

Internet based checklist for the risk assessment of Salmonella contamination in finishing pig herds, abattoirs and cutting plants

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Abstract

Monitoring systems are in place to categorize pig finishing herds, abattoirs and cutting plants for their level of Salmonella contamination. In order to improve their status, if necessary, the companies and their advisors need to implement an improvement plan. This can be based on a strengths and weaknesses analysis in relation to all factors that contribute to the Salmonella contamination level. To do this analysis in a uniform, structured and repeatable way, internet based checklists were developed.

In the checklist for herds questions relating to the Salmonella status of introduced piglets, transport hygiene of piglets, housing, management, cleaning and disinfection, feeding, disease status, rodent and fly control, and unloading practices are listed. Standard operating procedures (SOP's) will be available on the website for references on, for example, cleaning and disinfection, rodent and fly control, sampling and testing of weaned piglets / growers as well as hygiene checks. In the checklist for abattoirs questions relating to transport, holding area, slaughter, chilling, cleaning, disinfection and hygiene are listed.

For cutting plants questions relating to the quality of received goods, chilling, cutting, packaging, transport, hygiene, documentation, and cleaning and disinfection are listed.

Expert opinion is and will be gathered to weigh the different chapters and sub-questions in the checklists. The final score allows comparison to previous checks and to peers. Scores per chapter allow a ranking of most urgent points to be remedied in order to improve the Salmonella status. The internet application allows access to the checklist from any location at any time; however, pdf-documents of blank or completed checklists can be printed when desired. Logins provide sufficient privacy protection. Storage of the data in a central database provides data security. The checklists will be available in German, Dutch and English. User feedback will be used to improve all aspects of this tool continuously.

Introduction

Monitoring systems are in place to categorize pig finishing herds, abattoirs and cutting plants for their level of Salmonella contamination. In order to improve their status, if necessary, the companies and their advisors need to implement an improvement plan. This can be based on a strengths and weaknesses analysis in relation to all factors that contribute to the Salmonella contamination level. To do this analysis in a uniform, structured and repeatable way, three internet based checklists were developed. One checklist is intended for the use on finishing farms. The other two are intended for abattoirs and cutting plants respectively.

Material and Methods

Within the SafeGuard project a working group was put together consisting of representatives from an abattoir, animal health services both from Germany and The Netherlands, a private laboratory working in the field of food hygiene, a German state inspection service, the Dutch Product Board for Livestock and Meat and a computer programmer.

Project steps were:

- to list and evaluate the available analysis tools;
- to create three checklists, one for farms, one for abattoirs and one for cutting plants, by considering available standard operating procedures (SOP's) and including documentation and scoring systems;
- to carry out trial analyses of high and low prevalence herds and abattoirs and cutting plants to evaluate the scoring system and user friendliness;
- to gather opinions from potential users and other experts;
- to make the checklists available in three languages (German, Dutch and English) through a website.

Results

To evaluate available tools checklists from The Netherlands (in house checklist for Salmonella on farms and <http://www.verantwoordeveehouderij.nl/index.asp?producten/netwerken2008/18/spfcheck/index.asp>), Germany (in house checklist for Salmonella on farms), Belgium (www.biocheck.ugent.be/2/pages/) and the United Kingdom (www.ukmeat.org/FSAMeat/NewMethod.aspx) were gathered. The evaluation showed that none of the available tools fulfilled our criteria so it was decided to create our own checklists.

To limit the length of the checklists SOP's which were already available were used to refer to in the checklists. For example SOP's for sampling weaners for the detection of Salmonella, cleaning and disinfection of stables, rodent and fly control and a hygiene check were implemented.

The checklist of the three questionnaires consists of the chapters shown in table 1:

Tab. 1: Chapters of the three created checklists

Farm	Slaughtering	Cutting and deboning
<i>Salmonella</i> status of the weaned pigs on the supply farm(s) of origin of the finishing herd;	Transport	Check on incoming goods
Transport conditions of the weaners / growers	Unloading and inspection of the pigs;	Cooling and storage
Health status at entry of the barn of the weaners / growers	General slaughter conditions	Deboning
Feed and water	Dirty slaughter area	Vacuum and packaging
	Clean slaughter area	
	Official meat inspection	
Hygiene and environmental conditions of the barn at entry of the weaners / growers	Process hygiene control	Process hygiene checks
	Chilling	
Hygiene procedures at marketing	Inspection and shipping	Commissioning and shipment
Management practices	Management;	Management
	Cleaning and disinfection	Cleaning and disinfection
External and internal bio-security	Personnel hygiene	Personnel hygiene
	Construction issues	
	Water;	Water
Rodent and fly control	Rodent control.	Rodent control

A scoring system was set up with general scores per chapter and with individual scores for questions within chapters. The individual score can either be positive or negative for resp. desired and unwanted answers. The scores are based on the expert opinion within the development team and from external experts. Trials will be conducted to fine tune the scoring system and the user friendliness. After an individual checklist is finished a total score is calculated which can be used to compare to previous lists or to peers. Shortcomings which are identified by the checklist are listed in a report which can be downloaded in pdf, stored and printed. The online development makes it possible to make changes at any moment by team members.

The internet platform and the online-questionnaires were developed by using the scripting language PHP and a MySQL database. Login and password protection ensure privacy of the entered data. Advisers and veterinarians assisting herds or abattoirs can register online to get an individual account with a password. When logged in the user may choose the wanted kind of checklist. After that a new list can be started by entering the unique herd or abattoir number, a name and a date. Alternatively a previously started or finished checklist can be edited or printed. The possibility to create more than one checklist for a herd or an abattoir allows the advisor to monitor the progress.

During the use of the checklist clarification of the question at hand is given on the right hand side of the screen to prevent miss interpretation of the question. If applicable the SOP to which the question is referring can be opened, stored and printed.

Discussion

Salmonella is a relevant, or the most relevant, zoonoses in pig meat production. The recent EU baseline study showed significant differences in Salmonella prevalence at herd and abattoir level across Europe.

A significant part of Salmonella contamination of pig carcasses and pork can be prevented by proper abattoir hygiene. Accordingly, prevention of faecal contamination and good slaughter hygiene contribute for a large part to the number of points that can be acquired in the questionnaire. Legal requirements urge the operators to take action when Salmonella is found on carcasses. Salmonella control should happen along the entire supply chain. For that reason it is good that pig farmers, whose herd is categorised in the highest Salmonella category, are under the obligation to reduce the Salmonella prevalence in their herd. Some abattoirs process pig from high risk herds separately.

The present tool, that is still under development and needs more validation, can be a valuable tool to identify weak spots in the management of either farmers or food production companies. Finally, this tool can never be the holy grade with the final solutions. It will help operators and their advisors to structurally check and think about the risky processes. The weighing of the answers is based on experts' opinion. Experts base their insight on experience from the past and evidence from literature. Final scientific validation of all points will however not take place. The weight factors will stay guesstimates. The tool is now applied in the field to tests its applicability as support tool for advisory work in the pig supply chain, by veterinarians testing it at farm level and food safety advisors applying it in medium size abattoirs and cutting plant.

Another very promising area of application for this tool is education. The attendees can fill in the questionnaire, discuss the outcomes, as well as the importance that is given by the weighing of the answer. These types of exercises are a pleasant way to educate the participants in control of food borne zoonoses. Besides bachelor students in food science, veterinary medicine and agricultural science, this type of courses can be typically useful for auditors and quality managers within the pork production chain.

Conclusions

A modern internet based diagnostic tool was developed to advice responsible persons and their advisers for the control of Salmonella in primary and meat production.

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