



## **COST ACTION 920 – FOODBORNE ZOOZOSIS: A CO-ORDINATED FOODCHAIN APPROACH**

### **ANNUAL SCIENTIFIC REPORT 2004**

#### **Introduction**

COST Action 920 has been active since the summer of 1991 with 22 participating countries. Since its inception COST 920 has brought together at a series of meetings and workshops, experts along the foodchain to discuss new and sustainable approaches to reducing the level of foodborne pathogens along the foodchain.

COST 920 has been particularly successful in bringing together the veterinary, food and public health experts that gather information, the scientists that use this information to assess the various risks in the foodchain and the advisors and policy makers who are responsible for managing these risks through control measures and new policies. Meetings have included representatives from the World Health Organisation (WHO), European Food Safety Authority (EFSA) and the Office Internationale des Epizooties (OIE) who are important international bodies involved in improving food safety. COST 920 has been also been invited to participate in WHO training workshops and provide scientific information to EFSA.

COST 920 has also been active in training and transferring expertise within the participating European countries. For example, recognised methods to differentiate and characterise the organisms that cause these diseases have been successfully transferred between countries. This is very important to ensure that the information from one country in Europe can be compared with data from the other countries. We have a long way to go but COST 920 is actively helping to improve comparability. Another important success for COST 920 has been in helping to train scientists in risk assessment in those countries that lack the knowledge. For example, scientists from Hungary, Poland and Romania have been trained in the basics of risk assessment and are now using this knowledge

to help to develop this expertise in their own country. Further details of COST 920 can be found on our website at [www.cost920.com](http://www.cost920.com).

### **Meetings and exchanges**

In 2004 COST 920 organised three working group meetings involving all four working groups and seven Short Term Scientific Missions (STSM) that support the exchange of scientists and techniques across Europe.

### **Working Group 1 – Detection and typing of foodborne zoonoses**

*Workshop on: Advanced technological solutions & platforms in food science.*

*November 2004, University of Veterinary Medicine, Vienna, Austria*

*Chair of Working Group John Threlfall UK*

Martin Wagner, University for Veterinary Medicine in Vienna organised this meeting that was focused on the extraction, detection and quantification of microbes by molecular tools and comprised the four sessions as follows:

**Session A:** Development and harmonization in microarray technology today.

**Session B:** Solutions to the problems of data generation by real-time PCR.

**Session C:** Quantification of pathogens by traditional and molecular tools.

**Session D:** Solutions to problems regarding the analysis of microbial communities

More than fifty, mostly young researchers from eleven European countries attended the meeting that comprised 22 oral and three poster presentations. Experts were not only invited from the food science area but also in related disciplines such as applied statistics, soil microbiology, phage biology and microbial ecology. The sessions were structured in a way so that a keynote speaker was leading into the area at the beginning of each session, which was concluded by special lectures critically reviewing the technological advancements shown during the sessions.

## **WORKING GROUP 3 – QUANTITATIVE FOODCHAIN RISK ASSESSMENT**

*Workshop on: Data needs in risk assessment*

*June 2004, Pamplona, Spain*

*Chair of Working Group – Arie Havelaar, NL.*

The local organization was chaired by Begoña Sesma (Instituto de Salud Pública de Navarra, Leyre, Pamplona and Isabel García-Jalón Departamento de Microbiología, Universidad de Navarra, Pamplona.

73 scientists, including PhD students, attended the workshop. Also, many members of the COST 920 Management Committee used the opportunity of a combined event to attend one or more sessions of the workshop. The program consisted of 5 scientific sessions and poster presentations. Scientific sessions were organized and chaired by different members of the working group, and included 6 invited speakers. All sessions included discussions in subgroups and/or in plenary. Sessions were:

### **Session 1: Data needs in completed and on-going risk assessments**

Objective: To discuss data problems encountered by working group members and to present solutions to overcome these problems

Chair: Arie Havelaar, Rapporteur: Lüppo Ellerbroek

### **Session 2: The EU zoonosis legislation and QMRA**

Objective: To discuss recent developments in data collection for the EU zoonoses legislation, to evaluate the use of these data for QMRA and to identify possible improvements.

Chair: Hilde Kruse, Rapporteur Riitta Maijala.

### **Session 3: Databases for QMRA**

Objective: To discuss problems and possible solutions in relation the organisation of a European database applicable for QMRA, including strategies for sampling and collection of data.

Chair: Bjarke Bak Christensen, Rapporteur: Hanne Rosenqvist

### **Session 4: Computer session**

Objective: To identify, discuss and demonstrate problems and solutions for implementing QMRA models in algorithms and in modelling software.

Chair: Tine Hald, Rapporteur: Emma Snary

### **Session 5: Recent work**

Chair: Begoña Sesma, Rapporteur: Rosa M<sup>a</sup> Gimeno

A full report of the workshop can be found at [www.cost920.com](http://www.cost920.com)

**WORKING GROUP 2 (“NEW AND EMERGING FOODBORNE PATHOGENS”) AND WORKING GROUP 4 (“SURVIVAL OF ZONOTIC PATHOGENS THROUGH THE FOODCHAIN”).**

*Joint workshop on: “New technologies in the foodchain and emerging zoonotic agents.”*

*October 2004, Bertinoro, Bologna, Berlin*

*Chairs of Working Groups: Andrea Ammon, Germany (WG 2), Pierre Colin, France (WG4).*

This meeting was held at Bertinoro Castle in Italy and was organized by Prof. Achille Franchini and his team from University of Bologna.

Five invited speakers and more than 50 national delegates attended this meeting. Swine and poultry productions dominated the emerging zoonoses sessions. In particular, pigs seem to be an important reservoir for Hepatitis E virus (HEV): several studies showed that HEV strains of swine origin are closely related to human strains isolated in the same geographical areas. In particular, in the Netherlands, an epidemiological study showed the close relationship of sequences of virus strains isolated from swine and human. In addition, recently, human cases of HEV have been reported and associated with the consumption of uncooked deer or wild boar meat.

In poultry production, it was interesting to hear many scientists considering Epsilon bacteria as emerging zoonotic pathogens. The class of Epsilon bacteria includes the genera *Campylobacter*, *Arcobacter* and *Helicobacter*. Although they can be found, as a normal flora, in every animal species, some of them seem to occur specially in birds. Of course, for *Campylobacter jejuni*, the most commonly reported gastrointestinal pathogens; poultry and wild birds appear to be the main reservoir. Nevertheless, some other Epsilon bacteria (*Arcobacter butzleri*, *Helicobacter canadensis* and *H. pullorum*) can be from another source ; unfortunately these hypotheses are not always confirmed due to inadequate isolation and identification procedures. Nevertheless, for example, a study on the prevalence of *H. pullorum* from broiler flocks in Belgium revealed that 34 % of the broilers were found positive (intestinal and liver samples). *Arcobacter spp.* seem also to be common in food of animal origin; poultry products are commonly contaminated, but probably these bacteria. may not belong to the natural poultry flora. The creation of the CAMPYCHECK project ([www.campycheck.org](http://www.campycheck.org)) is important to address the limitations of current isolation and identification

methods and to establish the prevalence of these *Campylobacteriaceae* in patients, animal faeces and the food and water chain. Interestingly it was noticed that, in Norway, a plan to reduce human exposure to *Campylobacter spp.* through broiler meat products, was implemented, including a surveillance program on broilers, a survey of broiler meat products and a follow-up advisory service on farms with flocks positive for these bacteria. These positive flocks are slaughtered at the end of the day, and carcasses from these flocks are either heat treated or frozen before being marketed. By this way, there has been a significant reduction in the proportion of positive flocks, and also a positive public health effect.

The avian botulism is mainly caused by type C and D *Clostridium botulinum* toxins; nevertheless it seems that the risk of human botulism associated with poultry meat is low. Despite that, in France, food borne cases of botulism (type B) were associated with the consumption of poultry meat cooked sausages; heavily contaminated raw poultry meat and spices combined with low cooking temperature and lack of refrigeration during the hot summer of 2003, were probably responsible for the 3 reported human cases.

The role of the environment in the transmission of food borne zoonotic pathogens inside and outside the farm is important for public health. Animal wastes and effluents are frequently applied as fertilizer to land used for crop or silage production and for animal grazing. Many pathogens are well adapted to survive in faeces and can persist in animal wastes for long periods. In these conditions, these products should be considered as an important vehicle for transmission within herds, farms and finally through the food chain. For example, *Salmonella* Typhimurium and *S. Dublin* can survive in protozoa present in the environment. Consequently it may be necessary to hold manure and slurry for extended periods prior to spreading on farmland or for use in the production of food crops, or to apply processes such as composting, heat drying to decrease the number of pathogens.

The food industry is also a very critical environment for bacteria. Some of them can adhere to surfaces, forming a biofilm, and sometimes can survive after an antimicrobial treatment. In fact, it appears that it is very difficult to detach all cells present in a biofilm, so it is necessary to choose adapted construction materials, to comply with hygienic designs rules and to limit the presence of water in surfaces. May be, in the future, the selection of “positive biofilm” should be one option to control the presence of pathogens in the food premises? Others options such as using

lactic acid bacteria not only in the product but also during the rearing period of animal, and specially poultry, seem to be very promising. Finally, the heat treatment of food, just before packaging, is another option to control the microbiological quality of the product. While emphasis was previously on canning and long-term preservation, focus has now shifted to mild heat treatments and subsequent chill storage. So it is important to know the safety limits of such treatments in terms of biological hazards, factors influencing the growth or inactivation... This is a challenge for the future to combine the treatment of the food and to keep the organoleptic quality of the product.

In conclusion, this meeting provided important exchanges of recent information on emerging zoonotic agents, on the origin and dissemination of pathogenic bacteria and on new processes used to control bacterial contamination along the food chain.

Workshop proceedings can be found on [www.cost920.com](http://www.cost920.com)

### **Short-Term Scientific Missions**

Seven missions took place in 2004 where scientists from The Netherlands, Poland, Hungary, Norway, Italy and Croatia, visited colleagues in UK, Austria, Italy, and Spain.

### **Future plans**

In 2005 and 2006 joint Working Group meetings are planned to integrate the important outcomes from the individual working group meetings. In 2006 it is hoped to organise a final COST 920 conference that will bring together all the working groups and provide some recommendations to the EU, EFSA and other important stakeholders on future research and surveillance priorities to facilitate the control of foodborne zoonoses in Europe.

Professor Chris Thorns  
Chair COST Action 920