Prevention of human diseases by an integrated quality control system

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Abstract

The efficiency, cost-effectiveness and scientific validity of current ante- and post-mortem meat inspection procedures are doubtful. A new approach is proposed and discussed. Meat and poultry inspection systems need to better address the risks posed by food-borne micro-organisms, particularly pathogens causing inapparent infections in food animals. Microbial agents (particularly bacteria) represent the greatest risk to public health. Intervention should not unduly focus at the abattoir or food processing stage, but also target the risks associated with production stages before the abattoir. It is proposed that producers have to guarantee, e.g. through HACCP-like systems, that their products meet the requirements. When verification of the HACCP-procedures by the competent authority reveals that the HACCP-system is not adequate, the operator or farmer should adapt the procedures. Some examples are described. The establishment of a new European Food Authority (EFA) is expected to contribute to a higher level of consumer health protection, and will help to restore and maintain consumers' confidence.

Keywords: Meat inspection; HACCP; Safe and wholesome

1. Introduction

Food safety is a key issue for consumers. The public expects safe food and believes that the government in co-operation with the scientific institutions can deliver it. Many scientists argue that our food has never been as safe as it is today, the consumer’s perception however is the opposite. Scientists have also established that in contrast to the consumer’s general conception, microbial agents (particularly bacteria) represent the greatest risk to public health. Consumers are more afraid of residues. Industrial processing such as pasteurisation affords a fairly high degree of safety in dairy products, this regrettably does not apply to muscle-based food of animal origin. The efficiency, cost-effectiveness and scientific validity of current ante- and post-mortem meat inspection procedures may differ from country to country. The detection rate of abnormalities through on-line inspection, palpation and incision of carcasses is low. When the ante-mortem inspection categorizes animals as healthy, the post-mortem inspection will on average detect only 20% of all the macroscopic lesions that are actually present in 1% or less of the animals (Berends et al., 1993; Harbers, 1991). Most of the abnormalities present in animals...
from industrialised countries are related to the aesthetic or technical quality of products. The level of exposure of consumers to microbiological hazards in fresh pork is unlikely to be reduced significantly by the detection and removal of gross abnormalities in the tissues examined (Pointon et al., 2000). Nevertheless, these abnormalities need to be detected and removed to assure wholesomeness of the product. Inspection at the end of the production-line is not designed and equipped to detect symptomless carriers of zoonotic agents or residues and may be in some cases even counter-productive regarding hygienic production proceedings. Meat and poultry inspection systems need to better address the risks posed by food-borne micro-organisms, particularly pathogens causing inapparent infections in food animals. Microbial decontamination procedures are currently being suggested. Its implementation in industrial food processing has, at least in some parts of the world, not yet met with governmental approval.

2. Consumer perspectives

What are the consumer’s main demands regarding food of animal origin?

In general, consumers ask for tasteful, nutritious and above all cheap food. Moreover it should be safe, wholesome, produced under hygienic and animal friendly circumstances without environmental pollution.

Various stakeholders throughout the food production line have conflicting interests in the above mentioned items.

In modern animal husbandry, large numbers of animals are raised under optimised hygienic conditions. These conditions however do not guarantee pathogen-free animals at slaughter. A succession of food hygiene scares in the recent past from Listeria monocytogenes in pate and soft cheeses, E.coli O157 in meat, dioxine in poultry, Salmonella in poultry and pigs, Campylobacter in poultry meat and BSE in cattle has fueled concern about the safety of food of animal origin. Also concern of animal diseases like foot and mouth disease, classical swine fever, etc. which do not have an impact on human health had a negative impact on the image of food of animal origin. The level of concern differs between countries. The BSE discussion in Germany is totally different from that in The Netherlands. Until November 2000, the German government, supported by the meat industry, told the public that BSE is not a problem in Germany. However, after several positive cases, the consumer did not trust the government and the meat industry anymore and the meat consumption dropped during a couple of weeks to 20%, while in The Netherlands no such influence could be seen. Transparency and openness is the key element of risk communication.

3. The new approach

Live animals and the environment may serve as source of pathogenic micro-organisms, which in turn contaminate carcasses during the slaughtering process and meat products during further processing, storage and handling. Therefore intervention should not unduly focus at the abattoir or food processing stages, but also target the risks associated with preharvest production stages. Properly structured HACCP-like systems, applied from farm to fork, offer the best available approach to optimise meat inspection (Snijders et al., 1989; Berends et al., 1993; Anonymous, 2000b). Monitoring is a prerequisite for a risk-based food safety system. Based on the assessment of monitoring results, meat inspection procedures may be adapted when necessary. Specific food safety requirements (FSRs) should be formulated for the potential food safety hazards. Operators have to guarantee that their products meet the specific FSRs. It is the role of the competent authority to judge whether the operators’ measures are suitable to guarantee food safety requirements. Specific FSRs should be set for microbiological, chemical and physical hazards as well as for pathological changes in slaughter animals. Although patho-physiological changes may not in all cases represent a food safety hazard (tumours, oedema, etc.) meat ought to be wholesome. Regarding microbiological FSRs a distinction can be made between hygiene guidelines and guidelines to prevent pathogenic micro-organisms. For the hygiene guidelines, EU proposals are prepared to introduce compulsory testing and evaluation of the total viable
counts and Enterobacteriaceae on working surfaces and carcasses. Guidelines for pathogenic micro-organisms should be based on concrete data and the prevalence of these hazards. The prevalence of pathogenic bacteria such as Campylobacter, Salmonella, verotoxin producing *E. coli* in the member states is virtually unknown. The competent veterinary authority should collect data using harmonised sampling methods before guidelines can be set.

In an integrated quality control system, information from the farm is an essential element to ensure safe meat (Harbers, 1991; Mousing et al., 1999; Anonymous, 2000b). Traceability for all animals is a prerequisite. The information should cover:

- the nature and origin of the animal feeding,
- the health status of the animals at the farm,
- the use of veterinary medical products,
- the results of any analysis carried out on samples taken at the farm,
- the results of slaughterhouse data regarding ante- and post-mortem findings.

This information is needed by the meat inspection as well as by the slaughterhouse management as a tool for steering the HACCP-like system. In such an integrated system, it is possible to allow a visual post-mortem system only. The advantages of omitting particular measures such as palpation and slicing, mentioned in the current meat inspection and replace them by only visual inspection are: reduction of cross-contamination; reduction of unnecessary damage to the carcasses; better application of resources to more appropriate sanitary measures.

Animals lacking the above-mentioned information cannot be accepted in such control system but have to be slaughtered separately. In addition they will undergo extensive post-mortem inspection and sampling for further laboratory examinations. The farmer has to pay for the cost of the extra analyses and inspection labour.

Hazards and their potential negative health impact are variable within and between production systems in different countries and regions. Different inspection systems may reach equivalent outcomes regarding the appropriate level of protection. This can be illustrated with new insights in trichinellosis control in pigs.

The prevention of human trichinellosis by proper meat inspection is a classic example of successful veterinary public health measures. The microscopic methods which have been used for more than a century to test pigs for the parasite were intended to prevent human disease. However, the value of these relatively insensitive direct detection methods, including trichinoscopy and pooled sample digestion, was debated as soon as more sensitive indirect (serological) methods became available (van Knapen, 2000).

Provided that the human disease does not exist in a certain area, the pigs are housed indoors all their life and husbandry is based on high hygiene standards, the abattoir control can be skipped completely. Monitoring of trichinella infection in wildlife will contribute to understanding of the infection pressure from nature to livestock. Trichinella-free pig farming is a feasible option for controlling this zoonosis, even in endemic areas. This approach provides an opportunity to combine good veterinary practice, in order to prevent animal diseases, with the prevention of Trichinella infection. All animals with access to the environment, or animals which are fed with potentially Trichinella-infected feed (swill, carcasses) will always constitute a public health threat, and must be inspected individually at slaughter (swine, horses, wild boars).

4. Final remarks

EU is trying to regain the confidence of the consumer with intervention programs like HACCP. David Byrne, European Commissioner, stated: “Safety is the most important ingredient in our food.”

Producers have to guarantee, e.g. through their HACCP-like systems, that their products meet the requirements. When verification of the HACCP-procedures by the competent authority reveals that the HACCP-system is not adequate, the operator or farmer should adapt the procedures.

Due to these safety programs and health hype in the public the traditional handicraft produced food have to meet the same regulations and procedures as the food produced in large companies. Less attention is paid to special taste and diversity of the product.
The ‘White Paper on Food Safety’ (Anonymous, 2000a) makes proposals that will transform EU food policy into a proactive, dynamic, coherent and comprehensive instrument to ensure a high level of human health and consumer protection. Legislation will be reviewed and amended as necessary in order to make it more coherent, comprehensive and up-to-date. The establishment of a new European Food Authority (EFA) by the end of 2002, which will become the scientific point of reference of the whole European Union, may contribute to a high level of consumer health protection, and will help to restore and maintain consumers’ confidence.

This White Paper also calls for strong involvement of the operators, who bear the prime responsibility for the food safety. There must be a greater transparency at all levels of food safety policy to enhance consumer confidence in food safety.

The ability to take rapid, effective, safeguard measures in response to health emergencies throughout the food chain will be an important element. Advice on labelling of foodstuffs will certainly form part of the activities of the Authority. EFA however, must not become a Paper Tiger but a rapid reaction force. The national food authorities should be complementary and in line with the EFA.

Without FSRs, set by legislative authorities, for a number of hazards and pathological-anatomical changes, it will be very difficult to stimulate farmers and meat industry to improve the quality and safety of their products.

References


