DEVELOPMENT AND IMPLEMENTATION OF RAPID METHODS FOR THE DETECTION OF PATHOGENIC BACTERIA IN MEAT AND MEAT-PRODUCTS

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In a collaborative research project, supported by the Dutch Product Board for Livestock and Meat (PVV), our three institutes: TNO, VVDO and RIKILT-DLO coördinate their efforts for the development and implementation of detection- and screening-assays for the food pathogenic bacteria, *Salmonella* sp., *Campylobacter jejuni/coli*, *Listeria monocytogenes* and *Yersinia enterocolitica* in meat and meatproducts. (see also posters B-34, B-35, B-36, B-37, and B-41).

Accurate detection of pathogens in foods remains an important challenge for food microbiologists. New rapid technologies, like instrumental methods (conductance measurement, turbidimetry), ELISA and the Polymerase Chain Reaction (PCR) have emerged in recent years and have already partially replaced classical microbiological methods, because of their superior speed, sensitivity, specificity or potential for automation. Microbiological methods, even the so-called rapid methods, are not fast enough in many cases for on-line monitoring of critical points identified according to the Hazard Analysis of Critical Control Points (HACCP) method. However, they are indispensable for the establishment of the critical points and for the evaluation of their control by physico-chemical means. In addition, endproduct testing still is required, eg. in cases where quality assurance systems are not (yet) established, for verification, certification, or external quality inspection.

DNA-based methods in particular have the potential to be highly specific for pathogenic (sub)species or even virulence factors and at the same time show high sensitivity. However, direct detection of low numbers of pathogens in foods without extensive purification of the samples is not feasible yet and PCR is not tested frequently in practical settings. In order to develop assays suited for routine food microbiology, simple and reliable sample pretreatment procedures adapted to the food matrix have to be developed. Several modular elements, like modified enrichment, immunomagnetic separation (IMS), filtration and centrifugation are available for combination with detection principles like PCR, ELISA or conductometry into powerfull tailormade detection or screening assays.

The development and application of methods for routine detection of *Salmonella*, *Campylobacter jejuni* and *Campylobacter coli* in meat and meat products is presented. Conductance measurement in combination with IMS, PCR or Immuno-fluorescence (IF) offers good prospects to become a rapid and sensitive screening method for *Yersinia enterocolitica* in meat and products. Next to detection of pathogens, DNA based methods were also applied for typing of *Salmonella* and *Campylobacter* strains in order to investigate reservoirs of contamination and routes of transmission among lifestock and from lifestock to humans.