

State of Art of meat inspection of pigs in the EU

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Abstract

The current meat inspection in the European Union (EU) is based on principles that are around 100 years old. However, the zoonotic hazards have shifted and the production systems for livestock are changing. This makes it necessary to look at whether the present way of conducting meat inspection is efficient or not. The elements of meat inspection in EU are specified in Regulation (EC) 854/2004 which also opens up for modifications of the existing practices if certain requirements are met. In essence, finisher pigs might be subjected to so-called integrated meat inspection, if they originate from integrated production systems where the animals are raised under controlled housing conditions since weaning. Moreover, Food Chain Information should be exchanged prior to slaughter. This paper evaluates the current state of meat inspection for finisher pigs in the EU. The evaluation is based primarily on 1) results of a workshop aiming at identifying the aims of different components of meat inspection, 2) information obtained through a questionnaire survey mailed to all EU member states, 3) Food and Veterinary Office (FVO) inspection reports.

The evaluation of the detailed aim of meat inspection revealed that there are several aims: food safety, notifiable diseases, animal health and welfare as well as international trade. The results of both the questionnaire and the FVO reports show that over-all speaking the member states are complying with the current regulation – but not necessarily in details. Only three member states have introduced integrated meat inspection in pigs. This implies omission of routine incision into the mandibular and/or mesenteric lymph nodes, and no routine opening of the heart. In some cases, the lungs are not palpated routinely. In member states where the pig population is considered free from Bovine Tuberculosis (TB) and Trichinella, only few elements of traditional meat inspection in pigs are related to food safety. Despite that Salmonella ascribed to pork is causing a much higher number of human cases than bovine TB and Trichinella, this and similar food borne agents are not dealt with effectively at meat inspection in many cases. The FVO reports also show that lack of compliance with current regulation in particular regarding ante mortem inspection as well as stunning and bleeding. This is of relevance for both animal welfare and the ability to identify notifiable diseases should these occur.

Further work is needed regarding how to make full use of risk-based principles and cost-effectiveness in meat inspection for the benefit of consumers, society and industry while ensuring international trade. Here, we should consider use of new diagnostic techniques, requirements for increased biosecurity practices, and identification and increased focus on high-risk pigs/herds.

Introduction

The current meat inspection regulation in the EU is based on principles that are around 100 years old. However, the zoonotic hazards and the livestock production systems are changing, making it necessary to look at whether the present way of conducting meat inspection is efficient. The concept of integrated production system has recently been introduced in the EU to describe pig herds with high biosecurity. The regulation has opened up for modifications to existing meat inspection in such herds. But what is the State of Art of meat inspection in the EU? What are the challenges? And where are we heading? This was studied in a project conducted by the Danish Agriculture & Food Council in 2010-2011. Figure 1. Evaluation of aim(s) of specific component of post mortem meat inspection and most important lesions and if possible their causes, based partly on results from a workshop in Denmark, partly on Jensen et al. (2006) – Pigs

PIGS	Aim					
	Food safety	Notifiable diseases	Animal Production diseases	Animal Welfare	Quality	Trade
Inspection (palpation/incision if listed) of organ/area						
Head, mouth, throat & tongue		Foot and mouth, SVD			Abscess	
Mandibular lymph nodes – incision	Avian/ bovine TB?	Hovine TB				Hovine TB
Lungs, trachea & oesophagus	Avian/ bovine TB?	Hovine TB	Pleuritis and pneumonia due to AP, Mycoplasma	Actinob. Pleurpneum.		
Lungs, bronchial & mediastinal lymph nodes – palpation	Pyemia /septicaemia	CSF	Pleuritis and pneumonia due to e.g. AP	Actinab. Pleuropneum.		
Trachea and large bronchia - Longitudinal incision ^b	Hovine TB?	Hovine TB	Lung worms		Lung worms	
Heart and pericardium – Incision	Pyemia /septicaemia	CSF	Erysipelothrix Strept. suis		Endo-/pericarditis	
Diaphragm	Cysticercus cellulosa	CSF				
Liver and portal lymph nodes – Palpation	Intoxication Avian/bovine TB?	Hovine TB,	Abscess		Abscess cirrhosis	Hovine TB
Gastro-intestinal tract & mesenterium	Salmonellosis		Enteritis e.g. due to Lawsonia	Gastric ulcer Chronic enteritis	Enteritis	
Gastric & mesenterial lymph nodes	Avian/bovine TB?	Hovine TB	Indicators for enteritis	Indicators for enteritis		Hovine TB
Spleen – palpation if necessary	Pyemia /Septicaemia	Classical & African swine fever				
Kidneys	Intoxication /septicaemia	Classical & African swine fever	Renal insufficiency		Appearance smell & texture	
Pleura and peritoneum	Hovine TB?	Hovine TB CSF	Pleuritis	Peritonitis	Pleuritis => Not edible	
Genitalia		Brucellosis	Reproductive disorders in sows	Late pregnancy/ recent calving torsion of testicle		
Udder and its lymph nodes ^b			Abscess			
Umbilical area and joints of young animal – palpation	Septicaemia		Many infections		General poor quality	

(a): Workshop held in Denmark in September 2010 with participation from different stakeholder groups. b: incisions not required (or question not relevant) if organs are not destined for human consumption. A question mark highlights that it is doubtful whether these agents are meat-borne.

Material and Methods

First, the detailed aims of meat inspection as described in Regulation 854/2004 were evaluated on a workshop in September 2010 in Denmark with participation of different stakeholders: is the purpose to ensure food safety, notifiable diseases, animal health or welfare, trade, or meat quality? The result of the workshop was supplemented with information from a text book on pathology (Jensen, 2006). Next, a questionnaire was sent out to EU member states to obtain detailed information about the way that meat inspection is conducted. A total of 22 questionnaires were received. Finally, FVO reports were studied to obtain information of level of implementation of the current regulations. The different reports were obtained from the homepage of FVO (http://ec.europa.eu/food/fvo/index_en.cfm). The full report of the study will become available mid-2011 and can be obtained upon contact to the authors.

Results

Figure 1 presents an evaluation of the aim of the individual component of meat inspection. The primary aim of meat inspection is usually recognised as food safety. However, meat inspection is also used to survey and identify notifiable animal diseases, animal health and welfare as well as to ensure trade and quality. It is in fact noted in Fig. 1 that only few components of meat inspection are related to food safety – in particular for member states that are free from TB.

Traditional meat inspection according to Regulation (EC) 854/2004 is conducted in most member states. Only Denmark, Germany and the Netherlands have modified inspection programmes in place for the part of their pig production that fulfils the requirement for integrated production systems (animals should be raised under controlled housing conditions since weaning). The modification related to omission of routine incisions into the mandibular and mesenteric lymph nodes, and no routine opening of the heart. In some cases, the lungs are not palpated routinely. Several member states expect to be introducing similar meat inspection practices for pigs within the coming years.

Both the questionnaire data and the summary of results of FVO inspections confirm that most member states in principle meet the requirements in Regulation (EC) 854/2004. However, the regulation is not necessarily fulfilled with respect to all details. In many member states incisions into the mandibular lymph nodes and palpation of the mesenteric lymph nodes (which are done to identify TB) are not necessarily done routinely. Neither is the heart of finisher pigs routinely opened in all abattoirs at all times. Zoonotic agents like Salmonella play a limited role in the current meat inspection. Moreover, improper ante and post mortem inspection occurs widely. Regarding animal welfare, the results in the FVO reports reveals incompliances regarding stunning and bleeding. Finally, the FVO reports reveal lack of compliance when the local and central competent authorities are conducting their work.

Discussion

Details in Fig. 1 might be discussed; e.g., the exact allocation of some diseases and conditions. The message in the figure is that there are several aims of meat inspection. Despite that the perception is that food safety is the most important reason for conducting meat inspection other aims are playing a role (Fig. 1). One of these aims is surveillance for notifiable diseases like foot and mouth disease and classical swine fever. An early diagnosis of such diseases might prevent an outbreak from turning into an epidemic. And here, the efficacy of ante and post mortem inspection should be studied further. Meat inspection data might be used to document freedom from notifiable diseases to trading partners. Moreover, systematic collection of certain meat inspection data might be valuable for use in herd health management and for monitoring of animal welfare. However, there are most likely individual needs for how individual countries would collect and use such data. Regarding international trade, meat inspection plays a role with respect to surveillance for both notifiable diseases and zoonotic infections. Thorough observations at meat inspection make it possible to give specific guarantees in relation to trade. Finally, inspection for quality could be performed by the slaughterhouse.

In member states that are considered free from Bovine TB and Trichinella in livestock, only few elements of traditional meat inspection in pigs are related to food safety. Moreover, in these member states the lack of full compliance with the current regulation - found by FVO - that requires incision/palpation into mandibular and mesenteric lymph nodes is judged as having limited if any impact on food safety. Interestingly, other food safety hazards like Salmonella - which is causing many more human cases than bovine TB, Brucella, or Trichinella - are not dealt with effectively in the current meat inspection in most member states. Incompliance found related to ante mortem inspection might jeopardize the member states with respect to notifiable livestock diseases, since such diseases, hence, might be diagnosed too late, making disease-control more difficult than necessary. Moreover, the lack of compliance with regards to stunning and bleeding might have a detrimental impact on animal welfare. The competent authority should here be seen as drivers aiming at ensuring the compliance with the current regulation. Unfortunately, the FVO reports contain many comments to the conduct of the local or central competent authority.

Further work is needed regarding how to make full use of risk-based principles and cost-effectiveness in meat inspection. Risk-based surveillance might imply inspection of high-risk animals/premises that are identified based on a specific list of risk factors / parameters. Such an approach is different from the current practice where attention is paid equally good or bad to all animals. However, which should be the requirements for such risk-based programmes? And where are the pitfalls? And does it make sense to operate with 27 different programmes in the EU instead of a generic programme for free states and non-free states, respectively? This needs to be discussed. Another approach is to replace some specific

components of current inspection with control actions in other parts of the food chain. An example is to prohibit the use of peat (sphagnum) as litter material for pigs unless heat-treated to avoid exposure to avian tuberculosis. This will make sense, if such control actions are more cost-effective than the current meat inspection that involves incision and palpation of selected lymph nodes. Meat inspection should here be seen as a kind of surveillance that can deal with infected/affected animals. For some hazards, meat inspection is the only way of identifying a positive animal. But for other hazards, pre-harvest intervention/inspection, biosecurity requirements can also be considered. In line, new tools such as multi-diagnostics might offer promising results; by use of meat-juice samples the status with respect to several agents might be revealed before the carcass leaves the cooling unit. However, issues like cross-contamination at abattoir, and low positive predictive value when testing for notifiable disease will need to be discussed.

Conclusion

Most member states in EU still conduct traditional meat inspection. However, meat inspection is up for debate in all parts of the world. Further work is needed regarding how to make full use of risk-based principles and cost-effectiveness in meat inspection for the benefit of consumers, society and industry while ensuring international trade. Many important issues remain to be discussed according to the current regulation before we can move on to a more risk-based meat inspection, among others:

1. Which hazards should be included in a surveillance system at the slaughterhouse?
2. How can surveillance and control for zoonotic parasites and notifiable diseases be conducted risk-based?
3. Which notifiable diseases should be surveyed at meat inspection?
4. Are data collected at meat inspection usable for the purpose?

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References

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