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Jean-François J.-F. Hocquette, Ruth Hamill, B. Hiller, Isabelle Cassar-Malek,  
Brigitte B. Picard

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# Advancing Beef Safety through Research and Innovation

An international conference organised by *ProSafeBeef*

A European Commission Research Project  
(Food CT-2006-36241)



February 8th to 9th 2012  
Teagasc Food Research Centre, Ashtown, Dublin 15, Ireland





# Advancing Beef Safety through Research and Innovation

Proceedings of a meeting at Teagasc Food Research Centre, Ashtown,  
Dublin 15, Ireland

8<sup>th</sup> to 9<sup>th</sup> February 2012

Editor

Geraldine Duffy,

Teagasc Food Research Centre, Ashtown, Dublin 15, Ireland



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**Local Conference Organising Committee**

Dr Geraldine Duffy, Teagasc Food Research Centre

Mr Robert Mooney, Teagasc Food Research Centre

Ms Edel Deane, Teagasc Food Research Centre

Dr Kaye Burgess, Teagasc Food Research Centre

Ms Orla Lynch, Teagasc Food Research Centre



## *Preface*

On behalf of the conference organising committee, I am delighted to welcome you to this international conference and industry demonstration day on *Advancing Beef Safety and Quality through Research and Innovation* held at the Teagasc Food Research Centre, Ashtown, Dublin 15, Ireland on 8<sup>th</sup> to 9<sup>th</sup> February 2012.

The conference brings together a multi-disciplinary international team of researchers together with the stakeholders from across the beef farm-to-fork chain to discuss the latest innovations in beef quality and safety research with a focus on how they can be applied in the beef chain. The topics addressed at the conference range from microbial risk assessment, pathogen control, chemical contaminants, nutrition, novel beef products and processes and consumer attitudes to beef safety and novel technologies. The conference also includes an industry demonstration day showcasing new products, technologies and innovations originating from the project, with presentations, practical demonstrations, and an opportunity for stakeholders to meet directly with the researchers.

The conference is organised as part of a European Commission integrated research project **ProSafeBeef** *Advancing Beef Safety and Quality through Research and Innovation*. This is a five year integrated research project, which commenced in March 2007 and is funded within the EU VI framework programme. It is co-ordinated by Teagasc Food Research Centre, Ashtown, Dublin, Ireland and involves 41 leading research and industrial organisations from Europe, North and South America, Australia and New Zealand. This conference and proceedings present some of the latest findings from this research project.

I would like to acknowledge the support of our sponsors the Food Safety Authority of Ireland. The conference exhibitors Irish Power and Process and Fisher Scientific and all the speakers, poster presenters, chairpersons and delegates for contributing to the success of the conference. A special thanks to the local organising committee, Robert Mooney, Edel Deane, Orla Lynch and Kaye Burgess.

Dr Geraldine Duffy,  
*ProSafeBeef*, Project Co-ordinator,  
Teagasc Food Research Centre,  
Ashtown,  
Dublin 15



# Genetic and genomic markers of beef quality

Hocquette, J.F.<sup>1</sup>, Hamill, R.<sup>2</sup>, Hiller, B.<sup>3</sup>, Cassar-Malek, I.<sup>1</sup>, Picard, B.<sup>1</sup>

<sup>1</sup> INRA, UR1213, Herbivore Research Unit, Theix, France

<sup>2</sup> Ruth Hamill, Teagasc Food Research Centre, Ashtown, Dublin 15, Ireland

<sup>3</sup> Research Unit Muscle Biology and Growth, Leibniz Institute for Farm Animal Biology, Dummerstorf, Germany

Many genetic markers (SNPs) are currently available throughout the world to predict or improve beef quality. However, research conducted in *ProSafeBeef* validated some markers but not all of them, since the effects of many of these markers are breed-specific. A database of SNP markers with potential to influence beef quality has also been established. Further studies are required to identify more appropriate markers for the major pure cattle breeds.

Gene and protein expression profiling of the bovine muscle tissue revealed that the expression level of many genes may be potential indicators of muscle mass, tenderness, flavour or marbling of meat. Among them, markers of adipocytes are potentially indicators of the ability of animals to deposit intramuscular fat. New markers of beef tenderness have also been identified within the heat shock protein family. Major classes of genes are also differentially expressed under n-3 versus n-6 fatty acid based feeding regimes. However, these markers are often specific to muscle type, animal type, livestock practices or environmental conditions.

Despite these limitations, SNPs or expression levels of genes related to the heat shock protein family, muscle fiber characteristics, metabolic enzymes, connective tissue or proteases involved in ageing of beef may be potential markers of beef quality and in particular of tenderness. Taken together, these results indicate that specific adaptations of predictive tests of beef quality or specific equations of prediction using genetic or genomic tools according to bovine breed, rearing practices, animal type and beef cut would be necessary. In addition to many genotyping platforms existing in different countries, a bovine muscle transcriptomic analysis service is now

available for stakeholders. Similarly, a dot-blot quantitative tool for the analysis of several proteins in many bovine muscle samples will be available soon.