Effective mathematical modelling of continuous subcutaneous infusion pharmacokinetics should aid understanding and control in insulin therapy. Thorough analysis of candidate model performance is important for selecting the appropriate models. Eight candidate models for insulin pharmacokinetics included a range of modelled behaviours, parameters and complexity. The models were compared using clinical data from subjects with type 1 diabetes with continuous subcutaneous insulin infusion. Performance of the models was compared through several analyses: $R^2$ for goodness of fit; the Akaike Information Criterion; a bootstrap analysis for practical identifiability; a simulation exercise for predictability. The simplest model fit poorly to the data ($R^2 = 0.53$), had the highest Akaike score, and worst prediction. Goodness of fit improved with increasing model complexity ($R^2 = 0.85–0.92$) but Akaike scores were similar for these models. Complexity increased practical non-identifiability, where small changes in the dataset caused large variation (CV > 10%) in identified parameters in the most complex models. Best prediction was achieved in a relatively simple model. Some model complexity was necessary to achieve good data fit but further complexity introduced practical non-identifiability and worsened prediction capability. The best model used two linear subcutaneous compartments, an interstitial and plasma compartment, and two identified variables for interstitial clearance and subcutaneous transfer rate. This model had optimal performance trade-off with reasonable fit ($R^2 = 0.85$) and parameterisation, and best prediction and practical identifiability (CV < 2%).
Multi-criteria assessment tool for sustainability appraisal of remediation alternatives for a contaminated site

Purpose: In order to improve and support decision-making for the selection of remedial techniques for contaminated sites, a multi-criteria assessment (MCA) method has been developed. The MCA framework is structured in a decision process actively involving stakeholders, and compares the sustainability of remediation alternatives by integrating environmental, societal, and economic criteria in the assessment. Materials and methods: The MCA includes five main decision criteria: remedial effect, remediation cost, remediation time, environmental impacts, and societal impacts. The main criteria are divided into a number of sub-criteria. The environmental impacts consider secondary impacts to the environment caused by remedial activities and are assessed by life-cycle assessment (LCA). The societal impacts mainly consider local impacts and are assessed in a more qualitative manner on a scale from 1 to 5. The performance on each main criterion is normalized to a score between 0 and 1, with 1 being the worst score. An overall score is obtained by calculating a weighted sum with criteria weights determined by stakeholders. The MCA method was applied to assess remediation alternatives for the Groyne 42 site, one of the largest contaminated sites in Denmark. Results and discussion: The compared remediation alternatives for the site were: (1) excavation of the site followed by soil treatment; (2) in situ alkaline hydrolysis; (3) in situ thermal remediation; and (4) continued encapsulation of the site by sheet piling. Criteria weights were derived by a stakeholder panel. The stakeholders gave the highest weighting to the remedial effect of the methods and to the societal impacts. For the Groyne 42 case study, the excavation option obtained the lowest overall score in the MCA, and was therefore found to be the most sustainable option. This was especially due to the fact that this option obtained a high score in the main categories Effect and Social impacts, which were weighted highest by the stakeholders. Conclusions: The developed MCA method is structured with five main criteria. Effect and time are included in addition to the three pillars of sustainability (environment, society, and economy). The remedial effect of remediation is therefore assessed and weighted separately from the main criteria environment. This structure makes interpretation of criteria scores more transparent and emphasizes the importance of effect and time as decision parameters. This also facilitated an easier weighting procedure for the stakeholders in the case study, who expressed a wish to weigh the remedial effect independently from the secondary environmental impacts.
Mode conversion enables optical pulling force in photonic crystal waveguides

We propose a robust scheme to achieve optical pulling force using the guiding modes supported in a hollow core double-mode photonic crystal waveguide instead of the structured optical beams in free space investigated earlier. The waveguide under consideration supports both the 0th order mode with a larger forward momentum and the 1st order mode with a smaller forward momentum. When the 1st order mode is launched, the scattering by the object inside the waveguide results in the conversion from the 1st order mode to the 0th order mode, thus creating the optical pulling force according to the conservation of linear momentum. We present the quantitative agreement between the results derived from the mode conversion analysis and those from rigorous simulation using the finite-difference in the time-domain numerical method. Importantly, the optical pulling scheme presented here is robust and broadband with naturally occurred lateral equilibriums and has a long manipulation range. Flexibilities of the current configuration make it valuable for the optical force tailoring and optical manipulation operation, especially in microfluidic channel systems.

General information
State: Published
Organisations: Technical University of Denmark, Department of Photonics Engineering, Plasmonics and Metamaterials, Harbin Institute of Technology, North South University
Authors: Zhu, T. (Ekstern), Novitsky, A. (Intern), Cao, Y. (Ekstern), Mahdy, M. R. (Ekstern), Wang, Z. L. (Ekstern), Sun, F. (Ekstern), Jiang, Z. (Ekstern), Ding, W. (Ekstern)
»Oh-my-God-partiklen
Detekteret. Nogle partikler fra det ydre rum har så høj energi, at de egentlig ikke burde være her.
De er kosmologiens svar på humlebien, der ikke kan flyve, og fysikerne leder stadig efter en god forklaring

General information
State: Published
Organisations: National Space Institute, Innovation and Research-based consultancy
Authors: Pedersen, J. O. P. (Intern)
Pages: 2-3
Publication date: 28 Jul 2017

Publication information
Pages (from-to): 2-3
Newspaper: Weekendavisen
Volume: 30
No.: Ideer
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Publication: Communication › Newspaper article – Annual report year: 2017

Resonant power converter with dead-time control of synchronous rectification circuit
The invention relates in a first aspect to a resonant power converter comprising a synchronous rectifier for supplying a DC output voltage. The synchronous rectifier is configured for alternatingly connecting a resonant output voltage to positive and negative DC output nodes via first and second semiconductor switches, respectively, separated by intervening dead-time periods in accordance with first and second rectification control signals. A dead-time controller is coupled to the resonant output voltage or the resonant input voltage and configured for adaptively adjusting lengths of the dead-time periods via the first and second rectification control signals.

General information
State: Published
Organisations: Department of Electrical Engineering, Electronics, Department of Applied Electronics
Authors: Ekhtiar, M. (Intern), Zsurzsan, T. (Intern), Andersen, M. A. E. (Intern)
Publication date: 20 Jul 2017

Publication information
IPC: H02M 3/335 A1
Patent number: WO2017121720
Date: 20/07/2017
Priority date: 12/01/2016
Priority number: EP20160150905
Original language: English
Electronic versions:
WO2017121720A1.pdf
Main Research Area: Technical/natural sciences
Source: espacenet
Characteristics of Xanthosoma sagittifolium roots during cooking, using physicochemical analysis, uniaxial compression, multispectral imaging and low field NMR spectroscopy

To effectively promote the industrial utilization of cocoyam (Xanthosoma sagittifolium) roots for enhanced food sustainability and security, there is a need to study their molecular, mechanical and physicochemical properties in detail. The physicochemical and textural characteristics of the red and white varieties of cocoyam roots were thus analysed by low field nuclear magnetic resonance relaxometry, multispectral imaging, uniaxial compression testing, and relevant physicochemical analysis in the current study. Both varieties had similar dry matter content, as well as physical and mechanical properties. However, up to four fast-interacting water populations were observed in the roots, dependent on the root variety and their degree of gelatinization during cooking. Changes in the relaxation parameters indicated weak gelatinization of starch at approximately 80 °C in both varieties. However, shorter relaxation times and a higher proportion of restricted water in the white variety indicated that this variety was slightly more sensitive towards gelatinization. A strong negative correlation existed between dry matter and all multispectral wavelengths >800 nm, suggesting the potential use of that spectral region for rapid analysis of dry matter and water content of the roots. The small, but significant differences in the structural and gelatinization characteristics of the two varieties indicated that they may not be equally suited for further processing, e.g. to flours or starches. Processors thus need to choose their raw materials wisely dependent on the aimed product characteristics. However, the spectroscopic methods applied in the study were shown to be effective in assessing important quality attributes during cooking of the roots.

General information
State: Accepted/In press
Organisations: National Food Institute, Research Group for Food Production Engineering, Research Group for Nano-Bio Science, Technical University of Denmark, University of Iceland, Kwame Nkrumah University of Science and Technology
Authors: Boakye, A. A. (Ekstern), Gudjónsdóttir, M. (Ekstern), Skytte, J. L. (Intern), Chronakis, I. S. (Intern), Wireko-Manu, F. D. (Ekstern), Oduro, I. (Ekstern)
Number of pages: 14
Publication date: 8 Jul 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Science and Technology
ISSN (Print): 0022-1155
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.43 SJR 0.544 SNIP 0.916
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.433 SNIP 0.914 CiteScore 1.08
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.506 SNIP 1.385 CiteScore 1.34
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.488 SNIP 1.01 CiteScore 1.55
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.395 SNIP 0.902 CiteScore 0.71
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.344 SNIP 0.668 CiteScore 0.51
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.31 SNIP 0.532
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.269 SNIP 0.454
BFI (2008): BFI-level 1
Biostable glucose permeable polymer

A new biostable glucose permeable polymer has been developed which is useful, for example, in implantable glucose sensors. This biostable glucose permeable polymer has a number of advantageous characteristics and, for example, does not undergo hydrolytic cleavage and degradation, thereby providing a composition that facilitates long term sensor stability in vivo. The versatile characteristics of this polymer allow it to be used in a variety of contexts, for example to form the body of an implantable glucose sensor. The invention includes the polymer composition, sensor systems formed from this polymer composition, and methods for making and using such sensor systems.

General information
State: Published
Organisations: Department of Electrical Engineering, Department of Photonics Engineering
Publication date: 22 Jun 2017

Publication information
Country: United States
IPC: C08G 71/02 A I
Patent number: US2017172471
Date: 22/06/2017
Priority date: 18/12/2015
Priority number: US201514974250
Original language: English
Main Research Area: Technical/natural sciences
Source: espacenet
Source-ID: US2017172471
Publication: Research › Patent – Annual report year: 2017

Scenarios for sustainable heat supply and heat savings in municipalities - the case of Helsingør, Denmark
Local climate action is not only a domain of large cities, but also smaller urban areas that increasingly address climate change mitigation in their policy. The Danish municipality of Helsingør can achieve a substantial CO2 emissions reduction by transforming its heat supply and deploying heat savings. In this paper, we model the heating system of Helsingør, assess it from a simple socio- and private-economic perspective, develop future scenarios, and conduct an iterative process to derive a cost-optimal mix between district heating, individual heating and heat savings. The results show that in 2030 it is cost-optimal to reduce the heating demand by 20–39% by implementing heat savings, to deploy 32%–41% of district heating and to reduce heating-related CO2 emissions by up to 95% in comparison to current emissions. In 2050, the cost-optimal share of district heating in Helsingør increases to between 38 and 44%. The resulting average heating costs and CO2 emissions are found to be sensitive to biomass and electricity price. Although the findings of the study are mainly applicable for Helsingør, the combined use of the Least Cost Tool and modelling with energyPRO is useful in planning of heating and/or cooling supply for different demand configurations, geographical region and scale.
Spatio-temporal precipitation climatology over complex terrain using a censored additive regression model

Flexible spatio-temporal models are widely used to create reliable and accurate estimates for precipitation climatologies. Most models are based on square root transformed monthly or annual means, where a normal distribution seems to be appropriate. This assumption becomes invalid on a daily time scale as the observations involve large fractions of zero observations and are limited to non-negative values. We develop a novel spatio-temporal model to estimate the full climatological distribution of precipitation on a daily time scale over complex terrain using a left-censored normal distribution. The results demonstrate that the new method is able to account for the non-normal distribution and the large fraction of zero observations. The new climatology provides the full climatological distribution on a very high spatial and temporal resolution, and is competitive with, or even outperforms existing methods, even for arbitrary locations.

General information
State: Published
Organisations: University of Innsbruck
Authors: Stauffer, R. (Ekstern), Mayr, G. J. (Ekstern), Messner, J. W. (Intern), Umlauf, N. (Ekstern), Zeileis, A. (Ekstern)
Pages: 3264-3275
Publication date: 15 Jun 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: International Journal of Climatology
Volume: 37
Issue number: 7
ISSN (Print): 0899-8418
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.49 SJR 1.823 SNIP 1.491
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 2.036 SNIP 1.442 CiteScore 3.28
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.922 SNIP 1.592 CiteScore 3.16
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 2.102 SNIP 1.695 CiteScore 3.32
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 2.012 SNIP 1.5 CiteScore 2.88
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.844 SNIP 1.56 CiteScore 2.85
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.83 SNIP 1.417
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.76 SNIP 1.35
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
A Quantitative Property-Property Relationship for the Internal Diffusion Coefficients of Organic Compounds in Solid Materials

Indoor releases of organic chemicals encapsulated in solid materials are major contributors to human exposures and are directly related to the internal diffusion coefficient in solid materials. Existing correlations to estimate the diffusion coefficient are only valid for a limited number of chemical-material combinations. This paper develops and evaluates a quantitative property-property relationship (QPPR) to predict diffusion coefficients for a wide range of organic chemicals and materials. We first compiled a training dataset of 1103 measured diffusion coefficients for 158 chemicals in 32 consolidated material types. Following a detailed analysis of the temperature influence, we developed a multiple linear regression model to predict diffusion coefficients as a function of chemical molecular weight (MW), temperature, and material type (adjusted R² of 0.93). The internal validations showed the model to be robust, stable and not a result of chance correlation. The external validation against two separate prediction datasets demonstrated the model has good predicting ability within its applicability domain (R²ext > 0.8), namely MW between 30 and 1178 g/mol and temperature between 4 and 180 °C. By covering a much wider range of organic chemicals and materials, this QPPR facilitates high-throughput estimates of human exposures for chemicals encapsulated in solid materials.

General information
State: Accepted/In press
Organisations: Department of Management Engineering, Quantitative Sustainability Assessment, Transport DTU, University of Michigan
Authors: Huang, L. (Ekstern), Fantke, P. (Intern), Jolliet, O. (Ekstern)
Number of pages: 34
Publication date: 26 May 2017
Main Research Area: Technical/natural sciences

Publication Information
Journal: Indoor Air
ISSN (Print): 0905-6947
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.55
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.88
Web of Science (2015): Indexed yes
Could baseline establishment be counterproductive for emissions reduction? Insights from Vietnam’s building sector
This article provides insights into the role of institutions involved in climate governance working towards a future low-carbon society at the national level, within the global climate change governance architecture. Specifically, it contributes to understanding the fragmented governance of energy efficiency policy in developing countries by focussing on Vietnam’s building sector, identifying key institutions related to underlying discourses, national and international power relations, resource distribution and coalitions. It uses the case of baseline setting in developing Nationally Appropriate Mitigation Actions (NAMAs) to illustrate institutional dynamics, nationally and transnationally, as well as to question whether demands for baseline setting achieve the ideal trade-off between actual GHG emissions reduction and institutionalized demands for accountability. The analysis reveals that, in addition to domestic efforts and challenges, the international agenda greatly influences the energy efficiency policy arena. The article presents lessons to be learnt about policy processes from the specific Vietnamese case, reflecting on the role of international actors and discourses in it. Finally, it argues for the abolition of baselines in favour of adequate monitoring and evaluation, from the perspective that requirement for deviation from fictitious baselines is unproductive and only serves an international techno-managerial discourse.

General information
State: Accepted/In press
Organisations: Department of Management Engineering, UNEP DTU Partnership
Authors: Henrysson, M. (Intern), Lütken, S. (Intern), Puig, D. (Intern)
The reverse tragedy of the commons: an exploratory account of incentives for under-exploitation in an open innovation environment

This paper presents an empirical account of a phenomenon that we refer to as the ‘reverse tragedy of the commons’ in open innovation. The name signifies the ‘under-exploitation’ of intellectual property (IP) under weak appropriability. The name is this graphic because the tragedy is costly, and can also render IP effectively worthless and block innovation in the short to medium term. We propose that the tragedy is borne out of the interaction between enterprise characteristics, a
competitive setting and the framework that is set by the policy intervention. This finding is pertinent to policy-makers with regard to the design of research, development and innovation instruments, as well as managers who must determine how to implement open practices in innovation.

**General information**

State: Accepted/In press
Organisations: Department of Management Engineering, Technology and Innovation Management, Gaia Consulting, Prime Minister's Office
Authors: Piirainen, K. A. (Intern), Raivio, T. (Ekstern), Lähteenmäki-smith, K. (Ekstern), Alkærsig, L. (Intern), Li-Ying, J. (Intern)
Number of pages: 14
Publication date: 5 May 2017
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Technology Analysis and Strategic Management
ISSN (Print): 0953-7325
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.653 SNIP 0.88 CiteScore 1.56
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.651 SNIP 0.639 CiteScore 1.43
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.562 SNIP 0.834 CiteScore 1.22
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.548 SNIP 0.792 CiteScore 1.37
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.765 SNIP 0.992 CiteScore 1.48
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 0.622 SNIP 0.969 CiteScore 1.34
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 0.681 SNIP 0.987
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 0.581 SNIP 1.158
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.517 SNIP 0.719
Scopus rating (2007): SJR 0.576 SNIP 0.957
Scopus rating (2006): SJR 0.584 SNIP 0.859
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.466 SNIP 0.716
Scopus rating (2004): SJR 0.472 SNIP 0.735
Scopus rating (2003): SJR 0.525 SNIP 0.855
Scopus rating (2002): SJR 0.653 SNIP 1.125
Scopus rating (2001): SJR 0.56 SNIP 1.17
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.371 SNIP 1.002
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.383 SNIP 0.823
Original language: English
DOIs:
Sensitivity-based research prioritization through stochastic characterization modeling

Product developers using life cycle toxicity characterization models to understand the potential impacts of chemical emissions face serious challenges related to large data demands and high input data uncertainty. This motivates greater focus on model sensitivity toward input parameter variability to guide research efforts in data refinement and design of experiments for existing and emerging chemicals alike. This study presents a sensitivity-based approach for estimating toxicity characterization factors given high input data uncertainty and using the results to prioritize data collection according to parameter influence on characterization factors (CFs). Proof of concept is illustrated with the UNEP-SETAC scientific consensus model USEtox.

General information
State: Accepted/In press
Organisations: Department of Management Engineering, Quantitative Sustainability Assessment, National Academies of Sciences, Leiden University, School of Sustainable Engineering and the Built Environment
Authors: Wender, B. A. (Ekstern), Prado-Lopez, V. (Ekstern), Fantke, P. (Intern), Ravikumar, D. (Ekstern), Seager, T. P. (Ekstern)
Number of pages: 9
Publication date: 29 Apr 2017
Main Research Area: Technical/natural sciences

Publication Information
Journal: International Journal of Life Cycle Assessment
ISSN (Print): 0948-3349
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.43 SJR 1.328 SNIP 1.423
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.504 SNIP 1.554 CiteScore 3.49
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.736 SNIP 1.738 CiteScore 3.65
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.666 SNIP 1.979 CiteScore 3.35
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.515 SNIP 1.701 CiteScore 2.89
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.581 SNIP 1.716 CiteScore 2.82
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.447 SNIP 1.861
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.201 SNIP 1.592
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Det varer ved

General information
State: Published
Organisations: National Space Institute, Innovation and Research-based consultancy
Authors: Pedersen, J. O. P. (Intern)
Pages: 12-13
Publication date: 28 Apr 2017

Publication information
Pages (from-to): 12-13
Newspaper: Weekendavisen
Volume: 2017
No.: 17
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Main Research Area: Technical/natural sciences
Publication: Communication › Feature article – Annual report year: 2017

Forskerhjerner på march gør ingen gavn
En gåtur i flok løser ikke videnskabens problemer - i morgen yder jeg mit bidrag ved at blive hjemme og forsk

General information
State: Published
Organisations: National Space Institute, Innovation and Research-based consultancy
Authors: Pedersen, J. O. P. (Intern)
Number of pages: 3
Publication date: 21 Apr 2017

Publication information
Newspaper: Boersen
Lack of skeletal muscle IL-6 influences hepatic glucose metabolism in mice during prolonged exercise

The liver is essential in maintaining and regulating glucose homeostasis during prolonged exercise. IL-6 has been shown to be secreted from skeletal muscle during exercise and has been suggested to signal to the liver. Therefore, the aim of this study was to investigate the role of skeletal muscle IL-6 on hepatic glucose regulation and substrate choice during prolonged exercise. Skeletal muscle-specific IL-6 knockout (IL-6 MKO) mice (age, 12-14 wk) and littermate lox/lox (Control) mice were either rested (Rest) or completed a single bout of exercise for 10, 60, or 120 min, and the liver was quickly obtained. Hepatic IL-6 mRNA was higher at 60 min of exercise, and hepatic signal transducer and activator of transcription 3 was higher at 120 min of exercise than at rest in both genotypes. Hepatic glycogen was higher in IL-6 MKO mice than control mice at rest, but decreased similarly during exercise in the two genotypes, and hepatic glucose content was lower in IL-6 MKO than control mice at 120 min of exercise. Hepatic phosphoenolpyruvate carboxykinase mRNA and protein increased in both genotypes at 120 min of exercise, whereas hepatic glucose 6 phosphatase protein remained unchanged. Furthermore, IL-6 MKO mice had higher hepatic pyruvate dehydrogenase (PDH) \(^{\text{Ser232}}\) and PDH \(^{\text{Ser300}}\) phosphorylation than control mice at rest. In conclusion, hepatic gluconeogenic capacity in mice is increased during prolonged exercise independent of muscle IL-6. Furthermore, Skeletal muscle IL-6 influences hepatic substrate regulation at rest and hepatic glucose metabolism during prolonged exercise, seemingly independent of IL-6 signaling in the liver.

General information
State: Published
Organisations: University of Copenhagen
Authors: Bertholdt, L. (Ekstern), Gudiksen, A. (Ekstern), Schwartz, C. V. L. (Intern), Knudsen, J. G. (Ekstern), Pilegaard, H. (Ekstern)
Pages: R626-R636
Publication date: 7 Apr 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: American Journal of Physiology - Regulatory Integrative and Comparative Physiology
Volume: 312
Issue number: 4
ISSN (Print): 0363-6119
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.03 SJR 1.462 SNIP 0.993
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.68 SNIP 1.017 CiteScore 3.11
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.721 SNIP 1.154 CiteScore 3.35
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.768 SNIP 1.258 CiteScore 3.73
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.645 SNIP 1.209 CiteScore 3.58
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.535 SNIP 1.165 CiteScore 3.34
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.522 SNIP 1.134
Binding of hydrophobic antigens to surfaces
A first aspect of the present invention is a method of detecting antibodies comprising the steps of: i) providing a first group of beads comprising a surface modified with C1-C10 alkyl groups comprising amine, ammonium, ether and/or hydroxyl groups, ii) contacting said first group of beads with a first hydrophobic antigen to provide a first group of bead-antigen conjugates by adsorption of the first hydrophobic antigen on the first group of beads, iii) isolating said bead-antigen conjugates, iv) contacting said bead-antigen conjugates with a sample to bind antibodies therein to provide bead-antigen-antibody conjugates, and v) detecting said bead-antigen-antibody conjugates. Further aspects include an antibody detection kit, a bead-antigen conjugate and a composition comprising at least two different groups of bead-antigen-conjugates.

General information
State: Published
Organisations: National Veterinary Institute, Innate Immunology
Authors: Boas, U. (Intern)
Publication date: 16 Mar 2017

Publication information
IPC: G01N 33/543 A I
Patent number: WO2017042303
Date: 16/03/2017
Priority date: 08/09/2015
Priority number: EP20150184294
Original language: English
Electronic versions:
WO2017042303A1.pdf
Main Research Area: Technical/natural sciences
Source: espacenet
Source-ID: WO2017042303
Publication: Research › Patent – Annual report year: 2017

Modelling of electricity savings in the Danish households sector: from the energy system to the end-user
In this paper, we examine the value of investing in energy-efficient household appliances from both an energy system and end-user perspectives. We consider a set of appliance categories constituting the majority of the electricity consumption in the private household sector, and focus on the stock of products which need to be replaced. First, we look at the energy system and investigate whether investing in improved energy efficiency can compete with the cost of electricity supply from existing or new power plants. To assess the analysis,
Balmorel, a linear optimization model for the heat and power sectors, has been extended in order to endogenously determine the best possible investments in more efficient home appliances. Second, we propose a method to relate the optimal energy system solution to the end-user choices by incorporating consumer behaviour and electricity price addition due to taxes. The model is nonexclusively tested on the Danish energy system under different scenarios. Computational experiments show that several energy efficiency measures in the household sector should be regarded as valuable investments (e.g. an efficient lighting system) while others would require some form of support to become profitable. The analysis quantifies energy and economic savings from the consumer side and reveals the impacts on the Danish power system and surrounding countries. Compared to a business-as-usual energy scenario, the end-user attains net economic savings in the range of 30–40 EUR per year, and the system can benefit of an annual electricity demand reduction of 140–150 GWh. The paper enriches the existing literature about energy efficiency modelling in households, contributing with novel models, methods, and findings related to the Danish case.

General information
State: Accepted/In press
Organisations: Department of Management Engineering, Systems Analysis, Management Science
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Number of pages: 19
Publication date: 13 Mar 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Energy Efficiency
ISSN (Print): 1570-646X
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.43 SJR 0.74 SNIP 0.816
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.675 SNIP 0.971 CiteScore 1.16
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.998 SNIP 1.172 CiteScore 1.38
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.704 SNIP 1.211 CiteScore 1.33
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): SJR 1.155 SNIP 1.541 CiteScore 1.91
ISI indexed (2012): ISI indexed no
Scopus rating (2011): SJR 0.71 SNIP 1.633 CiteScore 1.71
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.907 SNIP 1.862
Scopus rating (2009): SJR 0.285 SNIP 0.965
Original language: English
DOIs:
10.1007/s12053-017-9516-5
Source: FindIt
Source-ID: 2357502569
Publication: Research - peer-review › Journal article – Annual report year: 2017

Prosumers and smart grid technologies in Denmark: developing user competences in smart grid households
This paper explores and describes resident’s experiences from a smart grid project that involved 20 households in a rural area in Denmark and ran from 2014 to 2015. The study is based on qualitative data from the participating households, collected 6, 12 and 18 months after the start of the intervention. Drawing on theories of social practice and the three intertwined elements of a practice: competences, images and materials, the paper contributes with an in-depth analysis of a complex intervention, focusing on how the participants changed energy practices as a result of the installed smart grid technologies. Long-term studies on such comprehensive energy interventions and derived changes in domestic energy practices are exceptional. The results show that people relate to their natural environment in new ways and construct new practices according to the movements of the sun; that they gradually become skilled practitioners and prosumers; and that they also increase consumption and develop expectations towards the energy company, requesting better dialogue on energy consumption and control. The paper concludes with reflections and suggestions on how findings may be relevant to policy and research in the area.
Durable fuel electrode

The present invention relates to a composite for an electrode, a composite precursor, a method of manufacturing a composite, and the composite obtained by said method. The invention further relates to an electrode comprising the composite, as well as a solid state electrochemical cell comprising the composite. The invention also relates to the use of the composite as a fuel electrode, solid oxide fuel cell, and/or solid oxide electrolyser. The invention discloses a composite for an electrode, comprising a three-dimensional network of dispersed metal particles, stabilised zirconia particles and pores, wherein the size of the pores is smaller than the size of the metal particles, wherein the size of the metal particles is essentially equal to or smaller than the size of the stabilised zirconia particles, wherein the porosity is below 33, 30, or 29 vol%, more preferably below 26 or 24 vol%, and most preferably below 23, 22, 21, 18, 15, or 13 vol%, and/or wherein the pores are essentially exclusively generated from the volume created by reducing a corresponding metal oxide to the metal particles.