

CONTENTS

Preface	VII
Scientific Programme	1
Author Listing	307

Keynotes

Constraint-Based Models of Microbial Physiology: Surprisingly Versatile Bas Teusink, Bob Planqué, Douwe Molenaar and Frank Bruggeman	5
------------------------------------------------------------------------------------------------------------------------------------------------------	---

Human in the Loop for Modelling Food and Biological Systems: a Novel Perspective coupling Artificial Intelligence and Life Science Nathalie Méjean Perrot, Nadia Boukhelifa, Alberto Tonda, Thomas Chabin, Marc Barnabé, Dominique Swennen, Alice Roche, Thierry Thomas-Danguin and Evelyne Lutton	11
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

Non-thermal Food Processing: Modelling of Processes towards Safety, Quality and Sustainability Anet Režek Jambrak, Ilija Djekić and Jan Van Impe.....	19
-----------------------------------------------------------------------------------------------------------------------------------------------------------------	----

Tutorial and Workshop Presentations

Sustainability in Food Industry: Towards a Unified Multi-Objective Decision Making Framework Philippe Nimmergeers, Satyajeet Bhonsale, Carlos André Muñoz López, Ihab Hashem and Jan Van Impe.....	25
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

Application of Dynamic Optimization for Food Systems using Pomodoro: A Tutorial Satyajeet Bhonsale, Dries Telen, Philippe Nimmergeers and Jan Van Impe	29
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

E-CAM: a European Infrastructure for Advanced Simulation Software Development, Training and Industry Collaboration from Food and Pharma to Advanced Materials Donal Mac Kernal	33
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

Modeling and Simulation in Sustainable Food Systems Engineering

Position Paper: Needs Analysis and Trends in Sustainable Food Systems within Higher Education Monika Polańska, Paula Bourke, Enda Cummins, Wolfram Schnäckel Vasilis Valdramidis and Jan Van Impe	41
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

CONTENTS

Modelling Multicriteria Argument Networks about reduced Meat Consumption Nicolas Salliou and Rallou Thomopoulos.....	46
Consumer Demand for Sustainable versus Low-Cost Food Products: An Agent-based Modelling Approach Rallou Thomopoulos and Serafim Bakalis	52
Multi-objective Optimization of the Formulation of Barley Bread using Artificial Neural Network and Genetic Algorithm Predrag Kojić and Milica Pojić.....	57
Numerical Study of Airflow and Temperature Distribution in a loaded Cold Store Pierre Coldrey, Jean Moureh, Graciella Alvarez, Denis Leducq, Alain Foster, Mohammed Youbi-Idrissi, Alain Damas and Judith Evans.....	60
 Modeling and Simulation in Quantitative Risk Assessment	
A Quantitative Human Exposure Assessment Model for Antibiotic Resistant <i>Escherichia Coli</i> through Tap Water Consumption Eithne O’ Flaherty, José Luis Balcázar, Carles M. Borrego and Enda Cummins	71
Modelling the Persistence of Nano Silver through Drinking Water Treatments David Shevlin and Enda Cummins.....	74
Quantitative Risk Assessment of Antimicrobials in the Feed to Food Chain Rachel Clarke, Mark G Healy, Owen Fenton and Enda Cummins.....	77
Next Generation Microbiological Risk Assessment: Next Generation Sequencing (NGS) for the Determination of Fish Flesh Microbiota Theofania Tsironi, Vassiliki Nefel Simou, Afrodite Mexi, Lougovis Vladimirois, Koussisis Stamatis and Dimitra Houhoula.....	81
 Modeling and Simulation in Food Safety and Spoilage	
Kinetic Modelling of Scavenger Reactions: Parameter Estimation for a Gallic Acid Based Oxygen Scavenger Astrid F. Pant and Matthias Reinelt.....	89
Efficient Data Collection for Modelling the Growth Rate as a Function of the Environmental Conditions Simen Akkermans, Philippe Nimegeers and Jan F. Van Impe.....	95

The Role of Control Strategies for the Implementation of Food Safety in Hospital and Health Units, as a Tool for HACCP Assistants and Simulators Efstatia Tsakali, Olga Gortzi, George Boskou, Andreas Souliotis, Dimitrios Timpis and John Tsaknis	104
Modelling of Temperature, Water Activity and Microbial Growth on the Surface of a Pork Leg during Refrigerated Transportation Mouna Merai	108
Quantitative Anti-Fungal Activity Assessment of ZnO Nanoparticles: Towards the Design and Development of Novel Air Filtration Systems Vasilis P. Valdramidis, Davide Sardella and Ruben Gatt	113
Effect of Food Microstructure on Thermal Inactivation Dynamics of Listeria Monocytogenes Davy Verheyen, Maria Baka, Torstein Skåra and Jan F. Van Impe	117
A Simple Method for growing Pseudomonas Fluorescens Biofilms on a Hydrophobic Polystyrene Surface Valeria Angarano, Cindy Smet, Maria Baka, Simen Akkermans, Andre Chieffi and Jan Van Impe	125
Stochastic Methods to model Bacterial Growth and Food Safety Risks: Some Perspectives Míriam R. García and Antonio A. Alonso	130
Growth/No Growth Models of Different Stress adapted <i>Listeria Monocytogenes</i> Strains Pantelis Stathopoulos, Dimitra Houhoula, Dimitris Timpis, Efstatia Tsakali, Jan F.M. Van Impe and Spiridin Konteles	135
Modeling and Simulation in Food Process Systems Engineering	
PSE4GUT: Influence of a Low Calories Diet Shift on Gut Microbiota Dynamics – Towards a Process Systems Engineering Approach Theodora Akrigidou, Cindy Smet, Philippe Nimmemeers, Simen Akkermans and Jan F.M. Van Impe	145
Simultaneous Data Scaling and Training of Data Driven Regression Models for Quality Control of Batch Processes Carlos André Muñoz López, Philippe Nimmemeers and Jan Van Impe	150
Smart Sensors to assess and to anticipate Fish Quality Evolution Carlos Vilas, Míriam R. García, Eva Balsa-Canto and Antonio A. Alonso.....	158

CONTENTS

Industrial Process design for Microwave Pasteurization of Liquid Foods: a Computational Study Huseyin Topcam and Ferruh Erdogan	166
A Coupled CFD-Heat Transfer Model for In-Package Solid Food Pasteurization Clarissa Detomi de Albuquerque, Sébastien Curet and Lionel Boillereaux.....	172
Numerical Modelling of Airflow and Heat Transfer in a Vented Pallet of Cheese Anh Thu Pham, Jean Moureh and Denis Flick.....	177
Edible Oil Hydrogenation: Revisited Viscosity Prediction for Accurate Process Simulation Pierre Albrand, Anne-Marie Billet, Carine Julcour and Vincent Gerbaud	181
Optimal Control of Fructo-Oligosaccharide Production J. Schorsch, M. Kinnaert, R. Fekih-Salem, L. Dewasme, C.C. Castro and A. Vande Wouwer	184
 Modeling and Simulation in Innovative Food Production and Processing Technologies	
Modelling and Validation of Time Temperature History and Enzyme Inactivation in the Continuous Flow Microwave assisted Pasteurization of Apple Juice Érica S. Siguemoto, Carmen C. Tadini and Jorge A. W. Gut.....	189
A Long-Short-Term Memory Network Model for Biscuit Baking Alberto Tonda and Nathalie Perrot.....	194
On the Quantification of the Impact of Natural Antimicrobials on the Growth Kinetics of <i>Listeria</i> in Complex Food Models Katherine Costello, Madeleine Bussemaker, Eirini Velliou, Jorge Gutierrez-Merino, Maria Baka and Jan Van Impe	199
Effect of Xanthan Gum on Physicochemical and Textural Properties of Gluten-Free Batter and Bread Christian R. Encina-Zelada, José A. Teixeira, Fernando Monteiro, Ursula Gonzales-Barron and Vasco Cadavez.....	204
Creating, Refining and Validating a Model Describing Spatiotemporal Dynamics in Cheese during Ripening Thorsten Stefan	210

Influence of Cold Atmospheric Plasma on the Microbial Dynamics of <i>Salmonella Typhimurium</i> during Storage at Different Temperatures Cindy Smet, Maria Baka, James Walsh, Vasilis Valdramidis and Jan F.M. Van Impe.....	214
Influence of Plasma Characteristics on the Efficacy of Cold Atmospheric Plasma (CAP) for Inactivation of Biofilms developed by <i>Listeria Monocytogenes</i> and <i>Salmonella Typhimurium</i> M. Govaert, C. Smet, M. Baka and J.F.M. Van Impe	221
Modelling Microbiological and Quality Marker Responses to Enhance Cold Plasma Cereal Grain Processing Dana Ziuzina, Agata Los, Simen Akkermans, Daniela Boehm, Patrick J. Cullen, Jan F.M. Van Impe and Paula Bourke	229
Characterization of Fish Based Model Food Systems for Microwave Heating Modeling Ferruh Erdogan, Huseyin Topcam, Ozan Altin, Davy Verheyen, Jan F. Van Impe, Ti Kian Seow, Dagbjørn Skipnes and Torstein Skåra	235
 Multi-Scale Modeling Methods	
A Semi-Automatic Modelling Approach for the Production and Freeze Drying of Lactic Acid Bacteria Thomas Chabin, Marc Barnabé, Alberto Tonda, Nadia Boukhelifa, Fernanda Fonseca, Eric Dugat-Bony, Hélène Velly, Evelyne Lutton and Nathalie Méjean Perrot	243
A Generalized NURBS Based Dynamic Metabolic flux Analysis Framework: Deciphering Intracellular Pathway Activation from Extracellular Measurements Philippe Nimmermeier, Simen Akkermans, Wouter Gijsen, Dries Telen and Jan Van Impe	248
Ghost Competition: On the Reliability of Quorum Sensing as an Information Source for Bacterial Species Ihab Hashem, Philippe Nimmermeier, Satyajeet Bhonsale, Carlos André Muñoz López and Jan Van Impe.....	253
Multi-Scale Modelling to explain Wine Fermentation D. Henriques, R. Minebois, R. Pérez-Torrado, E. Balsa-Canto and A. Querol..	259
Two-Equation Oxygen Diffusivity of Apple Cortex Tissue for Multiscale Modeling of Gas Exchange Siem Janssen, Pieter Verboven, Bart Nicolaï and Susana Zorrilla	264

CONTENTS

Estimation of Intrinsic Viscosity of Apple Cells by Numerical Simulation
Artemio Plana-Fattori, Christophe Doursat, Giana Almeida, Gabrielle Moulin,
Cassandre Leverrier, Even Ou and Denis Flick**269**

**Modeling of Microwave Heating in a Cylindrical Cavity System: Effect
of Rotation and Sample Location on Temperature Uniformity**
Ozan Altin, Ferruh Erdogan, Dagbjørn Skipnes and Torstein Skåra.....**277**

Modeling and Simulation in Food Business and Economics

**An Evaluation of the Effect of Different Tempering Conditions on Dark
Chocolate Compositions**
Jewel Ann Joseph, Jan F.M. Van Impe and Monika Polańska.....**285**

**Techno-Economic Evaluation of β -Cyclodextrin Production from Cassava
Tubers**
Nikolaos Vacharakis, Anastasia Louizaki, Chrysi Charalambous,
Stylianos Raphaelides and Alexandros Koulouris.....**290**

Modeling a Brewery: Capacity and Cost Analysis
Alexandros Koulouris, Albert Roussos and Demetri Petrides**295**

Short Paper

Design and CFD Simulation of a Parabolic Solar Fruit Dryer
Joshua Wanyama, Cyrus Galyaki, John Muyonga, Nicholas Kiggundu
and Noble Banadda**301**