The effect of age on the intestinal mucus thickness, microbiota composition and immunity in relation to sex in mice

A mucus layer covers and protects the intestinal epithelial cells from direct contact with microbes. This mucus layer not only prevents inflammation but also plays an essential role in microbiota colonization, indicating the complex interplay between mucus composition-microbiota and intestinal health. However, it is unknown whether the mucus layer is influenced by age or sex and whether this contributes to reported differences in intestinal diseases in males and females or with ageing. Therefore, in this study we investigated the effect of age on mucus thickness, intestinal microbiota composition and immune composition in relation to sex. The ageing induced shrinkage of the colonic mucus layer was associated with bacterial penetration and direct contact of bacteria with the epithelium in both sexes. Additionally, several genes involved in the biosynthesis of mucus were downregulated in old mice, especially in males, and this was accompanied by a decrease in abundances of various Lactobacillus species and unclassified Clostridiales type IV and XIV and increase in abundance of the potential pathobiont Bacteroides vulgatus. The changes in mucus and microbiota in old mice were associated with enhanced activation of the immune system as illustrated by a higher percentage of effector T cells in old mice. Our data contribute to a better understanding of the interplay between mucus-microbiota-and immune responses and ultimately may lead to more tailored design of strategies to modulate mucus production in targeted groups.

General information
State: Published
Organisations: TI Food and Nutrition, Wageningen University & Research, University of Groningen
Authors: Elderman, M. (Ekstern), Sovran, B. (Ekstern), Hugenholtz, F. (Ekstern), Graversen, K. (Intern), Huijskes, M. (Ekstern), Houtsma, E. (Ekstern), Belzer, C. (Ekstern), Boekschoten, M. (Ekstern), De Vos, P. (Ekstern), Dekker, J. (Ekstern), Wells, J. (Ekstern), Faas, M. (Ekstern)
Number of pages: 22
Publication date: 1 Sep 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: PLoS ONE
Volume: 12
Issue number: 9
Article number: e0184274
ISSN (Print): 1932-6203
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): 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
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Web of Science (2013): Indexed yes
Scopus rating (2016): CiteScore 3.11 SJR 1.201 SNIP 1.092
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.414 SNIP 1.131 CiteScore 3.32
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.545 SNIP 1.141 CiteScore 3.54
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.74 SNIP 1.147 CiteScore 3.94
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.945 SNIP 1.142 CiteScore 4.15
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.369 SNIP 1.23 CiteScore 4.58
ISI indexed (2011): ISI indexed no
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.631 SNIP 1.161
Web of Science (2010): Indexed yes
Optimal pseudorandom sequence selection for online c-VEP based BCI control applications

Background: In a c-VEP BCI setting, test subjects can have highly varying performances when different pseudorandom sequences are applied as stimulus, and ideally, multiple codes should be supported. On the other hand, repeating the experiment with many different pseudorandom sequences is a laborious process. Aims: This study aimed to suggest an efficient method for choosing the optimal stimulus sequence based on a fast test and simple measures to increase the performance and minimize the time consumption for research trials. Methods: A total of 21 healthy subjects were included in an online wheelchair control task and completed the same task using stimuli based on the m-code, the gold-code, and the Barker-code. Correct/incorrect identification and time consumption were obtained for each identification. Subject-specific templates were characterized and used in a forward-step first-order model to predict the chance of completion and accuracy score. Results: No specific pseudorandom sequence showed superior accuracy on the group basis. When isolating the individual performances with the highest accuracy, time consumption per identification was not significantly increased. The Accuracy Score aids in predicting what pseudorandom sequence will lead to the best performance using only the templates. The Accuracy Score was higher when the template resembled a delta function the most and when repeated templates were consistent. For completion prediction, only the shape of the template was a significant predictor. Conclusions: The simple and fast method presented in this study as the Accuracy Score, allows c-VEP based BCI systems to support multiple pseudorandom sequences without increase in trial length. This allows for more personalized BCI systems with better performance to be tested without increased costs.
A bacterial cell factory for efficient production of ethanol from whey

The invention relates to a method for homo-ethanol production from lactose using a genetically modified lactic acid bacterium of the invention, where the cells are provided with a substrate comprising dairy waste supplemented with an amino nitrogen source (such as acid hydrolysed corn steep liquor). The invention further relates to genetically modified lactic acid bacterium and its use for homo-ethanol production from lactose in dairy waste. The lactic acid bacterium comprises both genes (lacABCD, LacEF, lacG) encoding enzymes catalysing the lactose catabolism pathway; and transgenes (pdc and adhB) encoding enzymes catalysing the conversion of pyruvate to ethanol. Additionally a number of genes (Idh, pta and adhE) are deleted in order to maximise homo-ethanol production as compared to production of lactate, acetoin and acetate production.

General information
State: Published
Organisations: National Food Institute, Research Group for Microbial Biotechnology and Biorefining
Authors: Jensen, P. R. (Intern), Liu, J. (Intern), Solem, C. (Intern), Dantoft, S. H. (Intern)
Publication date: 31 Aug 2017

Publication information
IPC: C12N 15/75 A1
Patent number: WO2017144672
Date: 31/08/2017
Priority date: 25/02/2016
Priority number: EP20160157325
Original language: English
Electronic versions:
WO2017144672A1.pdf
Evaluation of pharmacokinetic model designs for subcutaneous infusion of insulin aspart

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%).

General information
State: Accepted/In press
Organisations: Department of Applied Mathematics and Computer Science, Scientific Computing, Dynamical Systems, University of Canterbury, University of Copenhagen
Authors: Mansell, E. J. (Ekstern), Schmidt, S. (Ekstern), Docherty, P. D. (Ekstern), Nørgaard, K. (Ekstern), Jørgensen, J. B. (Intern), Madsen, H. (Intern)
Number of pages: 13
Pages: 1-13
Publication date: 22 Aug 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Pharmacokinetics and Pharmacodynamics
ISSN (Print): 1567-567X
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.8 SJR 0.696 SNIP 0.801
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.709 SNIP 0.953 CiteScore 1.77
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.696 SNIP 0.851 CiteScore 1.82
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.561 SNIP 0.802 CiteScore 1.7
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.974 SNIP 1.179 CiteScore 2.07
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.955 SNIP 1.109 CiteScore 2.2
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.884 SNIP 0.79
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.072 SNIP 1.226
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.
»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

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:Ekhtiari, M. (Intern), Zsurzsan, T. (Intern), Andersen, M. A. E. (Intern)
Publication date:20 Jul 2017
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: Published
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
Pages: 2670-2683
Publication date: 8 Jul 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Science and Technology
Volume: 54
Issue number: 9
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
Modeling level change in Lake Urmia using hybrid artificial intelligence approaches

The investigation of water level fluctuations in lakes for protecting them regarding the importance of these water complexes in national and regional scales has found a special place among countries in recent years. The importance of the prediction of water level balance in Lake Urmia is necessary due to several-meter fluctuations in the last decade which help the prevention from possible future losses. For this purpose, in this paper, the performance of adaptive neuro-fuzzy inference system (ANFIS) for predicting the lake water level balance has been studied. In addition, for the training of the adaptive neuro-fuzzy inference system, particle swarm optimization (PSO) and hybrid backpropagation-recursive least square method algorithm have been used. Moreover, a hybrid method based on particle swarm optimization and recursive least square (PSO-RLS) training algorithm for the training of ANFIS structure is introduced. In order to have a more fare comparison, hybrid particle swarm optimization and gradient descent are also applied. The models have been trained, tested, and validated based on lake level data between 1991 and 2014. For performance evaluation, a comparison is made between these methods. Numerical results obtained show that the proposed methods with a reasonable error have a good performance in water level balance prediction. It is also clear that with continuing the current trend, Lake Urmia will experience more drop in the water level balance in the upcoming years.

General information
State: Accepted/In press
Organisations: Semnan University
Authors: Esbati, M. (Ekstern), Ahmadieh Khanesar, M. (Intern), Shahzadi, A. (Ekstern)
Number of pages: 12
Pages: 1-12
Publication date: 22 Jun 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Theoretical and Applied Climatology
ISSN (Print): 0177-798X
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.09 SJR 0.954 SNIP 1.039
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.961 SNIP 1.001 CiteScore 1.82
BFI (2014): BFI-level 1
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.

**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
**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.

**General information**

State: Accepted/In press
Organisations: Department of Management Engineering, Systems Analysis
Authors: Ben Amer-Allam, S. (Intern), Münster, M. (Intern), Petrovic, S. (Intern)
Number of pages: 12
Publication date: 17 Jun 2017
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Energy
ISSN (Print): 0360-5442
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.17 SJR 1.999 SNIP 1.798
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.276 SNIP 2.046 CiteScore 5.03
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.647 SNIP 2.63 CiteScore 5.7
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.54 SNIP 2.593 CiteScore 5.02
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.998 SNIP 2.25 CiteScore 4.25
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.609 SNIP 2.043 CiteScore 4
ISI indexed (2011): ISI indexed yes
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.

**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
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.
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)
Number of pages: 12
Publication date: 10 May 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Climate Policy
ISSN (Print): 1469-3062
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.23 SJR 1.165 SNIP 1.414
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.596 SNIP 1.268 CiteScore 2.42
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.215 SNIP 0.955 CiteScore 1.82
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.777 SNIP 0.827 CiteScore 1.36
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.95 SNIP 0.945 CiteScore 1.57
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.019 SNIP 0.873 CiteScore 1.35
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.808 SNIP 1.15
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.683 SNIP 1.241
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.885 SNIP 0.962
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.398 SNIP 0.719
Scopus rating (2006): SJR 0.701 SNIP 1.388
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
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
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
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 forske

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

High-level production of diacetyl in a metabolically engineered lactic acid bacterium
The present invention provides a genetically modified lactic acid bacterium capable of producing diacetyl under aerobic conditions. Additionally the invention provides a method for producing diacetyl using the genetically modified lactic acid bacterium under aerobic conditions in the presence of a source of iron-containing porphyrin and a metal ion selected from Fe3+, Fe2+ and Cu2+. The lactic acid bacterium is genetically modified by deletion of those genes in its genome that encode polypeptides having lactate dehydrogenase (E.C 1.1.1.27/E.C.1.1.1.28); α-acetolactate decarboxylase (E.C 4.1.1.5); water-forming NADH oxidase (E.C. 1.6.3.4); phosphotransacetylase (E.C.2.3.1.8) activity; and optionally devoid of or deleted for genes encoding polypeptides having diacetyl reductase ((R)-acetoin forming; EC: 1.1.1.303); D-acetoin reductase; butanediol dehydrogenase ((R,R)-butane-2,3-diol forming; E.C. 1.1.1.4/1.1.1.-) and alcohol dehydrogenase (E.C. 1.2.1.10) activity. The invention provides for use of the genetically modified lactic acid bacterium for the production of diacetyl and a food product.

General information
State: Published
Organisations: National Food Institute, Research Group for Microbial Biotechnology and Biorefining
Authors: Solem, C. (Intern), Jensen, P. R. (Intern), Liu, J. (Intern)
Publication date: 13 Apr 2017