identification of the association between diet and parasite occurrence in this rodent. We therefore propose that this method is useful in providing further insight into host biology, feeding preferences and potential exposure to parasites species, contributing to the understanding of the complex relationship between hosts and parasites.

General information
State: Published
Organisations: National Veterinary Institute, Section for Diagnostics and Scientific Advice, University of Copenhagen, Norwegian Veterinary Institute, National Research Centre for the Working Environment
Authors: Lynggaard, C. (Ekstern), Woolsey, I. D. (Ekstern), Al-Sabi, M. N. S. (Intern), Bertram, N. (Ekstern), Jensen, P. M. (Ekstern)
Pages: 180-186
Publication date: 1 Aug 2018
Main Research Area: Technical/natural sciences

Publication information
Journal: International Journal for Parasitology: Parasites and Wildlife
Volume: 7
Workshop on acceleration of the validation and regulatory acceptance of alternative methods and implementation of testing strategies

This report describes the proceedings of the BfR-RIVM workshop on validation of alternative methods which was held 23 and 24 March 2017 in Berlin, Germany. Stakeholders from governmental agencies, regulatory authorities, universities, industry and the OECD were invited to discuss current problems concerning the regulatory acceptance and implementation of alternative test methods and testing strategies, with the aim to develop feasible solutions. Classical validation of alternative methods usually involves one to one comparison with the gold standard animal study. This approach suffers from the reductionist nature of an alternative test as compared to the animal study as well as from the animal study being considered as the gold standard. Modern approaches combine individual alternatives into testing strategies, for which integrated and defined approaches are emerging at OECD. Furthermore, progress in mechanistic toxicology, e.g. through the adverse outcome pathway approach, and in computational systems toxicology allows integration of alternative test battery results into toxicity predictions that are more fine-tuned to the human situation. The road towards transition to a mechanistically-based human-focused hazard and risk assessment of chemicals requires an open mind towards stepping away from the animal study as the gold standard and defining human biologically based regulatory requirements for human hazard and risk assessment.

General information
State: Published
Organisations: Copenhagen Center for Health Technology, National Food Institute, Research Group for Molecular and Reproductive Toxicology, National Institute of Public Health and the Environment, Utrecht University, Federal Institute for Risk Assessment, European Chemicals Agency, Cosmetics Europe, BASF, European Commission Joint Research Centre Institute, Vrije Universiteit Brussel, SeCAM
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Publication information
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ISSN (Print): 0887-2333
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.981 SJR 0.931 CiteScore 3.37
Vitamin D-biofortified beef: A comparison of cholecalciferol with synthetic versus UVB-mushroom-derived ergosterol as feed source

This study investigates dietary fortification of heifer feeds with cholecalciferol and ergocalciferol sources and effects on beef total vitamin D activity, vitamer, respective 25-hydroxymetabolite contents, and meat quality. Thirty heifers were allocated to one of three dietary treatments [(1) basal diet + 4000 IU of vitamin D₃ (Vit D₃); (2) basal diet + 4000 IU of vitamin D₂ (Vit D₂); and (3) basal diet + 4000 IU of vitamin D₂-enriched mushrooms (Mushroom D₂)] for a 30 day pre-slaughter period. Supplementation of heifer diets with Vit D₃ yielded higher (p < 0.001) Longissimus thoracis (LT) total vitamin D activity (by 38–56%; p < 0.05) and serum 25-OH-D concentration (by 20–36%; p < 0.05), compared to that from Vit D₂ and Mushroom D₂ supplemented animals. Irrespective of vitamin D source, carcass characteristics, sensory and meat quality parameter were unaffected (p > 0.05) by the dietary treatments. In conclusion, vitamin D₃ biofortification of cattle diets is the most efficacious way to enhance total beef vitamin D activity.

General information
State: Published
Organisations: National Food Institute, Research Group for Bioactives – Analysis and Application, University College Dublin, University College Cork
Combination of sodium caseinate and succinylated alginate improved stability of high fat fish oil-in-water emulsions

Sodium caseinate (CAS) and commercial sodium alginate (CA), long chain modified alginate (LCMA) or short chain modified alginate (SCMA) were used in combination for emulsifying and stabilizing high fat (50–70%) fish oil-in-water emulsions. Physical (creaming, droplet size, viscosity and protein determination) and oxidative (primary and secondary oxidation products) stabilities of the emulsions were studied during 12 days of storage. Creaming stability was higher for emulsions produced with alginates and CAS compared to emulsions prepared with only CAS. Combined use of CAS + LCMA performed better in terms of physical stability compared to emulsions produced with only CAS. However, the oxidative stability of this emulsion was inferior probably due to the presence of an unsaturated carbon chain in LCMA structure. CAS + SCMA emulsions not only showed better physical stability such as smaller droplet size, lower creaming and higher viscosity, but also had an improved oxidative stability than emulsions produced with only CAS.

General information
State: Published
Organisations: National Food Institute, Research Group for Bioactives – Analysis and Application, Aarhus University, Division of Food Technology
Authors: Yesiltas, B. (Intern), Sørensen, A. M. (Intern), García Moreno, P. J. (Intern), Anankanbil, S. (Ekstern), Guo, Z. (Ekstern), Jacobsen, C. (Intern)
Pages: 290-299
Publication date: 30 Jul 2018
Main Research Area: Technical/natural sciences

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Volume: 255
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Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 5.19 SJR 1.793 SNIP 2.109
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.85 SJR 1.731 SNIP 2.095
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.582 SNIP 1.946 CiteScore 4.31
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.557 SNIP 2.01 CiteScore 3.92
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.554 SNIP 2.056 CiteScore 3.87
ISI indexed (2013): ISI indexed yes
Temperature-dependent adaptation allows fish to meet their food across their species’ range

In seasonal environments, timing is everything: Ecosystem dynamics are controlled by how well predators can match their prey in space and time. This match of predator and prey is thought to be particularly critical for the vulnerable larval life stages of many fish, where limited parental investment means that population survival can depend on how well larvae match the timing of their food. We develop and apply novel metrics of thermal time to estimate the timing of unobserved stages of fish larvae and their prey across the north Atlantic. The result shows that previously identified life-history strategies are adaptive in that they allow parents to “predict” a beneficial environment for their offspring and meet larval fish food timing that varies by 99 days across a species’ range.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Oceans and Arctic, University of Hawaii at Manoa, Aarhus University, Technical University of Denmark

Original language: English
50–70% o/w emulsion, Cod liver oil, Emulsifier, Lipid oxidation, Modified alginate, Omega-3, Oxidative stability, Physical stability
DOIs:
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Source: Scopus
Source-ID: 85042292488
Publication: Research - peer-review › Journal article – Annual report year: 2018
Efficient Transport Simulation With Restricted Batch-Mode Active Learning

Simulation modeling is a well-known and recurrent approach to study the performance of urban systems. Taking into account the recent and continuous transformations within increasingly complex and multidimensional cities, the use of simulation tools is, in many cases, the only feasible and reliable approach to analyze such dynamic systems. However, simulation models can become very time consuming when detailed input-space exploration is needed. To tackle this problem, simulation metamodels are often used to approximate the simulators’ results. In this paper, we propose an active learning algorithm based on the Gaussian process (GP) framework that gathers the most informative simulation data points in batches, according to both their predictive variances and to the relative distance between them. This allows us to explore the simulators’ input space with fewer data points and in parallel, and thus in a more efficient way, while avoiding computationally expensive simulation runs in the process. We take advantage of the closeness notion encoded into the GP to select batches of points in such a way that they do not belong to the same high-variance neighborhoods. In addition, we also suggest two simple and practical user-defined stopping criteria so that the iterative learning procedure can be fully automated. We illustrate this methodology using three experimental settings. The results show that the proposed methodology is able to improve the exploration efficiency of the simulation input space in comparison with non-restricted batch-mode active learning procedures.
Stability of vitamin D₃ and vitamin D₂ in oil, fish and mushrooms after household cooking

Information on the retention of vitamin D in food following household cooking is scarce. So far the retention of its metabolites vitamin D₃, vitamin D₂, and 25-hydroxyvitamin D₃ has shown that the type of food and the cooking method are the essential determinants, and there is no significant difference between the metabolites. We investigated the retention of vitamin D₃ and vitamin D₂ in sunflower oil, vitamin D₃ in rainbow trout, and vitamin D₂ in button mushrooms. The investigated cooking methods were boiling at different pH, steam cooking, microwave cooking, pan-frying, and oven baking. There was no difference between the retention of vitamin D₃ and vitamin D₂ added to sunflower oil, which ranged from 70 to 99%. In rainbow trout, the retention of vitamin D₃ at 85–114% was not significantly different from 100%, except for panfrying at 85%. However, the retention of vitamin D₂ in mushrooms at 62–88% was significantly different from 100% (p ≤ 0.05).
The mismatch between the in-country determinants of technology transfer, and the scope of technology transfer initiatives under the United Nations Framework Convention on Climate Change

Despite decades of international political emphasis, little is known about the in-country determinants of technology transfer for climate change mitigation. We draw upon the conclusions of a series of standardised, official governmental statements of technology priorities, coupled with questionnaire-based data collection, to shed light on the nature of those determinants. We find that there is a disconnect between what developing country governments perceive as the key enablers of, and barriers to, technology transfer, and what bilateral and multilateral technology transfer programmes can offer, given budgetary constraints and the logic of development aid spending. We show that the well-established notion of making climate change mitigation actions an integral part of sound development plans is especially relevant for technology transfer. We offer pointers as to how this might be done in practice, in the context of the ‘technology action plans’ developed as part of the United Nations-sponsored technology needs assessment process.
The prehistoric peopling of Southeast Asia

The human occupation history of Southeast Asia (SEA) remains heavily debated. Current evidence suggests that SEA was occupied by Hoabinhian hunter-gatherers until ~4000 years ago, when farming economies developed and expanded, restricting foraging groups to remote habitats. Some argue that agricultural development was indigenous; others favor the "two-layer" hypothesis that posits a southward expansion of farmers giving rise to present-day Southeast Asian genetic diversity. By sequencing 26 ancient human genomes (25 from SEA, 1 Japanese Jōmon), we show that neither interpretation fits the complexity of Southeast Asian history: Both Hoabinhian hunter-gatherers and East Asian farmers contributed to current Southeast Asian diversity, with further migrations affecting island SEA and Vietnam. Our results help resolve one of the long-standing controversies in Southeast Asian prehistory.
Mortality of *Calanus helgolandicus*: Sources, differences between the sexes and consumptive and nonconsumptive processes

While losses from mortality are as important as gains from reproduction in zooplankton population dynamics, the former are more challenging to quantify. We used two approaches to provide complementary insights into the mortality of a biomass-dominant copepod, *Calanus helgolandicus*, at Station L4 in the English Channel. Using a neutral-red staining method, we found that dead carcasses represented a mean of 9% of the *C. helgolandicus* copepodites sampled. The resulting nonconsumptive mortality rates are the first that have been derived for *C. helgolandicus*; and estimates suggest a contribution of 0–54% (median of 4.4%) to the total mortality rate. Consumptive mortality (i.e., that due to removal by predation), dominated for most of the year and contributed a mean of 89% to total mortality. Nonconsumptive mortality increased during summer and winter, and was positively related to maximum wind speed during the preceding 72 h, indicating that extreme weather events may lead to increased mortality. Using the Vertical Life Table approach, mortality rates across the CV-adult male stage pair were on average ~2.5 times greater than those of CV-adult females. Adult male consumptive mortality rates were ~6 times greater than those for females; adult male nonconsumptive rates were twice those of females, suggesting that predation is of greater significance to male loss rates. Summer CV-adult mortality rates were positively correlated to temperature, and to the abundance of predatory chaetognaths and siphonophores, suggesting that the gelatinous predator assemblage is the dominant agent for population control of late stage copepodites of *C. helgolandicus* at L4.

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Validation of a novel one-step reverse transcription polymerase chain reaction method for detecting viral haemorrhagic septicaemia virus

Viral haemorrhagic septicaemia (VHS) is one of the most serious viral diseases in salmonid and olive flounder farms. Various diagnostic methods for detecting VHS virus (VHSV) are described in the VHS chapter of the World Organization for Animal Health (OIE) Aquatic Diagnostic Manual. A conventional reverse transcription-PCR (cRT-PCR) targeting the viral nucleocapsid gene is recommended for the detection of VHSV and, to some extent, for genotypic classification. However, the recommended assay exhibits low sensitivity for the detection of VHSV genotype IVa isolates and often shows non-specific amplicons when the RNA template is extracted from non-infected fish cell lines. For these reasons, it is necessary to develop a new RT-PCR method for the foolproof detection of all VHSV genotypes and elimination of non-specific results. In this study, we selected five candidate primer sets that target the VHSV nucleoprotein (N) gene, and selected the most sensitive among them (3F/2R). We then established the optimal reaction conditions for these primers, and ensured that no non-specific amplification had occurred in the fish tissues, fish cell lines, or heterologous viruses. The analytical sensitivity of the novel cRT-PCR was compared to that of cell culture assays, real-time RT-PCR, and other cRT-PCR methods and was found to be as sensitive as or superior to the other methods for detecting all VHSV genotypes. Our newly developed cRT-PCR assay was tested with 80 isolates, representing a collection of all known VHSV genotypes worldwide. Clear and unique amplicons were amplified from all 80 VHSV isolates. The reproducibility, and partly the robustness, of the assay were confirmed by an inter-laboratory proficiency tests including nine laboratories. A high diagnostic sensitivity and specificity was confirmed on tissue material from affected fish. In conclusion a highly robust, sensitive and specific cRT-PCR for detection of VHSV was developed and validated.
Evolution of complex asexual reproductive strategies in jellyfish
Many living organisms in terrestrial and aquatic ecosystems rely on multiple reproductive strategies to reduce the risk of extinction in variable environments. Examples are provided by the polyp stage of several bloom-forming jellyfish species, which can reproduce asexually using different budding strategies. These strategies broadly fall into three categories: (1) fast localized reproduction, (2) dormant cysts, or (3) motile and dispersing buds. Similar functional strategies are also present in other groups of species. However, mechanisms leading to the evolution of this rich reproductive diversity are yet to be clarified. Here we model how risk of local population extinction and differential fitness of alternative modes of asexual reproduction could drive the evolution of multiple reproductive modes as seen in jellyfish polyps. Depending on environmental parameters, we find that evolution leads to a unique evolutionarily stable strategy, wherein multiple
reproductive strategies generally coexist. As the extinction risk increases, this strategy shifts from a pure budding mode to a dual strategy and finally to one characterized by allocation into all three modes. We identify relative fitness-dependent thresholds in extinction risk where these transitions can occur and discuss our predictions in light of observations on polyp reproduction in laboratory and natural systems.

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Composition Engineering in Two-Dimensional Pb-Sn-Alloyed Perovskites for Efficient and Stable Solar Cells

Environmentally friendly tin (Sn)-based metallic halide perovskites suffer from oxidation and morphological issues. Here, we demonstrate the composition engineering of Pb-Sn-alloyed two-dimensional (2D) Ruddlesden-Popper perovskites, \((\text{BA})_2(\text{MA})_3\text{Pb}_{4-x}\text{Sn}_x\text{I}_{13}\), for efficient and stable solar cell applications. Smooth thin films with high surface coverage are readily formed without using any additive owing to the self-assembly characteristic of 2D perovskites. It is found that Sn plays a significant role in improving the crystallization and crystal orientation while narrowing the bandgap of Pb-Sn 2D perovskites. Photophysical studies further reveal that the optimal Sn ratio (25 mol %) based sample exhibits both minimized trap density and weakened quantum confinement for efficient charge separation. Consequently, the optimized \((\text{BA})_2(\text{MA})_3\text{Pb}_3\text{Sn}_1\text{I}_{13}\)-based solar cells yield the best power conversion efficiency close to 6% with suppressed hysteresis.

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