



INCREaSE 2017

International Congress on Engineering
and Sustainability in the XXI cEntury

BOOK OF ABSTRACTS

Faro, Portugal, October 11-13, 2017

Editors

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Preface

The 1st International Congress on Engineering and Sustainability in the XXI Century, INCREaSE 2017 aims to make a significant contribution to the areas of engineering and sustainable development in a multidisciplinary way, reflected by research and technology in the fields of Civil, Electronics, Food and Mechanical engineering. The work presented in the event includes several transversal challenges, such as Natural and Anthropogenic Risks, Tourism and Sustainability, Healthy Food, Water and Society, Sustainable Mobility, Renewable Energy and Energy Efficiency, and Other Subjects Related to the Sustainable Development.

The present book only holds the abstracts from the Keynote Talks, the IFA Workshop and from contributions not submitted to the Congress' Proceedings or to the scientific journals associated with the Congress. The remaining abstracts from the works presented in the INCREaSE 2017 are published in the Congress' Proceedings, edited by Springer, or in several scientific journals and cannot be included in this book for copyright reasons.

This year's INCREaSE was held during October 11-13, 2017, in Faro, Portugal, organized by the Institute of Engineering and hosted by University of Algarve. There was a very positive response to the Call for Papers for INCREaSE 2017. We received 108 works, from 318 different authors, from 17 countries, being accepted for publication 53 full and short papers, where at least three reviewers reviewed each paper.

The essential actors of any conference are the authors, who submitted their scientific contributions. They are the main responsible for the high quality of the scientific program of INCREaSE 2017. The reviewers, members of the Scientific Committee and all the other committees, also played a key role with their dedicated and thorough work.

INCREaSE 2017 had an excellent group of invited speakers: Andrew Patton McCoy (Virginia Polytechnic Institute & State University), Cristina Silva (ESB/Universidade Católica Portuguesa & International Journal of Food Studies), Jorge de Brito (Instituto Superior Técnico, Universidade de Lisboa), Katherine Flynn (The European Association for Food Safety – SAFE consortium), Marc Hilbert (Volkswagen AG), Marco Ottavi (University of Rome Tor Vergata), Mariana Golumbeanu (Balkan Environmental Association – BEnA). We are grateful to these leading experts for their inspiring participation in INCREaSE 2017.

We wish to express our gratitude to all of the above participants that enabled the success of first edition of INCREaSE.

Finally, we look forward to meeting you again at the next edition of INCREaSE, in 2019.

October, 2017

António Mortal
Jaime Aníbal
Jorge Semião
Miguel Oliveira

Cláudia Sequeira
Jânio Monteiro
Manuela Moreira da Silva

Organization

INCREaSE is an international congress organized by the Engineering Institute from the University of Algarve, Faro, Portugal.

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Technical Program

Technical Program

Wednesday, October 11, 2017	Publication	
13.00-14.00	Registration Open	
14.00-15.00	Opening session	
15.00-15.40	Keynote Talk 1 Facilitating The Wider Use Of Recycled Aggregates In The Production Of Structural Concrete <i>Jorge de Brito – Instituto Superior Técnico, Universidade de Lisboa</i>	Book of Abstracts, page 16
15.40-16.00	Poster Session / Coffee Break	
16.00-17.20	Session 1 - Climate Changes and Environmental Protection <i>Chair: Jorge de Brito</i>	
	1.1 The environmental protection in South-American integration process: a Union of South American Nations (UNASUR) perspective <i>Isabela Battistello Espíndola and Celso Maran de Oliveira</i>	Proceedings' Book
	1.2 Renewing Terraces and Drystone Walls of Algarvian Barrocal. Cultural and Touristic Values <i>Marta Marçal Gonçalves, Gonçalo Prates and Stefan Rosendahl</i>	Proceedings' Book
	1.3 Rockfall Risk Assessment Along Cluffed Coastlines of Algarve, Portugal <i>José Viegas, Jean-Pierre Gonçalves and Luís Andrade Pais</i>	Proceedings' Book
	1.4 The development of indicators of sustainable mobility associated with an urbanism of proximity. The case of the city of Faro <i>Manuela Pires Rosa, Catarina Martins and José Rodrigues</i>	Proceedings' Book
16.00-16.40	Keynote Talk 2 Optimization of food products: Predictive modelling for safety and quality	Book of Abstracts, page 17

- 16.40-17.20 **Session 2 - Emergent Processes, products and packaging in the food industry**
Chair: Cristina Silva
- 2.1 Development of New Pastry Products and Jams with Shiitake Mushrooms
Paula Correia, Jéssica Monteiro and Raquel Guiné Proceedings' Book
- 2.2 Estimation of Proximate Composition of Quinoa (Chenopodium quinoa, Willd.) Flour by Near-Infrared Transmission Spectroscopy
Christian Encina-Zelada, Vasco Cadavez, Jorge Pereda, Luz Gómez-Pando, Bettit Salvá-Ruiz, Martha Ibañez, José A. Teixeira, Ursula Gonzales-Barron Proceedings' Book
- 16.00-17.20 **Session 3 - Renewable Energy and Energy Efficiency**
Chair: José Oliveira
- 3.1 Case Studies on Energy Retrofitting
Fátima Farinha and Eurídice Cristo Proceedings' Book
- 3.2 Promotion of higher penetration of distributed PV through storage for all (StoRES)
S. Afxentis, M. Florides, C. Yianni, V. Efthymiou, I. Papageorgiou, G. Partasides, G. Papagiannis, G. Christoforidis, S. Mocci, A. Rubiu, J. Oliveira, J. Sancho, N. Poize, T. Pristovnik and G. E. Georghiou Proceedings' Book
- 3.3 Comparative analysis of the tracking efficiency of a Maximum-Power Point Tracker based on Maximum-Power Point Resistance Modeling versus a classic P&O
Juan Manuel Enrique Gómez, Antonio Javier Barragán Piña, Eladio Durán Aranda, Juan Ríos Gutiérrez, José Manuel Andújar Márquez, Isménio Martins, Jânio Monteiro and Jorge Semião Proceedings' Book
- 3.4 Sustainable Energy Communities: Implementation Study of a Wind Community in Algarve (Portugal)
Francisco Calhau, Pedro Pintassilgo and João Guerreiro Proceedings' Book

18.30-21.30 **Welcome Reception – Faro Municipal Museum**

Thursday, October 12, 2017

- 9.00-9.40 **Keynote Talk 3**
Toward the future of housing efficiency: leveraging technology, behavior, education and cost
Andrew Patton McCoy – Virginia Polytechnic Institute & State University Book of Abstracts, page 18
- 9.40-10.40 **Session 4 - Sustainable Planning and Construction, Maintenance and Rehabilitation**
Chair: Andrew Patton McCoy
- 4.1 Temporary housing made from recycled paper tubes - A comparative study of housing “Paper Log House” and its adaptations to different contexts
Luana T. Carbonari and Lisiane I. Librelotto Proceedings’ Book
- 4.2 Sustainable Rehabilitation of an old Building in Monchique
Alexander Silva, António André and Mónica Moreira Proceedings’ Book
- 4.3 Validation of Structural Reinforcement Solutions, in Execution Phase
Patrícia Barros, Carlos Martins and Jorge Renda Proceedings’ Book
- 9.40-10.40 **Session 5 - Innovative Solutions in Electric and Electronic Systems**
Chair: Luís Oliveira
- 5.1 An Open Hardware Electronic Controller for Motorized Rotary Injection Valves Used in Flow Injection Analysis.
Jose Ignacio Otero Bueno, Juan Daniel Mozo Llamazares, Eladio Duran Aranda and Jorge Semião Proceedings’ Book
- 5.2 Analysis of Parameters that Affect Service Quality Indicators of a Medium Voltage Feeder Belonging to a Substation Ensemble of the Distributor Energisa Mato Grosso
Arnulfo Barroso de Vasconcellos; Saulo Roberto Sodr  dos Reis; Priscila Costa Nasci- Proceedings’ Book

- mento; Teresa Irene Ribeiro de Carvalho Malheiro; Reginato Domingos Scremim; Lourival Lippmann Junior; Giancarlo Covolo Heck; Mateus Witter; Savio Ricardo Muniz Aires da Costa; Priscilla Cristina Rodrigues de Lanas*
- 5.3 The Influence of Electric Loads Switching on the Reactive Flow of a Voltage Bus Proceedings’
Book
Arnulfo Barroso de Vasconcellos, Fabricio Parra Santilio, José Mateus Rondina, Willian Gustavo dos Santos, Gabriela Nunes Lopes, Gabriela Pessoa Campos, Igor Rossini Smerrecki, and Teresa Irene Ribeiro de Carvalho Malheiro
- 9.40-10.40 **Session 6 - Healthy Food & Mediterranean Diet**
Chair: Célia Quintas
- 6.1 Formulating snacks to increase pulses intake by children and the elderly Proceedings’
Book
Manuela Guerra, Alice Pires, Andreia Nunes, Ariana Fernandes, Ana Lopes, Joana Costa, Olga Gonçalves and Carlos Brandão
- 6.2 Flavonoid profiles of *Arbutus unedo* L. pomaces Proceedings’
Book
Maria Antónia Rodrigues, Ludovina Galego and José Paulo Da Silva
- 6.3 Influence of carob pod (*Ceratonia siliqua* L.) variety and processing on the antioxidant capacity and total phenolic content of carob liquors Proceedings’
Book
Raquel Rodríguez-Solana, Miguel Dantas and Anabela Romano
- 10.40-11.00 **Poster Session / Coffee Break**
- 11.20-11.40 **Keynote Talk 4**
How Machine Learning is Affecting the Technical Development in the Automotive Industry Book of Abstracts, page 19
Marc Hilbert – Volkswagen AG
- 11.40-13.00 **Session 7 - Technical Exhibition**
Chair: Paulo Santos
- 7.1 CRIA - Divisão de Empreendedorismo e Transferência de Tecnologia da Universidade do Algarve

- Hugo Barros*
- 7.2 AREAL - Agência Regional de Energia e Ambiente do Algarve
Paulo Martins
- 7.3 ITELMATIS Control Systems
Jorge Luz
- 7.4 ANA - Faro Airport
João Jesus
- 13.00-14.20 **Lunch Break**
- 14.20-15.00 **Keynote Talk 5**
The Role of Reliability for Sustainability
Marco Ottavi – University of Rome Tor Vergata Book of Abstracts, page 20
- 15.00-16.20 **Session 8 - Innovative Solutions in Electronic and Computer Systems**
Chair: Marco Ottavi
- 8.1 Power-Delay Analysis For Subthreshold Voltage Operation
Hugo Cavalaria, Ruben Cabral, Jorge Semião, Marcelino Santos, Isabel Teixeira and Paulo Teixeira Proceedings' Book
- 8.2 Development of a measurement system for assessment of bubble production of seagrass
J. Parente Silva, D. Nunes, P. Santos, P. Felisberto, and A.J. Silva Proceedings' Book
- 8.3 Performance Sensor For Subthreshold Voltage Operation
Ruben Cabral, Hugo Cavalaria, Jorge Semião, Marcelino Santos, Isabel Teixeira and Paulo Teixeira Proceedings' Book
- 8.4 A non-intrusive IoT system for the Detection of Faults in Internal Combustion Engines
Sergey Nogin, Jorge Semião and Jânio Monteiro Proceedings' Book
- 15.00-16.20 **Session 9 - Water for Ecosystems and Society**
Chair: José Monteiro
- 9.1 Public participation: a tool for water conservation and environmental management Proceedings' Book

Albertina Raposo, A. Durão, M.M. Morais and Lia Vasconcelos

- 9.2 Conceptual approach for the modernization of sanitation systems in peri-urban slums and its application in Maputo city, Mozambique
Miguel Subtil, José Saldanha Matos and Rui Ferreira Santos Proceedings' Book
- 9.3 Treatment Optimization of a Landfill Leachate Testing a Flotation Process Before the RO
Tiago Barradas, Sanae Ajbar El Gueriri, Nuno Gomes, Miguel Nunes, Conceição Ribeiro and Manuela Moreira Da Silva Proceedings' Book
- 9.4 Almadrava: Men and sea. Social relationship in a short-term community
Nuno Batista and Marta Marçal Gonçalves Submitted to a Journal

15.00-16.20 **Session 10 - Climate Changes and Environmental Protection**

Chair: Mariana Golumbeanu

- 10.1 Low-Emission Rural Development in the Amazon
Fronika Claziena Agatha de Wit Proceedings' Book
- 10.2 The Importance of Improved Cooking Stove for Forest Conservation, Economic Benefits and Climate Change Mitigation — A Bangladesh Case Study
Bishwajit Roy, Md. Habibur Rahman and Palash Sarker Proceedings' Book
- 10.3 Culture strategies for lipid production using low-cost carbon sources by *Rhodosporidium toruloides*
Valdemira Afonso, Laura Tangerino, Daiana Oliveira and Sara Raposo Proceedings' Book
- 10.4 Bioclimatic Analysis of Public Roads in the City of Manaus through Computational Simulation.
Larissa Galvão Proceedings' Book

17.20-20.00 **City Tour - Faro Municipal Museum**

20.00-23.00 **Conference Dinner – Tertúlia Algarvia**

Friday, October 13, 2017

- 09.00-09.40 **Keynote Talk 6**
 Sparking New Life into Food Safety Research Book of Abstracts, page 21
Katherine Mary Flynn – The European Association for Food Safety – SAFE consortium
- 09.40-10.40 **Session 11 - Food Safety**
 Chair: *Katherine Mary Flynn*
- 11.1 Arbutus unedo L. fruit distillate from tradition to innovation Proceedings' Book
Ludovina Galego, Vera Francisco and Isabel Ratão
- 11.2 Arbutus unedo L. spirit: does the water addition before fermentation matters? Proceedings' Book
Ilda Caldeira, Filomena Gomes and Goreti Botelho
- 11.3 Assessment of the microbiological quality of dried aromatic herbs commercialized in the Algarve Proceedings' Book
Marcela Oliveira, Daniela Silva and Célia Quintas
- 09.40-10.40 **Session 12 - Sustainable Planning and Construction, Maintenance and Rehabilitation**
 Chair: *António André*
- 12.1 Light Steel Framing Social Housing as a Sustainable Construction Proposal Proceedings' Book
Daiane Duarte and Adnauer Daltro
- 12.2 Damage evaluation of rammed earth walls subjected to offshore earthquakes Proceedings' Book
João Estêvão and Alfredo Braga
- 12.3 Earth construction in the Algarve - Past and future Proceedings' Book
Alfredo Manuel Braga, Miguel José Oliveira, Elisa M. J. Silva, and Luís Filipe Viana
- 09.40-10.40 **Session 13 - Innovative Solutions for Tourism in Electronic and Computer Systems**
 Chair: *João Rodrigues*
- 13.1 Portable Device for Touch, Taste and Smell Sensations in Augmented Reality Experiences Proceedings' Book

J. D. P. Sardo, J. Semião, J. M. Monteiro, J. A. R. Pereira, M. Freitas, E. Esteves, João M. F. Rodrigues

- 13.2 MIRAR: Mobile Image Recognition based Augmented Reality Framework
João A.R. Pereira, Ricardo Veiga, Marco Freitas, João D.P. Sardo, Pedro J.S. Cardoso, and João M.F. Rodrigues Proceedings' Book
- 13.3 Managing Intangibles Relational Capital for the sustainability of the Energy Sector in the Social Media.
Ana-María Casado-Molina, Francisco Cabrera and Célia M.Q. Ramos Submitted to a Journal

10.40-11.00 **Poster Session / Coffee Break**

11.00-11.40 **Keynote Talk 7**

Integrated Coastal Zone Management: a Sustainable Policy Tool for the Romanian Black Sea Region
Mariana Golumbeanu – Balkan Environmental Association (BENA) Book of Abstracts, page 22

11.40-13.00 **Session 14 - Water for Ecosystems and Society**

Chair: Flávio Martins

- 14.1 Exploration of Constructed Wetlands WWTPs: Seven Years of Águas do Algarve Experience
Ana Pereira, Rui Fernandes, António Martins and Joaquim Freire Proceedings' Book
- 14.2 Nickel and nitrogen phytoremediation by *Cyperus involucratus*: nickel impairs biomass production and nitrogen removal
Manuela Moreira Da Silva and José A. Monteiro Proceedings' Book
- 14.3 The Best Destination to an Urban Treated Effluent in Algarve: Aquifer Recharge or an Ecological Solution?
Noémia Bento, Yasmina Ben Abdessadak, Joaquim Freire, Elisa M. J. Da Silva and Manuela Moreira Da Silva Proceedings' Book

11.40-13.00 **Session 15 - Innovative Solutions in Power Electronic Systems**

Chair: Isménio Martins

- 15.1 An application of Interleaved Zeta-Buck-Boost Combination Converter in Distributed Generation
E. Durán, M.B. Ferrera, S.P. Litrán A.J. Barragán, J.M. Enrique, J.M. Andújar, J. Semião, J. Monteiro, I. Martins Proceedings' Book
- 15.2 Analysis of the Influence of Water Trees Geometrics' Shapes in the Level of Degradation of the Power Cable's Insulation
F. N. Lima, M. T. Sá, I. R. Smerecki, B. C. Carvalho, A.P. Finazzi Proceedings' Book
- 15.3 Evaluation of Predictive based Electric Vehicle's Charge Scheduling Algorithms in Self-Consumption Scenarios
Dario Cruz and Jânio Monteiro Proceedings' Book
- 11.40-13.00 **Session 16 - Sustainable Planning and Construction, Maintenance and Rehabilitation**
Chair: Jorge Isidoro
- 16.1 New Modular Bridges Solutions – A sustainable solution to connect people
António André, José Fernandes, Igor Soares and Pedro Pacheco Proceedings' Book
- 16.2 Numerical comparative analysis of second order effects of recycled aggregate concrete columns
João Estêvão and Vitor Barreto Submitted to a Journal
- 16.3 Green facades and living walls: the Portuguese experience
Andreia Cortês, João Almeida, Myriam Kannon-Boulé and António Tadeu Proceedings' Book
- 16.4 Impact of density on thermal conductivity of an insulation layer composed of rice by-products
Beatriz Marques, João Almeida, Jorge De Brito and António Tadeu Proceedings' Book
- 11.40-13.00 **Session 17 - IFA Workshop**
Chair: Margarida Vieira
- 17.1 IFA (ISEKI Food Association) - an European Association for Integrating Food Science and Engineering Knowledge Into the Food Chain
Margarida Cortez Vieira (IFA National Representative- Portugal) Book of Abstracts, page 24
- 17.2 The Open Innovation Network of Food Waste Recovery
Book of Abstracts, page 25

- Charis Galanakis (Chair of the "Food Waste Recovery" IFA Special Interest Group)*
- 17.3 Traditional Foods @ 21st Century Book of Abstracts, page 26
- Dimitris Tsaltas (Chair of the "Traditional Food" IFA Special Interest Group)*
- 17.4 International Journal of Food Studies – An e-journal with a challenge story Book of Abstracts, page 27
Cristina L.M. Silva (ESB/Universidade Católica Portuguesa & International Journal of Food Studies)
- 13.00-14.20 **Lunch Break**
- 14.20-15.20 **Panel Discussion**
Moderator: Manuela Moreira da Silva
José Rui Felizardo – CEIIA
Luís Chícharo – ICCE-UNESCO
Margarida Vieira – ISE/UAlg & ISEKI Food Association
Marc Rechter – ENERCOUTIM
- 15.20-16.00 **Closing session**
- During all Coffee Breaks **Poster Sessions**
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- P01 Analysis of Radio Signal Coverage in the Area of a Medium Voltage Feeder Using Radio Mobile Software Book of Abstracts, page 29
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- P02 Freshness and nutritional composition of several species of chilled seafood marketed in Luanda (Angola) and in Faro (Portugal) Proceedings, page 163

- Mirian Inocência de Sousa, Eduardo António Panguila, Ana Cristina Figueira and Eduardo Esteves*
- P03 Evaluation of the freshness and shelf-life of fresh and chilled mackerel (*Scomber* spp.) and horse mackerel (*Trachurus* spp.), marketed in Luanda (Angola) and in Faro (Portugal)
Eduardo António Panguila, Mirian Inocência de Sousa, Eduardo Esteves and Ana Cristina Figueira Proceedings, page 174
- P04 Assessment of freshness and quality of deep-water pink shrimp, *Parapenaeus longirostris*, stored in ice using physicochemical, microbiological and sensorial parameters
Jaime António, João Lagartinho and Eduardo Esteves Book of Abstracts, page 30
- P05 Education as a Tool to Reduce the Water Footprint of Young People
Milda Venckute, Manuela Moreira Da Silva and Mauro Figueiredo Submitted to a Journal
- P06 Healthy, tasty and sustainable Mediterranean Food. UMAMI taste and polyphenols of twiggly glasswort (*Salicornia ramosissima*)
Abílio Guerreiro, Carimo Rassal, Carlos M. Afonso, Ludovina Galego, Manuel Serra, Maria A. Rodrigues Proceedings, page 199
- P07 Economy as the Inducer Factor of the Number of Scientific Publications in the Field of Air Pollution
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- P08 Performance in soil erosion control of low-cost measures applied in burnt areas of NE Portugal: a USLE-based assessment
Tomás Figueiredo, Edson Lima, Felícia Fonseca, Luciano Fleischfresser and Zulimar Hernandez Book of Abstracts, page 32
- P09 Optimization of an Aeration System in a Wastewater Treatment Plant - Albufeira, Portugal
Luís Cristóvão, Duarte Marinho, António Martins, Eduardo Esteves, Gil Fraqueza and Manuela M. Silva Book of Abstracts, page 33
- P10 Biodegradation of a Packaging Film from Plant Origin
Afroditi Drizou, Rui Cruz and Margarida Vieira Book of Abstracts, page 34

- P11 Characterisation of oil extracted from melon seeds (*Cucumis melo* var. *reticulatus*)
Raquel Carmo and Patrícia Nunes Book of Abstracts, page 35
- P12 Effects of spoilage on nitrogen and carbon stable isotopes signatures of the clam *Ruditapes decussatus*
Jaime Aníbal, Cristina Veiga-Pires and Eduardo Esteves Proceedings' Book
- P13 Microbiological quality of seeds sold at supermarkets in Southern Portugal
Daniela Silva, Marcela Oliveira and Célia Quintas Proceedings' Book
- P14 Mathematical Modelling of Cholera Outbreaks
Davide Santos and Jorge Isidoro Book of Abstracts, page 36
- P15 A prototype of sustainable residential automation
Flávio Vitorino Queiroz, Denis Rogério Da Silva, Murilo Miceno Frigo and Eduardo Hiroshi Nakamura Book of Abstracts, page 37
- P16 Preliminary results of the pilot floating beds for eco-rehabilitation of contaminated water course
Cátia Rocha, A. Durão, T. Borralho and Adelaide Almeida Book of Abstracts, page 38
- P17 Production of baker's yeast (*Saccharomyces cerevisiae*) from prickly pear fruit juice
Aicha Nancib, Nabil Nancib, Soumeiya Kannoni, Sara Maouche and Joseph Boudrant Book of Abstracts, page 39
- P18 Residual yoghurt whey as a raw material for production of lactic acid by *Lactococcus lactis* subsp. *lactis*
Aicha Nancib, Nabil Nancib, Rania Boussekine, Sarra Benferhat and Joseph Boudrant Book of Abstracts, page 40
- P19 Establishment of a network for the development of innovative products with microALGAS: ALGARED +
León R, Vigara J, Giraldez I, Morales E, Vila M, Cañavate JP, Fernández-Díaz C, Manchado M, Fernandez E, Galván A, Llamas A, Gonzalez-Ballester D, Dubini A, Raposo S, Barros R, Varela J, Barreira L, Cancela L, Simões DC, Link W, Cabrita E, Pereira H, Pousão-Ferreira P, Bandarra NM, Agraso MM, Retamero M, Vélez J, Leitao N, Lima P, Vilas-Boas F, Moreno-Garrido I, Lubian L, Navalho J, del Pino V. Book of Abstracts, page 41

- P20 A review of using alternative materials to improve the green roofs sustainability Book of Abstracts, page 42
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Abstracts: Keynote Talks

Facilitating the wider use of recycled aggregates in the production of structural concrete

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Abstract. As the world population increases, the use of natural resources and energy grows proportionally, becoming one of the major environmental concerns of our times. Several economic sectors are already pursuing a solution to this problem, by analysing the added-value potential of reusing their own wastes. The conventional methods of constructing and demolishing buildings and concrete structures are implemented in such a way that most of the resulting waste is sent to landfills, instead of being recycled or reused in new constructions. The use of recycled aggregates from construction and demolition wastes as replacement for natural aggregates has been considered as one of the most salubrious approaches towards a greater sustainability in construction. A performance-based classification, based on the physical properties of aggregates sourced from these wastes is presented in this paper. It also contains the results of a statistical analysis on the effect of increasing recycled aggregate content to the compressive strength. Furthermore, this paper presents simple and practical rules in conformity with Eurocode 2 (EC2), such as the relationship between the tensile and compressive strength, modulus of elasticity and compressive strength and the application of correction factors to the creep coefficient. Additionally, the results of a comparative analysis between the carbonation and chloride ion penetration with the mechanical performance of the material are also shown. Finally, this study shows how these rules can be used in the design of a structural concrete element containing recycled aggregates in accordance with EC2.

Keywords: Recycled aggregates, construction and demolition wastes, concrete, sustainability, structural design.

Optimization of food products: Predictive modelling for safety and quality

Cristina L.M. Silva

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Abstract. The quality of food products needs be optimized taking into account an overall perspective. The microbial and chemical safety must be assured, and nutritional and sensory quality maximized. To achieve this goal none of the whole chain steps can be overlooked. From post-harvest/slaughter to processing, storage and distribution, the understanding of how physical, chemical and/or microbial parameters affect foodstuffs is crucial in order to control and predict conditions assuring its quality. Moreover, predictive modeling, including kinetics and transport phenomena, can and should be used as an integrative tool to predict and maximize products quality. This presentation includes research results for conventional or non-thermal food preservation processes, shelf life studies, or valorization of by-products.

Keywords: food safety and quality; optimization; modeling; food chain

Toward the future of housing efficiency: leveraging technology, behavior, education and cost

Andrew Patton McCoy

Virginia Polytechnic Institute & State University

Abstract. Since 2006, firms and local policy have increasingly emphasized green building certification, training and construction processes and committed to sustainable principles in the United States. At the same time, local authorities have implemented some of the most aggressive green building standards in the nation within the Low Income Housing Tax Credit (LIHTC) program, a program to build multifamily housing across the US. In the state of Virginia, the Virginia Housing Development Authority (VHDA) has provided significant incentives for applicants who choose to develop in compliance with green certification standards. This work reviews the VHDA program and the effect of technology, behavior and education in the US market through the lens of Virginia. Based on the measurement of actual, unit-level data, energy usage for developments in the study residents saved over 40% in the first year and 45% on average over three years on their annual energy costs compared to non-green housing. Residents that reported receiving education on their apartment's technology had a lower average energy usage monthly and annually (over 3 years) by almost 15% (14.8%) and a lower energy bill by \$10.56 per month. Data further indicate a higher average total cost for non-green developments per square foot compared to green developments.

How machine learning is affecting the technical development in the automotive industry

Marc Hilbert

Volkswagen AG

Abstract. In this keynote Marc Hilbert will outline the potential of machine learning for the automotive sector. Volkswagen Group's IT function operates several labs, in cities like Berlin, Munich and San Francisco, where programmers, data analysts and innovation specialists develop new technologies, products and services. Marc Hilbert will share experiences and best practice from the creation of the Data:Lab in Munich, discussing how the Volkswagen Group deals with new trends in technology and how it can work with various partners to shape the digital future of Volkswagen. He will outline the style of work, research approach and challenges using current Data:Lab use cases.

The Role of Reliability for Sustainability

Marco Ottavi

University of Rome Tor Vergata

Abstract. Reliability is a fundamental enabling factor of the so-called digital revolution. Thanks to the increasing reliability achieved in VLSI, the ubiquitous presence of cheap and powerful digital devices can be guaranteed. As much as reliability enabled the digital revolution, we discuss how reliability could also enable higher sustainability in energy production and use. In particular we will discuss about how power generation and consumption could be made more efficient and thus sustainable, by increasing the reliability of power production on a solar cell array, and allowing reliable low power operation of VLSI systems.

Sparkling New Life into Food Safety Research

Katherine Flynn¹, Oddur M. Gunnarsson^{1,2}, Tim Hogg^{1,3} and Hrönn Ólína Jörundsdóttir^{1,2}

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Abstract. The European consumer likely assumes that any food found anywhere in Europe is safe to eat. Our food may be safer than it's ever been, but our food is changing and new risks are appearing. Grand global challenges such as climate change, increasing population, urbanisation and decreasing natural resources will certainly affect future food production and consumption patterns. The European Association for Food Safety, SAFE consortium has identified five food safety themes for the future. 1. Bioeconomy. As Europe moves towards a circular bio-based economy novel foods and alternate food sources from food processing waste streams, insects and microalgae might soon become available raising novel food safety issues. 2. Emerging Microbial Threats. Microbes and their toxins are moving targets with new variants continually emerging from mutation and adaptation, long-forgotten microbes re-emerging and new foods, food mixtures and environments offering new opportunities for food contamination. 3. Safe Nutrients. The European food basket is evolving towards a diet high in fruits and vegetables and low in salt, sugar and fat and as food industry meets these demands foods are reformulated raising short and long-term safety concerns. 4. Chemical Hazards. Food-based exposure is a primary source of human risk from emerging chemicals, e.g., new chemicals, those not monitored in food and chemical mixtures, and this chronic hazard raises many food safety questions. 5. Risk Communication. Effective communication about potential risks associated with new foods, new processes and contamination events is essential for acceptance of e.g., insect-based foods, as even a single safety incident is likely to result in an irrevocable loss in consumer trust. Ensuring food safety along the entire chain from producers through consumers means facing multiple and evolving challenges whose complexity demands a new and interdisciplinary view of food safety research, development and innovation.

Integrated coastal zone management: a sustainable policy tool for the Romanian Black Sea region

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Abstract. The Black Sea coastal zones are facing problems of deterioration of their natural, socio-economic and cultural resources, further deepening because of the climate change impact. Yet, coastal planning activities or development decisions still take place in a sectorial way without being linked to each other. The solution is implementing common innovative methodologies for Integrated Coastal Zone Management (ICZM) plans within the Black Sea region, involving all riparian countries. Within the project framework, an experts’ team from NIRDEP - the National Institute for Marine Research and Development “Grigore Antipa” is elaborating the “New Methods for The Improvement of the Integrated Coastal Zone Management (ICZM) and Maritime Spatial Planning (MSP) in the Romanian Coastal Zone“. The paper introduce the experience of the Romanian coastal zone with the application of European Union Integrated Coastal Zone Management (ICZM) progress indicators covering the main priority aspects for coastal areas have been developed both for measuring the sustainability of coastal zone development. The implementation of the project will facilitate the compliance with national and EU legislation requirements concerning Integrated Coastal Zone Management (ICZM) and Maritime Spatial Planning (MSP) policies. It will also contribute to: Elaborating methods and identifying the data for the selection of the most appropriate coastal zone indicators; Drawing-up GIS maps and graphic representations of socio-economic indicators in the coastal zone; Defining a set of national indicators aiming at assessing the sustainability of the coastal zone; Acquiring new data in order to enhance the knowledge required for developing spatial policies in the Romanian coastal zone. By developing Romania’s competitiveness in the field of using georeferenced digital spatial data, the project will create the background for supporting the sustainable and integrated development of socio-economic activities along the Romanian Black Sea coast.

Keywords: ICZM, set of indicators, GIS, spatial policies.

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Abstracts: IFA Workshop

IFA (ISEKI Food Association) - an European Association for Integrating Food Science and Engineering Knowledge Into the Food Chain

Margarida Cortez Vieira

IFA National Representative- Portugal

Abstract. IFA is an independent European non-profit organisation, founded in 2005 as an outcome of 18 years of Thematic Network activities for all stakeholders in the food supply chain with regard to education, research, legislation and communication. Promoting synergies between research education and industry, IFA has members in 52 countries that benefit from the IFA activities which comprise tuning and accreditation of food study programmes, developing teaching materials and teaching methods, development of a virtual community of experts and establishing of a framework of agreements among partners, fostering the mobility of students and staff stimulating the development of joint projects. A thorough description of these activities is given in this presentation having as main objective to present IFA to food supply chain stakeholders who didn't know about IFA yet and invite them to become part of the ISEKI Food Family.

The Open Innovation Network of Food Waste Recovery

Charis Galanakis

Chair of the "Food Waste Recovery" IFA Special Interest Group

Abstract. The potential of food waste to create new opportunities and markets has been under-estimated until the very recent years. To this line, we defined in 2013 the term “Food Waste Recovery” to underline the prospect of upgrading compounds and ingredients lost within food waste streams by creating high added-value products (e.g. functional foods). “Open Innovation” is the use of purposive inflows and outflows of knowledge to accelerate internal innovation within organizations and expand the markets for external innovation usage, respectively. For example, when relevant knowledge exists outside the company, managers need to recognize, identify, capture, and manage such knowledge, choosing an appropriate integration mechanism.

Our group is the leading open innovation network in the field of Food Waste Recovery, aiming at helping food industries and other involved partners in the food chain to recover valuable compounds from food waste, valorize their streams and improve their sustainability. We bring leadership by providing expertise, insights and tools to implement innovations within the frame of bioeconomy, targeting new bio-based products development. Our experts’ group works closely with the collaborators to understand their needs and identify the most important challenges. We answer the above questions by collecting target information such as:

- the available technologies and the possibilities for licensing them
- integral methodologies to valorize process residues for recovery, energy, composting and other purposes
- identification of valuable compounds, most hopeful applications, best available markets and competition

In a latter stage, we act beyond the industrialization process, monitoring regulatory requirements, managing risk factors, bringing together industry partners, research institutions, and potential customers in an open innovation project. Our open innovation platform was recently nominated among the finalists of IChemE Awards 2017 in the category of “Training and Development”.

Traditional Foods @ 21st Century

Dimitris Tsaltas

(Chair of the "Traditional Food" IFA Special Interest Group)

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Abstract. Special Interest Group 7 (SIG7) is a network under the umbrella of ISEKI-Food Association in the field of Traditional Foods. Traditional food term refers to foods produced and consumed over a long term period in the long duration of civilizations and through generations. Traditional and regional foods are considered a legacy passed down within communities, and consumers expect a particular sensory experience with high nutritional value. Traditional foods produced are often the product of agricultural practices that preserve and enhance rural environments, and are not extensively processed with only low preservative content. Traditional foods and drinks may be produced as homemade, by small manufacturers or large food processors. The European food and drink industry is characterized by a predominance of Traditional Small and Medium Enterprises (SMEs). These companies are increasingly under pressure due to new developing markets, increasing demand of standardized and price competitive food products by the consumers, rising importance of large retailers, and challenges in obeying governmental regulations. A significant challenge for traditional food production is to improve its competitiveness by identifying innovations that guarantee the safety and sustainability of the products. At the same time, meeting general consumer demands, specific consumer expectations and attitudes towards traditional food is essential for the European traditional food sector. Our goals are to grow a reference group about traditional food, to implement education and research in the field of traditional food offering new opportunities for the food and agricultural industry in the frame of funded projects, to exchange ideas and best practices within the network, to foster cooperation with other organisations already existing for traditional foods.

International Journal of Food Studies – An e-journal with a challenge story

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Abstract. The International Journal of Food Studies (IJFS - www.iseki-food-ejournal.com) started to be a deliverable of an Erasmus thematic network project, led by Catholic University of Portugal, as an answer to the need of having a communication vehicle for food studies education. The IJFS, a journal of the ISEKI_Food Association (IFA - www.iseki-food.net), is an international peer-reviewed open-access journal featuring scientific articles on the world of Food in Education, Research and Industry. The journal is a forum created specifically to improve the dissemination of Food Science and Technology knowledge between Education, Research and Industry stakeholders. Two issues are published every year, since 2012, covering different categories of manuscripts, such as education, research and application, critical reviews of scientific literature, and exchange of views and opinions of a scientific nature. In recognition of its quality, the journal is indexed by the best reputed organizations, including Scopus since 2016. The International Journal of Food Studies is a case of excellence in terms of international cooperation, opens access communication and cooperation for food science and technology students, academics and professionals.

Keywords: Food studies; Education; Research; Industry; Bridging; Communication

Abstracts: Poster Session

Analysis of Radio Signal Coverage in the Area of a Medium Voltage Feeder Using Radio Mobile Software

Arnulfo Barroso de Vasconcelos¹; Saulo Roberto Sodré dos Reis¹; Priscila Costa Nascimento¹; Charles Mendes Rodrigues¹; Teresa Irene Ribeiro De Carvalho Malheiro²; Reginato Domingos Scremim³; Lourival Lippmann Junior³; Giancarlo Covolo Heck³; Mateus Witter⁴; Savio Ricardo Muniz Aires da Costa⁴

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Abstract. The study of signals propagation through theoretical models using computational tools has gained importance for propagation environment forecasting and identification of communications failures, which reduce the signal coverage, or completely obstruct its transmission. This implies an increase in the penalties for poor indicators of service quality and the average attendance time to emergency occurrences, TMAE, in the energy distributors. This paper analyzes the propagation environment of radio signal in the region of a feeder located in the state of Mato Grosso, Brazil, from the selection of critical and distant points of the substation. Computer simulations were performed with the radio and radiating parameters using the Radio Mobile software, and field measurements were made with the objective of identifying possible shadow regions, considering the terrain profile and obstacles, transmitting and receiving. This software is free and available for amateur radio operators and for educational purposes, adopting the Irregular Terrain propagation model (ITM), also known as Longley-Rice model. Terrain elevation data can be obtained for free from different image bases, such as NASA (STRM), Open Street Map, TerraServer, Google Earth, among others. Emergency attendance was supervised, evaluated and controlled through indicators that express the values linked to consumer units. These indicators are average preparation time of the maintenance team, the average displacement time and average execution time. The average team preparation time (TMP), which makes up the TMAE service quality indicator, indicates the efficiency of communication, team sizing and information flow of the operation center. Thus, this indicator was hampered by communication difficulties between headquarters and maintenance teams.

Assessment of freshness and quality of deep-water pink shrimp, *Parapenaeus longirostris*, stored in ice using physicochemical, microbiological and sensorial parameters

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Abstract. Quality changes in fresh deep-water pink shrimp, *Parapenaeus longirostris*, are of paramount importance for its storage and commercialization in good sanitary conditions, owing to its high perishability related to a combination of detrimental chemical reactions and microbial proliferation, which determines its shelf-life. This study focused on the analysis of physicochemical indices, microbiota growth and sensory analysis during storage of deep-water pink shrimp in ice at 5 °C. The specimens were kept for 13 days in a perforated plastic box covered with ice that allowed the melted water to drain; new ice was added every 8 to 12 hours. Samples were regularly taken to determine water content and activity (aw), total volatile basic nitrogen (TVBN) and trimethylamine (TMA) contents, as well as abundances of mesophilic and psychrotrophic bacteria, and Enterobacteriaceae. A sensory analysis panel assessed several attributes in order to develop a species-specific Quality Index Method (QIM) scheme. Water content remained at ca. 80% and aw values ranged 0.98-1.00 during the experiment, which confirms the high perishability of the samples. Unexpectedly, there were no significant changes in the concentrations of TVBN and TMA during this storage trial. In spite of this, the abundances of mesophilic and psychrotrophic bacteria increased consistently from ca. 3.0-3.5 log ufc/g to about 6.9-7.4 log ufc/g. The absence of increase in nitrogen-based compounds despite microbiota proliferation might be related to a leaching process due to the melting ice. Moreover, Enterobacteriaceae were not present in any of the samples analyzed, indicating good sanitary and hygienic conditions during handling and storage. Finally, a 14-demerit points QIM scheme was developed from the sensory analysis sessions and used to assess freshness. Considering the parameters analyzed herein, data suggests that deep-water pink shrimp should not be stored in ice at 5 °C more than 7 days.

Keywords: Seafood quality, Deep-water pink shrimp, *Parapenaeus longirostris*, Freshness, Spoilage indicators

Economy as the inducer factor of the number of scientific publications in the field of air pollution

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Abstract. The growth of the world population and intensification in the process of industrialization in the period after that the Industrial Revolution promoted a greater demand for energy sources. This has significantly increased the emission of atmospheric pollutants due to the shift from plant-based fuels to fossil fuels. In the last 50 years, there has been a breakthrough in the discussions on sustainability, bringing to the scientific debate the relationship between air pollution and adverse health effects. Thereat, the maintenance of environmental quality began to relate directly to the quality of public health. On the other hand, with the worsening of the climate change process, accentuated by the increasing emission of greenhouse gases, studies all over the world noticed an increased in the number of cases of hospitalization and mortality due to cardiorespiratory diseases, whose main cause is the inhalation of suspended particulate matter. The present study sought to investigate the global scenario of researches that relating the suspended particulate matter, economic indicators and their effects on public health, thus contributing to the strengthening of the worldwide debate about the theme. Thereunto, was use the mapping study technique for the quantitative and qualitative analysis of articles and publications on the subject. From the study, was generate a factor of comparison between the number of publications for each country and their respective indicators of economic development.

Keywords: Air Pollution, Indicators of economic Development, Mapping Study.

Performance in soil erosion control of low-cost measures applied in burnt areas of NE Portugal: a USLE-based assessment

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Abstract. Forests have large influence on the physical, biotic and socio-economic environments, preventing soil degradation by erosion, controlling water quality, providing raw materials and food, housing most of the terrestrial fauna and flora. However, wildfire risk is high in forest areas and. Wildfires leave soils exposed to erosive rainfalls, causing very significant soil loss and the degradation of this resource. Thus, post-fire erosion control is essential for a faster recovery of burnt areas, supported in effective soil conservation measures. The study aims at quantifying the performance of soil conservation techniques in the erosion control in burnt areas, emphasized on low-cost measures and applied in NE Portugal, District of Bragança. Assessment methodology included building up 14 regional simulation scenarios of application of the selected measures (vegetation debris barriers and seeding), using the Universal Soil Loss Equation (USLE) to assess their potential erosion risk. Simulating different retention degree and distribution of barriers along the slope, it was possible to quantify the performance of this technique in reducing soil loss under the regional scenarios defined earlier. Retention degree has more influence in reducing soil loss than distance between barriers, highlighting the need for adequate implementation of this measure with high retention degree barriers. Applied singly in the first post-fire year, seeding was not effective enough. Nevertheless, if repeated a second year, a relatively higher erosion control is achieved, therefore recommending reseeding. A combination of the previous techniques outcomes a better result for NE Portugal, as for most regional scenarios, estimated soil loss rates were lower than 2 ton / ha per year; a threshold which separates conditions of low and moderate erosion risk and corresponds to soil loss tolerance in shallow soils with non-renewable substrates, common in this Region.

Keywords: Wildfires, Post-fire measures, Soil erosion in burnt areas, NE Portugal

Optimization of an Aeration System in a Wastewater Treatment Plant – Albufeira, Portugal

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Abstract. Activated sludge is the biological process most widely used in wastewater treatment and requires aeration systems in order to promote organic matter and ammonia oxidation. The costs of energy associated with the aeration processes are of major importance, to ensure the sustainable management of wastewater treatment plants (WWTP). This study was carried out in a WWTP located in Albufeira, Portugal, and aimed to analyze and optimize the performance of an aeration control system that responds to ammonia and nitrate concentrations monitored in situ. The study was performed between December 2015 and April 2016. In addition to ammonia and nitrate concentrations, the system collected in situ data of dissolved oxygen, temperature and running times of the aerators. The wastewater flow rate was monitored and its relationship with the aerator operating periods was checked. Biochemical oxygen demand (BOD5) and chemical oxygen demand (COD) were analyzed at the entrance of WWTP and in the treated effluent before being discharged to the environment. The turbidity and fecal coliforms abundance were also determined in the treated effluent to confirm the efficiency of the UV disinfection system. The recirculation rate, sludge age and Mohlman index were also followed in the WWTP. In general, the treated effluent complied with the regulations defined in the WWTP license. The results showed that the aeration control based in the ammonia sensor measurements lead to a decrease of about 30% in the energy consumption of the aeration when compared with the corresponding periods in the previous years. The treated effluent presents quality characteristics that allow its further utilization.

Keywords: Activated sludge, Energy, Aeration control, Ammonia

Biodegradation of a Packaging Film from Plant Origin

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Abstract. Food packaging materials known as “common plastics” are in great part derived from olefins, and their biodegradation is very slow, taking more than 100 years in most cases to disintegrate totally. The use of recycling techniques helps to reduce the disposal of the plastic waste in soil or water. However, according to the Davos report, in 2050 if no other action is taken there will be as much plastic packages in the sea as fish. The development of new food packaging materials environmentally friendly produced from biological sources may be an excellent contribution to avoid this threat. This work was aimed at evaluating the biodegradation in soil of packaging films produced from lupin protein isolate (*Lupinus angustifolius*) during time. The films were produced by a casting method with solvent evaporation. Next, the films (dimensions: 2x3x0.0130 cm; colour: L= 81.76±0.63; a=-4.6±0.21 b= 20.9±1.39 and puncture strength: 72.4±18.9 g) were buried in soil at 11 cm depth and 5 cm distance apart from each other. The soil contained 80-150 mg/L of nitrogen (N), 80-150 mg/L of phosphorus (P₂O₅), 300-500 mg/L potassium (K₂O) and less than 70% of organic material. The films' biodegradation was registered during time by photographs. The obtained results showed that after 42 days the developed films were practically absorbed by the soil. These types of packaging films are of great interest not only because of its reduced impact on the environment but also due to the possible use of bio-products for their production.

Keywords: Packaging, Lupin Protein Isolate, Biodegradation, Soil

Characterisation of oil extracted from melon seeds (*Cucumis melo* var. *reticulatus*)

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Abstract. Recent research has shown that fruit seed oils may serve as specialty oils for health promotion due to their special fatty acid composition and other beneficial components. By-products obtained from various fruit processing industries are attractive sources of valuable bioactive components due to their low cost and availability in large quantity to use as raw materials. The use of these by-products can reduce the disposal cost of the food industry. The aim of this study was to study the oil extracted from melon seeds (*Cucumis melo* var. *reticulatus*, commercially classified as “melo gália” from Portugal): 1) determine the oil extraction yield, 2) physico-chemical characterization and 3) determine fatty acid profile of the extracted oil. Conventional oil extraction was performed using petroleum ether in a Soxhlet apparatus. The oil extraction yield obtained from seeds of melon was 25.74% and showed that melon seeds are very interesting for oil extraction. Freshly extracted oil presented acid and peroxide values of 1.54mg KOH/g oil and 4.18 meq O-OH/kg oil, respectively. The refraction value was 1.47. Linoleic, oleic, palmitic and stearic were the principal fatty acids and the extracted oil presented a percentage of unsaturated fatty acids higher than 80%.

Keywords: Seeds, oil, melon, *Cucumis melo*, fatty acids

Mathematical Modelling of Cholera Outbreaks

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Abstract. Cholera is a diarrhoeal disease caused by a bacterial infection of the intestine, the *Vibrio cholerae*, which can rapidly lead to severe dehydration and death if left untreated. In severe forms there is intense diarrhoea and vomiting with significant fluid loss: more than 10 to 20 litres/day. Cholera outbreaks are natural risks resultant from anthropogenic activity and insufficient sanitation infrastructure. Cholera is the origin of a considerable number of victims around the world in developing countries, and so, every year, in the beginning of rainy season, this disease becomes a concern in areas with poor sanitation. Humans are the main reservoir of the *Vibrio cholerae*. Other potential reservoirs are water, some molluscs, fish and aquatic plants. This work discusses a modelling approach of cholera outbreaks. The implications of controls in the model (vaccination, medical assistance and sanitation measurements) are simulated to evaluate their efficiency, alone or combined. Modelling cholera outbreaks faces some issues regarding to misspecifications and uncertainties, such as the contact rate, the concentration of the virus and the virus lifespan in the reservoir. The simulation will be done in a population with 10000 habitants, near a water source shared by all. The following restriction-scenarios were considered: Vaccination (0%, 50% or 100% of the population vaccinated), medical assistance (with or without), and sanitation measures (with or without). Preliminary results shows that vaccination of all population can be very effective, but it is expected to be expensive in some of the countries suffering from Cholera outbreaks (e.g., Mozambique).

Keywords: Epidemiology, Cholera, Outbreak, Mathematical modelling, Sanitation, Developing countries

A prototype of sustainable residential automation

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Abstract. Energy demand increases exponentially every year, especially in developing countries such as Brazil, and with this growth of the demand natural resources have been increasingly exploited. The energy potential is the result of the conversion of energy from natural, often nonrenewable resources, it is sensible to say that there is a limit to the amount of energy that can be produced, because these resources are scarce. That said the proposal of the Eco Domotics project is to use the principles of energy efficiency and the internet of things to develop a low-cost residential automation that provides economy and comfort. In order to do this, two prototyping platforms (Arduino) are used, which command the six types of sensors installed, as well as a microcomputer (Raspberry PI 2), which will store the sensed information in a database and provide remote control of the residence, In addition a 3D model will be built to make the tests on a smaller scale, and finally a photovoltaic system that will provide energy for this automation. The partial results are the precise control of the loads (lamps) in the model through the arduino through a USB cable, that later will be replaced by the wireless control, besides the installation of the solar plate that was successful in charging the batteries that provides energy to the System. Also there is the interface via internet, through Raspberry, for remote communication between user and system and finally the successful tests of measurement and control of temperature. At this stage of the research we achieved good results of instrumentation and command with low cost. Photovoltaic installations still represent a high cost in Brazil, but yet there is a financial return calculated in 7 years.

Keywords: Arduino, energy efficiency, home automation, Raspberry, sustainability

Preliminary results of the pilot floating beds for eco-rehabilitation of contaminated water course

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Abstract. The rapid economic growth and the degradation of water resources have been contributing to an increasing concern for surface water contamination. In the “Baixo Alentejo” region (Portugal), the surface water courses are known to have excess nutrients, due to farming practices, and/or excess of metals, as a result of mining activities. This is the case of the water course called “Ribeira da Água Forte”, which presents acidic characteristics due to receiving run-off from the mining activities (Almina-Aljustrel) located in the Roxo sub-basin, belonging to the Sado basin. Thus, it is important to find sustainable management practices for the environment using eco-rehabilitation. The eco-rehabilitation of surface water resources is an emerging technology, under developed in Portugal, which consists of the use of floating beds (floating platforms and rooted aquatic plants). The objective of this study is to test at a pilot scale the efficiency in removing existing pollutants in the water course of “Ribeira de Água Forte”. For this purpose, floating beds and two different macrophytes species (*Vetiveria zizanioides* and *Phragmites australis*) were used. Physicochemical characterization of the water course, construction of pilot floating beds its control/monitoring were carried out, in order to achieve the goal. The results were compared with the Portuguese legislation for different purposes. Preliminary results suggest: (1) the water course has a classification on the ecological status “Bad” and also not suitable for irrigation; (2) a better performance of contaminants removal by *Vetiveria zizanioides*, in comparison, to the *Phragmites australis* due to the conditions of its vegetative cycle; (3) the *Phragmites australis* has presented clear signs of senescence by late September. It is expected to obtain operational parameters in the floating beds at pilot scale that will allow the implementation at full-scale, thus contributing to improve the quality of surface water bodies for regions with Mediterranean characteristics.

Keywords: floating beds, river eco-rehabilitation, *Vetiveria zizanioides*, *Phragmites australis*

Production of baker's yeast (*Saccharomyces cerevisiae*) from prickly pear fruit juice

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Abstract. In recent years, microbial conversion of renewable raw materials has become an important objective in industrial biotechnology. *Opuntia ficus indica* (prickly pear) fruit juice, which contains fermentable sugars (glucose and fructose), offers a potential substrate for fermentation processes. The aim of the present study was to investigate the potential of using fruit wastes of *Opuntia ficus indica* (OFI) as carbohydrate feedstock for yeast biomass production by using *Saccharomyces cerevisiae*. OFI fruit juice was obtained by water extraction and evaluated as a substrate for baker's yeast production, in a batch fermentation. Various nitrogen sources were compared with yeast extract for efficient yeast biomass production. The results of this study indicate that the waste OFI fruit can serve as a substrate for bakery yeast production by fermentation using *Saccharomyces cerevisiae*. Reducing sugars concentration in the fermentation medium was found to be satisfactory at a concentration of 30 g/l. Among the different nitrogen sources, supplemented to OFI fruit juice (having the same elemental nitrogen level of 2.17 g/l), yeast extract and urea were the best with yeast biomass concentrations of 25.12 g/l and 20 g/l respectively.

Keywords: *Opuntia ficus indica*, Yeast biomass, *Saccharomyces cerevisiae*, Fermentation

Residual yoghurt whey as a raw material for production of lactic acid by *Lactococcus lactis* subsp. *Lactis*

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Abstract. Food waste is currently generated in significant quantities worldwide. While most of this has generally few uses different from landfilling or composting, advanced valorization alternatives should be developed to maximize the value derived from such an important waste source. For example, the operation in global yoghurt market provokes frequently the reject and withdrawn of yoghurt derivatives out of shelf life. Indeed, this waste can have a second life, by using them as raw material of fermentation. The aim of this work was to evaluate the potential use of yoghurt whey as a carbon source for lactic acid production by *Lactococcus lactis* subsp. *lactis*. Yoghurt whey was used essentially as the carbon source in the fermentation medium. The effects of carbon substrate, nitrogen substrate, salts, and control pH on the production of lactic acid were investigated. The *Lactococcus lactis* subsp. *lactis* proved to be a promising strain for the production of lactic acid from yoghurt whey. This production could be increased by supplementing yoghurt whey with nitrogen source and salts. The maximum lactic acid concentration of 32 g/l was obtained with a productivity of 1.2 g/l.h. On the other hand, the strain shows great potential for lactic production from residual yoghurt whey, even without using pH control during fermentation. Yoghurt whey is found to be very effective substrate for lactic acid production and this might be helpful for scaling up and make the process cost effective.

Keywords: *Lactococcus lactis* subsp. *lactis*, Whey, Lactic acid, Fermentation

Establishment of a network for the development of innovative products with microALGAs: ALGARED +

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Abstract. ALGARED + is a network of excellence, constituted under the operational program EP-INTERREG VA Spain-Portugal (POCTEP) and formed by universities, research centers, public and private companies in the aquaculture sector, biomedicine and microalgae production, located on the border of these two countries. The objective of this network is the implementation of a strategy in the Spanish-Portuguese border that promotes research and technological development in the area of microalgae biotechnology and its use in health, cosmetics and aquaculture. This project will be carried out in the Algarve / Western Andalusia, cross-border area an area heavily influenced by the Atlantic Ocean, home to ecosystems of great richness and biodiversity that can form a framework for important economic activities of great strategic importance, such as aquaculture and ficoculture. These activities have a high potential for innovation, and can be a source of wealth still unexplored as substances of pharmacological and cosmetic interest. The project is articulated in 6 Activities, aimed at bioprospecting, isolation and valorisation of new microalgal strains, in addition to contemplating measures of coordination among the participants and communication to the business community and society in general. Acknowledgments: This work has been funded by European Union funds (EP-INTERREG VA POCTEP 2014-2020-055).

A review of using alternative materials to improve the green roofs sustainability

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Abstract. In the last century growth and densification of the cities has generated serious environmental, social and economic impacts, for example effect ' Heat island ', increase of the CO₂ emissions and energetic consumption, decrease of the surfaces of green spaces and risk of floods. In order to improve urban sustainability some measures are demanded, as green roofs implementation. These construction systems generate many benefits: new green spaces, improvement the quality of the air and the energy efficiency of the buildings, and reduction of the impact of urbanization. However, these systems use unsustainable materials because of its composition and excessive manufacture. Consequently, the use of alternative materials (for example natural and recycled) will suppose an improvement of sustainability, favoring its implantation and diminishing environmental cost. Recent researches have been developed to incorporate new materials. In this paper a review of the current researches regarding to the use of alternative materials in green roofs is presented (type of materials, constructive sections, laboratory tests, results obtained,...), to increase the knowledge on the use of these constructive elements promoting its utilization and improving urban sustainability.

Keywords: green roofs, waste valorization, sustainable building, review