Conference on

Farm to Fork Food Safety: A Call for Common Sense

Hosted by The Agricultural University of Athens, Greece

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Conference Report

Critical Control Points from Farm to Fork

(Work Package 3, DL 7)

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Introduction

There are an estimated 45.4 million cases of food poisoning within the EU every year, which represents an unacceptable social (human suffering) and economic (health care and lost working days) cost. It is generally accepted that food safety systems such as Hazard Analysis Critical Control Point (HACCP) are the most effective means of producing safe, acceptable food. This is reflected in current and proposed food safety legislation (new EU hygiene regulations to come into effect in January 2006). However, as currently presented, many such food safety management systems are unworkable, expensive and ineffective. Furthermore, the concerns and suggestions of those involved in the industry are often ignored. An international food safety conference, “Farm to Fork Food Safety: A Call for Common Sense”, held in Athens, Greece in May 2004, brought farmer group representatives, meat plant managers, retailers, consumers, regulators, scientists and other interested professionals together to contribute their opinions, suggestions and practical experience towards the development of improved food safety systems. The conference was organised by Teagasc – The National Food Centre, Ireland in collaboration with the Agricultural University of Athens, Greece as part of the European Union Risk Analysis Information Network (EU-RAIN) concerted action project (QLK1-CT-2002-02178). The EU-RAIN project is funded by the European Union under the Fifth Framework Programme – Quality of Life and Management of Living Resources (QoL), Key Action 1 (KA 1) on Food, Nutrition and Health (www.eu-rain.com).

The conference was opened by Prof. Patrick Wall, University College Dublin (IRL) and European Food Safety Authority (EFSA) board member. Prof. Wall provided an
overview of current food safety issues and emphasised the need for a risk assessment based approach to food safety. He pointed out that while globalisation dramatically increases customer choice, it may, in fact, lead to new food safety challenges.

The opening address was followed by a series of presentations and discussions on (1) Farm Food Safety Systems; (2) Animal Feed Safety; (3) HACCP in the new EU Member States; (4) Meat & Poultry HACCP; (5) Meat HACCP – The Regulatory Perspective; and (6) Retail and Domestic Food Safety Management. A brief summary of the presentations will now follow. The “Farm to Fork Food Safety: A Call for Common Sense” conference abstract book is available from the EU-RAIN website (www.eu-rain.com/publications). A free CD of conference presentations is available upon request from Dr. Bláithín Maunsell, EU-RAIN Administrator (e-mail: bmaunsell@nfc.teagasc.ie).

**Farm Food Safety Systems**

Prof. Truls Nesbakken, Norwegian School of Veterinary Medicine (NO), presented on pre-harvest food safety assurance and the feedback of information to farmers. Zoonotic agents on farms are controlled by official control and monitoring programmes and good hygiene practice (GHP). These involve general hygiene, feed quality, rodent control and maintenance of records. Additionally, the importance of feedback of information to producers should not be underestimated. Informing farmers of the suitability of animals presented for slaughter provides an important example.
Food safety from the farming perspective was addressed by Mr. Tony Pettit, Teagasc - Kildalton Agricultural and Horticultural College (IRL) and Ms. Elizabeth Hogben, National Farmers’ Union (representing COPA: Committee of Agricultural Organisations in the European Union). Ms. Hogben pointed out that while exempt from compulsory HACCP implementation, codes for practice based on HACCP principals will be introduced on farms. She also stressed the importance of risk-based inspection to complement the risk-based regulations. Mr. Pettit reported on his experiences training farmers in food safety issues. He cautioned against over regulating farmers. He was stressed the importance of appropriate training schemes. He also suggested that an incentive system would be beneficial in motivating farmers.

A number of delegates expressed the view that it is inappropriate to introduce classical HACCP systems into farming. There was general consensus that hazard analysis principles coupled with good farming practice should be taken into account when developing guidelines for the farming sector.

**Animal Feed Safety**

The provision of safe feed to farm animals is imperative for subsequent food safety. Many recent food safety scares (e.g. BSE, dioxin crisis) have been caused by feed safety problems. Prof. Martin Tielen, Vice-President of FEFAC - The European Feed Manufacturers’ Federation, reported on steps FEFAC has taken towards the harmonisation of HACCP based feed safety assurance in Europe. This has involved the development of a European Feed Manufacturing Code (EFMC) aimed at ensuring
feed safety and improving traceability all along the feed chain. Dr. Servé Notermans, TNO Nutrition and Food Research (NL), highlighted feed issues requiring further scientific research. These included transfer factors (i.e. the transfer of toxic substances from animal feed to human foods, considering the metabolism of such substances in the animal itself), the utilisation of predictive modelling and the determination of acceptable levels of contamination.

**Meat plant HACCP in the new EU Member States**

HACCP implementation is mandatory in European Union meat plants (Decision EC/471/2001). Dr. Ladislav Steinhauser, Steinhauser SRO (CZ), and Prof. Danuta Kolozyn-Krajewska, Warsaw Agricultural University (PL), reported on the experiences of new EU member states regarding HACCP implementation. Since the late 1990s companies in the Czech Republic have been legally required to have HACCP systems in place. However, companies frequently fail to understand HACCP. At present 30% of red meat processing plants have certified HACCP programmes. Prof. Kolozyn-Krajewska reported a similar situation in Poland. She highlighted low levels of HACCP implementation in small companies compared to larger companies. Mandatory HACCP implementation has led and will continue to lead to the closure of a sizeable number of small meat businesses.

**Meat & Poultry HACCP**

A series of presentations dealt with HACCP in meat slaughter and processing plants. Mr. Brendan Howlett, Food Safety Authority of Ireland (IRL), gave an overview of
prerequisites in meat slaughter plants. Prerequisite programmes such as good manufacturing practice (GMP) and good hygiene practice (GHP) are necessary prior to the development of a HACCP plan in any slaughter plant. The beef slaughter prerequisites were divided into abattoir structure, abattoir maintenance, abattoir sanitation and abattoir operation.

Delegates were informed of the North American experience by Prof. John Sofos, Colorado State University (USA) and Dr. Colin Gill, Agriculture and Agri-Food Canada, Lacombe Research Centre (CA). Prof. Sofos gave an overview of beef and lamb HACCP systems, which have been operating in the US for the last 5 years. In contrast to European plants, most North American plants use carcass decontamination interventions to help meet regulatory criteria (e.g. zero tolerance for visible faecal material on carcasses). Decontamination interventions include vacuum cleaning, hot water washing while vacuum cleaning, spraying with 2% lactic acid, and pasturization with hot water or steam. Prof. Sofos emphasised the importance of operating procedures (e.g. hide removal, evisceration) in efforts to minimise faecal contamination and stressed that decontamination critical control points (CCPs) should only serve to reduce accidental or unnoticed contamination. Dr. Gill outlined various carcass decontamination systems in further detail and presented the results of their scientific evaluation. He concluded that while most decontamination methods result in a reduction in bacterial numbers where initial numbers were high, decontamination methods have very little effect if the initial bacterial numbers on the carcass were low. In fact, visible contamination is a very poor indicator of carcass contamination. Noteworthy, however, pasturization was found to essentially eliminate *E. coli* (<-3.40
log mean cfu/cm²) from carcasses that were not heavily contaminated (E. coli levels ≤ 0.04 log mean cfu/cm²) prior to treatment.

The meat industry was represented by Ms. Joanne Day, Dawn Pork and Bacon (IRL) and Mr. John Matthews, Irish Food Processors (IRL/UK). Ms. Day detailed the successful implication of HACCP in the Dawn Pork and Bacon Company. The HACCP system consists of evisceration, chilling, metal detection and storage as critical controls points. Mr. Matthews highlighted a lot of confusion in meat plants regarding the division between prerequisites and HACCP. Contradictory guidelines from different regulators were also highlighted.

Prof. Spyridon B. Ramantanis, Technological Educational Institution of Athens (GR) discussed the BSE risk and beef slaughter. He proposed the use of non-penetrative stunning methods such as irreversible stunning to reduce the risk of transfer of brain particles to other tissues via the blood circulation system.

Dr. Lüppo Ellerbroek, BfR - Federal Institute for Risk Assessment (D), presented on HACCP for processing of poultry and poultry products and highlighted the importance of pathogen control programmes at farm level. Cross contamination occurs in poultry slaughter houses. Thus, the slaughter of Campylobacter and Salmonella negative flocks prior to the slaughter of positive flocks and improved hygienic processing techniques were recommended.

Dr. John B. Luchansky, USDA-ARS-ERRC (USA), presented the results of a number of scientific studies on the recovery, characterisation and control of food-borne
pathogens during slaughter and further processing. He reported on a pilot scheme in which the meat industry assumes some of the responsibility for meat inspections as opposed to exclusive inspection by the national regulatory authority (official inspectors). Pathogen prevalence data revealed that the pilot scheme produced an equivalent level of performance compared to the standard inspection procedures. Other studies presented included the molecular characterisation of *Salmonella* isolates in pig faeces and on pig carcasses; a comparison of *E. coli* O157:H7 prevalence in healthy and downer dairy cattle at time of slaughter; and interventions to control *Listeria monocytogenes* in frankfurters.

Dr. Hans Blom, Norwegian Food Research Institute, MATFORSK (NO), reported on an interesting model system for HACCP implementation in the food industry. All staff (management, operatives, laboratory workers, delivery personnel) were involved in HACCP implementation, allowing them to have an input and also to develop a better understanding of the process.

In the discussion that followed this session, some researchers stated that evisceration and dehiding are not CCPs because critical limits are subjective and effective monitoring is impossible. Thus, meat slaughter and processing HACCP requires specific interventions such as hot water washing to ensure that any food risk to the consumer is minimised.

**Meat HACCP – The Regulatory Perspective**

Mary Howell, Food Standards Agency - FSA (UK) outlined work the FSA have undertaken to assist UK meat plants in the implementation of HACCP. These included guidelines and training packages. Furthermore, guidance on microbiological
testing was provided. The swabbing and excision methods of microbiological assessment of carcasses were compared in a study commissioned by the FSA. While the two methods were found not to have direct equivalence, results were in the same hygiene band 70% of the time. Work commissioned by the FSA has also highlighted that while microbiological testing was useful for analysing trends in an individual plant, it was not useful for directly comparing the results from different plants.

Prof. Riitta Maijala, EELA - National Veterinary and Food Research Institute (FIN), provided an overview of microbial performance standards, including an explanation of terminology such as (1) Appropriate Level of Protection (ALOP); (2) Food Safety Objective (FSO) - the maximum frequency and/or concentration of a microbial hazard in a food at the time of consumption that stills provides the ALOP; (3) Performance Objective (PO) - the maximum frequency and/or concentration of a microbial hazard in a food at a particular stage in the food chain that should not be exceeded in order to still achieve the ALOP; and (4) Performance Criteria (PC) - specifies how the PO can be achieved.

Dr. Ron Dwinger, Health and Consumer Protection Directorate-General, European Commission and Ms. Eibhlin O’Leary, Food Safety Authority of Ireland (IRL) provided an overview of future EU food safety legislation aimed at increasing food safety, improving traceability and restoring consumer confidence. The proposed legislation is underpinned by Regulation 178/2002 (General Food Law) and consists of the following Hygiene Regulations:

- H1: Regulation on Hygiene of Food Stuffs
- H2: Regulation on Hygiene of Foods of Animal Origin
- H3: Regulation on Official Controls of Food of Animal Origin
- H4: Directive on Animal Health
- H5: Directive to repeal existing rules (17 directives).

In addition, the following regulations are also involved:

- Regulation on Official Controls for Feed and Food (OFFC)
• Regulation on the microbiological criteria for foodstuffs and feed production.

One impact of the proposed legislation will be the provision by farmers of management and health information details to slaughter houses prior to animal slaughter. At present, some meat inspection procedures involve the incision of carcasses to check for the presence of pathogens that are rare in modern herds in Western Europe. In fact, such inspection procedures may contribute to cross contamination in slaughter houses. Future inspection protocols will be modified based on risk assessment.

Retail and Domestic Food Safety Management
The retail sector was represented at the conference by Dr. Kyriaki Lampropoulou, Quality Assurance manager, Makro Cash & Carry Wholesale S.A (GR), (Representing Metro Group, Europe). She outlined the Metro Group’s quality assurance system including steps undertaken to ensure cold chain adherence and product traceability and recall systems in place in the event of a problem.

It is widely accepted that temperature abuse is a contributary factor in many food poisoning outbreaks. Dr. Petros Taoukis, National Technical University of Athens (GR), reported on an EU funded study on the monitoring of temperature and management of the food distribution chill chain. This project involves the use of miniature data loggers and Time Temperature Indicators (TTI). Thus the actual quality status of a food is determined, based on temperatures it has been exposed to.

Dr. Declan J. Bolton, Teagasc – The National Food Centre (IRL) presented the results of a food safety knowledge survey and microbial survey of domestic fridges in Ireland. The results of the knowledge survey revealed a number of potentially dangerous practices in domestic kitchens (e.g. the storage of raw meet in shelves other than the bottom shelf of a fridge and incorrect meat defrosting practices). The
microbial survey of domestic fridges revealed relatively high bacterial levels (total viable counts greater than $7 \log_{10} \text{cfu/cm}^2$) and the presence of potentially dangerous bacteria (e.g. *Salmonella* in 7% of fridges).

Dr. Kalliopi Rantsiou, Hellenic Food Authority (GR), reported on a programme established for the training food handlers. The key elements of this programme included a register of trainers, the publication of a textbook and the production of course material including a video.

Dr. George Chryssochoidis, Agricultural University of Athens (GR), reported on a study regarding consumer perceptions towards olive oil. This study revealed that consumers are often more concerned with food quality and nutrition rather than food safety issues.

**Poster presentations**

Over 30 posters were presented at the EU-RAIN conference, covering topics as diverse as bio-security on farms, microbial hazards from farm to fork, food safety systems in slaughter houses, safer slaughtering techniques, temperatures in domestic refrigerators and restoring consumer confidence in food safety. (Please see the conference abstract book [http://www.eu-rain.com/publications](http://www.eu-rain.com/publications) for further details).
All posters were included in a poster competition judged by Dr. Servé Notermans and Dr. Lüppo Ellerbroek. Prize winners were invited to give a short oral presentation on their poster.

- Dr. Janet Corry, University of Bristol, UK (4th prize) outlined physical methods aimed at reducing *Campylobacter* and *Salmonella* on raw poultry in processing plants. Treatments included short-term freezing, hot water washing, exposure to dry heat (40°C to 80°C) and exposure to steam for 10-12 seconds.
- 3rd prize was awarded to student Mr. Panayiotis Tourlomoussis, also of University of Bristol, UK, for a study involving evaluation of acute phase proteins in blood as an alternative method in post-mortem inspection. This prize was accepted by Dr. Sava Buncic (scientific supervisor) on Panayiotis Tourlomoussis’s behalf.
- Coincidentally, both 1st and 2nd prize were awarded to Dr. Caitriona Byrne, now of University College Dublin (IRL). 2nd prize was awarded for a study on the incidence and characterisation of *Listeria monocytogenes* in beef processing environments in the United States, undertaken while working with the United States Department of Agriculture. 1st prize was awarded for a study on the pathogenic potential of bovine *Escherichia coli* O157:H7 isolates. This involved a comparison the virulence gene profiles in bovine and human isolates and identifying polymorphisms in the DNA sequences of virulence genes that may affect survival and virulence in the human gut.

**Conference Evaluation**

Conference delegates were asked to fill out a conference evaluation questionnaire. Feedback was very positive with 95 % of respondents rating the overall conference assessment as either excellent (14 %) or very good (81 %).

**Next EU-RAIN conference**

The next EU-RAIN conference, “*Food Pathogen Epidemiology: Microbes, Maladies and Methods*”, will be held in Padua, Italy on December 2nd and 3rd, 2004. This conference will be organised by Teagasc – The National Food Centre (IRL) in collaboration with the Istituto Zooprofilattico Sperimentale delle Venezie (I) and will
deal with all aspects of food pathogen epidemiology including outbreak case studies and current and developing laboratory techniques for pathogen detection.

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