

**International  
Congress**

Spore forming  
BACTERIA IN FOOD 2009

**June 15-17, 2009  
Quimper • France**

Edited by  
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ADRIA Développement,  
*Ivan LEGUERINEL*  
Université de Bretagne Occidentale  
Quimper - France



# **Spore forming** bacteria in food

# Spore forming bacteria in food



## Objectives of the congress

Despite investments of the food and feed industry to control contaminants in the food chain, the achievement of commercial sterility requirements has been hampered by the presence of unintended heat-resistant spores in food. Sporulated bacteria are involved in food spoilage, but also in toxin-mediated food poisoning, two phenomena that lead to high economic losses. Different evolution trends have been observed over the past two decades highlighting the urge to focus on the (re)emergence of sporeformers in food and discuss whether an adaptation or selection of sporeformers by food processes is occurring.

The **SPORE 2009** meeting aims at presenting and discussing state of the art research and the very latest scientific developments on the theme of sporeformers in food. SPORE2009 is co-organised by «ADRIA Développement», «LUBEM» and «Technopole Quimper».

## Scientific committee

- **Leguerinel Ivan** (LUBEM Quimper, Fr)
- **Sohier Daniele** (ADRIA Développement Quimper, Fr)
- **Brul Stanley** (University of Amsterdam, NL)
- **Carlin Frédéric** (INRA of Avignon, Fr)
- **Coroller Louis** (LUBEM Quimper, Fr)
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- **Gervais Patrick** (ENSBANA Dijon, Fr)
- **Heyndrickx Marc** (ILVO Institute Melle, Be)
- **Kolsto Anne-Brit** (University of Oslo, No)
- **Mafart Pierre** (LUBEM Quimper, Fr)
- **Mathot Anne-Gabrielle** (LUBEM Quimper, Fr)
- **Peck Mickael** (IFR institute, Uk)
- **Palop Alfredo** (University of Cartagena, Es)
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- **Thuault Dominique** (ADRIA Développement Quimper, Fr)
- **Tsuchido Tetsuaki** (Kansai University, Jp)
- **Van Immerseel Filip** (University of Ghent, Be)
- **Zwietering Marcel** (University of Wageningen, NL)

# **Spore forming bacteria in Food SPORE2009**

Edited by Sohier Danièle and Leguerinel Ivan

## ***Note from the Editors***

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Papers submitted to publication into the Proceedings were peer-reviewed by the members of the SPORES 2009 Scientific Committee.

“Peer review is a referring process used to check the quality and importance of reports of research. An article submitted in a peer-reviewed book is reviewed by other experts in the area. Its aims to provide a wider check on the quality and interpretation of a short report and to improve its quality” (*The Cochrane Library Glossary, 1996*).

## ***Acknowledgments***

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We would like to thank the authors for the quality of their contributions and highlight the emerging wide spread interest on sporeforming bacteria in food from participants coming from 25 countries *i.e.* Argentina, Australia, Brazil, Belgium, Canada, China, Czech Republic, Denmark, Ethiopia, Finland, France, Gabon, Georgia, Germany, Greece, Hungary, Italy, Japan, Netherlands, Nigeria, Norway, Spain, Thailand, United-Kingdom, United States.

# Scientific Programme

June 15<sup>th</sup>, 2009

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- 8:30-9:00**            **Registration**  
9:00-9:30            Opening session  
9:30-10:00          **Origin of bacterial spores contaminating foods.**  
**CARLIN Frédéric**, UMR408, Safety and Quality of Vegetables Unit, INRA Avignon (Fr)
- 10:00-10:30          **Recent insights into the phylogeny and systematics of sporeforming Firmicutes.**  
**DE VOS Paul**, Laboratory for Microbiology & BCCM/LMG Bacteria collection, University Ghent (Be) & **STACKEBRANDT Erko**, German Collection of Microorganisms and cell cultures GmbH, Braunschweig (De)
- 10:30-11:30**          **Poster session & coffee break including a flash poster presentation**
- Characterisation of news spore-forming lactic acid bacteria isolated from poultry farm with probiotic prospective. **BAYANE Ali**, Diawara B, Roblain D, Dubois R, Destain J and Thonart P
  - Food borne disease associated with *Clostridium perfringens*: investigations on exposure assessment. **WIJNANDS Lucas**, Delfgou-van Asch EHM, Van der Meij-Florijn A, De Jonge R and Van Leusden FM
  - Partial characterization of a novel germination-related lipase, LipC, of *Bacillus subtilis* and its homologs of pathogenic bacilli. Kato S, Masayama A, Terashima T, Hemmi H, Yoshimura T and **MORIYMA Ryuichi**
  - Microbiota in cocoa beans industrial processing. **REBELO LIMA Lídia**, Van der Velpen V, Wolkers-Rooijackers J, Nout MJR and Zwietering MH
  - Surface contamination of food processing lines by *Bacillus cereus* spores during cleaning in place procedures. **SYLLA Yahaya**, Le Gentil C and Faille C
- 11:30-12:30**          **“Spore forming bacteria biodiversity and prevalence” session**
- Quantification and identification of psychrotrophic *Clostridium sp.* spores from vacuum-packaged chilled Brazilian red meat. Silva AR, Pacheco-Sanchez CP, Chaves RD and **DE MASSAGUER Pilar Rodriguez**
  - Prevalence and biodiversity of psychrotrophic bacteria of the *Bacillus cereus* group from farm to egg product industry : analysis of eggshell surface and pasteurized whole liquid egg products. **JAN Sophie**, Brunet N, Techer C, Le Maréchal C, Koné AZ, Grosset N, Cochet MF, Gillard A, Gautier M, Puterflam J and Baron F
  - *Alicyclobacillus sp.* in samples of apple juice concentrate from argentine companies. **PALLARES Elsa Nancy**
- 12:30-14:00**          **Lunch**

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June 15<sup>th</sup>, 2009

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- 14:00-14:30      **Germination and outgrowth of *Bacillus cereus* spores: how to cope with wake up calls in different environments.**  
ABEE Tjakko, Food Microbiology Department, University of Wageningen (NL)
- 14:30-15:00      **Risk assessment and predictive microbiology of spore-forming bacteria in food.**  
AUGUSTIN Jean-Christophe, Food Microbiology Department, Veterinary School of Maisons-Alfort (Fr)
- 15:00-16:00      **“Systems biology” session**
- Array-based transcriptional analysis of *Clostridium botulinum* / *sporogenes* during its vegetative cycle, germination process and outgrowth. **BASSI Daniela** and Cocconcelli PS
  - Phenotype and transcriptome analysis of the germination and outgrowth phase of sorbic acid-stressed *Bacillus cereus* ATCC 14579 spores. **VAN MELIS Clint**, Tempelaars MH, Nierop Groot MN, Moezelaar R and Abee T
  - Putative spore germination genes in Clostridial genomes. **XIAO Yinghua**, Francke C, Abee T and Wells-Bennik M
- 16:00-17:15      **Poster session & coffee break**
- 17:15-18:15      **“Quantitative risk assessment : from farm to fork” session**
- Quantitative risk assessment for hazards that arise from non proteolytic *Clostridium botulinum* in minimally processed dairy-based food. **MALAKAR Pradeep**, Barker GC and Peck MW
  - A quantitative method, based on the analysis of high heat-resistant bacterial spores present in ingredients, to set thermal process (F0 value) in order to guarantee commercial stability of the product. Membré JM and **VAN ZUYLEN André**
  - Strain and population variability in risk assessment of spoilage by bacterial spores. **SMELT Jan**, Ingoglia C, Bos AP and Brul S
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- 19:00              **Cocktail & Conference Dinner**

# Scientific Programme

June 16<sup>th</sup>, 2009

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- 8:30-9:30**      **Clostridia : epidemiology, detection methods and incidence of spores in foods/environment.**
- 8:30-9:00      **Molecular epidemiology of *cpe*-positive *Clostridium perfringens* type A strains**  
**LINDSTROM Miia**, Department of Food and Environmental hygiene, Faculty of Veterinary Medicine, University of Helsinki (Fi)
- 9:00-9:30      ***Clostridium botulinum* and botulism**  
**PECK Mike**, Institute of Food Research, Norwich (Uk)
- 9:30-10:30**      **“New advances in rapid analysis tools for better control” session**
- PCR identification of toxigenic *Bacillus cereus* isolates from cow's milk. **BANYKO Juraj** and Vyletřlová M
  - A mixed-species microarray for tracking spore-forming bacilli in the food chain. Caspers MPM, Schuren FHJ, Van Zuijlen ACM, Brul S, Montijn RC, Abee T and **KORT Remco**
  - Multi-parametric PCR based tools : from natural biodiversity to selection by processes. **POSTOLLEC Florence**, Bonilla S, Hallier S, Thuault D and Sohier D
- 10:30-11:30**      **Poster session & coffee break**  
**10:30-11:00**      **Flash poster presentation**
- Thermal resistance of *Geobacillus stearothermophilus* spores in different food products: green peas, green beans and sweet corn. **ANDRÉ Stéphane**, LeBa D and Zuber F
  - Thermal inactivation kinetics of *Bacillus* spores and evaluation of kinetic data using actual temperature-time profile. **ATAMER Zeynep** and Hinrichs J
  - Thermal analysis of *Bacillus subtilis* spores. Champion D, **NGUYEN THI MINH Hue**, Perrier-Cornet JM and Gervais P
  - Heat resistance of psychrotolerant *Bacillus cereus* isolates from ready-to-eat/cook food products. **SAMAPUNDO Simbarashe**, Heyndrickx M, Xhaferi R and Devlieghere F
  - Resistance to pulsed UV light of *Bacillus subtilis* spores causing discoloration defects in breaded meat. **DE BENITO Amparo**, Marco S and Tomas D
- 11:30-12:30**      **Pathogen, toxins and food poisoning : what about epidemiology?**
- Emetic toxin production of *Bacillus cereus* is independent of sporulation, but requires the master sporulation regulator Spo0A. **LÜCKING Genia**, Dommel MK and Ehling-Schulz M
  - Fnr modulates both carbohydrate catabolism and enterotoxin synthesis under microaerobiosis. **MESSAOUDI kahina**, Clavel T, Schmitt P and Duport C
  - Risk profile of *Bacillus cereus* and public health implications. Rajkovic A, **UYTTENDAELE Mieke**, Dierick K, Samapundo S, Botteldoorn N, Mahillon J and Heyndrickx M
- 12:30-14:00**      **Lunch**

# Scientific Programme

June 16<sup>th</sup>, 2009

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- 14:00-14:30      **The use of bacterial spore formers as probiotics**  
**CUTTING Simon**, Molecular Microbiology Department, Royal Holloway University of London (Uk)
- 14:30-15:00      ***Bacillus cereus* group: genome plasticity for better adaptation**  
**KOLSTØ Anne-Brit**, Microbial Dynamics Laboratory LaMDa, School of Pharmacy, University of Oslo (No)
- 15:00-16:00**      **“Ready to eat food” session**
- Biodiversity of sporulated aerobic bacilli in surimi based products. **COTON Monika**, Denis C, Capot P and Coton E
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  - Modelling of *Clostridium perfringens* growth during cooling, refrigeration and reheating of beef-in-sauce products. **SEVRIN JALOUSTRE Séverine**, Cornu M, Morelli E, Noel V and Delignette-Muller ML
- 16:00-17:10**      **Poster session and coffee Break**
- 17:10-17:15**      **Best poster awards**
- 17:15-18:15      **“Foodborne spoilage microflora and adhesion to equipment surfaces” session**
- Use of high-pressure homogenisation, sodium-benzoate and eugenol for the inhibition of *Alicyclobacillus acidoterrestris* spores. **BEVILACQUA Antonio**, Corbo MR and Sinigaglia M
  - Influence of the mode of contamination on adhesion behaviour of *Bacillus atrophaeus* spores on porous and non-porous inert surfaces. **GRAND Isabelle**, Naïtali M, Meylheuc T, Herry JM, Hilaire D, Dane C and Bellon-Fontaine MN
  - Role of BclA protein in adhesion of *Bacillus cereus* spores and exosporium structuration. **LEQUETTE Yannick**, Combrousse T, De Lima Dias T, Lebret V and Faille C
- 18:30              Bus to Town Hall Reception
- 19:00**              **Town Hall Reception**



# Scientific Programme

June 17<sup>th</sup>, 2009

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- 8:30-9:30**                    **Heat resistance and process optimisation**  
8:30-9:00                    **Quantification of spore resistance for assessment and optimization of heating processes: a never-ending story**  
**MAFART Pierre**, Food Engineering department, Technical university, Quimper (Fr)
- 9:00-9:30                    **Industrial applications of strategies to control the risk associated with bacterial heat-resistant spores**  
**MEMBRÉ Jeanne-Marie**, Unilever, Safety and Environmental Assurance centre SEAC, Sharnbrook (Uk)
- 9:30-10:30**                    **“Spore resistance and process optimisation” session 1**
- Combined effect of lysozyme and nisin at different incubation temperature and mild heat treatment on the time to growth of *Bacillus cereus*. **Antolinos V**, Ros-Chumillas M, Guevara L, Muñoz M and **FERNANDEZ Pablo**
  - Inactivation of *Geobacillus stearothermophilus* spores in milk by microwaves treatment. **GADONNA-WIDEHEM Pascale**, Marier D, Fournier L, Onillon E and Laguerre JC
  - Modelling the influence of C18 free fatty acids on *Clostridium sporogenes* spore heat resistance. **MVOU LEKOGO Brice**, Coroller L, Mafart P and Leguerinel I
- 10:30-11:15**                    **Coffee Break and Poster session**
- 11:15-12:30**                    **“Spore resistance and process optimisation” session 2**
- New insights in the *Bacillus subtilis* spore resistance to UV and ionizing radiation. **MOELLER Ralf**, Horneck G, Rettberg P, Mollenkopf HJ, Stackebrandt E and Reitz G
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  - Effects of pH and temperature on *Paenibacillus macerans* heat resistance compared to other *Bacillus* spp. **RODRIGUEZ-LOZANO A**, Gaze JE
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# Scientific Programme

June 17<sup>th</sup>, 2009

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- 14:00-14:30      **Synthesis of the FP6 and FP7 proposals and/or results on sporeforming bacteria in food**  
**MOREAU Laurence**, European directorate for research, unit Food Health and Well being, Brussels (Be)
- 14:30-15:00      **On the origin of heterogeneity in preservation resistance of Bacillus spores; advanced from a ‘systems’ analysis of bacterial spore occurrence and outgrowth.**  
**BRUL Stanley**, Molecular Biology and Microbial Food Safety, Swammerdam Institute for life Science, University of Amsterdam (NI)
- 15:00-16:00**      **“From new advances in systems biology to strategies for sporeformer contaminants control ” session**
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  - Resistance, germination properties and proteomic analysis of total and coat proteins of spores of *Bacillus cereus* strain KBAB4 produced at different temperatures. **PLANCHON Stella**, Dargaignaratz C, Bornard I, Broussolle V and Carlin F
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