RISK-BASED MEAT INSPECTION AND RISK-BASED OFFICIAL CONTROLS AS MEANS FOR IMPROVING ANIMAL HEALTH AND ANIMAL WELFARE

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SUMMARY

The paper describes the need and ways of the transition from the traditional meat inspection being an end product inspection to a risk-based meat inspection being a process optimisation throughout the food chain as required by the new EU food safety regulations. Concluding from many data analyses at German slaughter houses with their supplying pig herds, criteria and an evaluation system for how to use these criteria in the framework of the "relevant food chain information" and the risk-based meat inspection are described and discussed. Finally, it is described how relevant parts of the food chain information can (and must) be used as basis for benchmarking the animal health and welfare as tool for a continuous improvement process in managing pig herds.

Keywords: risk-based meat inspection, food chain information, benchmarking animal health and animal welfare

INTRODUCTION

The recent crises in the meat industry due to meat-associated risks such as salmonella, nitrofen and dioxin prove that the traditional ante- and post-mortem inspection of slaughter animals and carcasses is not any longer able to recognise and prevent the risks of today. Therefore, the EU Commission has issued Reg. (EC) 853/2004 and Reg. (EC) 854/2004 that regulate the transition of the traditional meat inspection, which demands inspecting each individual carcass in the same way, to a risk-based meat inspection, which is using relevant pieces of information about the previous production stages for making risk-based decisions on the intensity of the inspection of slaughter pig batches. The present paper is describing the legal framework and the objectives of the risk-based meat inspection, and how the food chain information for the risk-based ante- and post-mortem meat inspection can and should be used for improving animal health and welfare.

OBJECTIVE

The Regulations (EC) No 853/2004 and (EC) 854/2004 laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption describe the risk-based approach for the official food supervision. The new EU legislation is not any longer prescribing exactly the inspection procedure, but defines the food safety goals. The consequence is that there are still various ideas and opinions on how to implement a reasonable risk-based meat inspection, and, in particular, on how to design the "relevant food chain information" a) for the decisions to be made in the framework of the risk-based meat inspection,

and b) for a reasonable feed-back to the farmer and his veterinarian as basis for improvements at farm level. The food chain information has to be designed in a way that it is possible for the official veterinarian to estimate the probability that slaughter pigs carry a higher or lower risk to human health and the frequency of lesions that has to be expected. Depending on the estimated risk for the consumers (e.g. zoonotic infections, residues, parasites and microbiological contamination) and the expected frequency of lesions, the official veterinarian has to decide for announced slaughter pig batches, whether the meat inspection of the carcasses has to be "visual", "traditional" or "more intensive". This means that the carcasses of slaughter pig batches, for which the food safety risk is estimated as low and the expected lesion frequency is low, can be inspected without palpation and incisions (= visual inspection). If the risk level is estimated as medium and/or the expected lesion frequency is high, the decision of the official veterinarian has to be that the carcasses are to be inspected in the current way with palpation and incisions including the removal of pathologically altered organs (= traditional inspection). In those cases, where the food chain information signals a high food safety risk and/or extremely high frequencies of lesions, the decision must be that special additional investigations tailored to the risk in question have to be applied (= more intensive inspection).

The objective of our research is to test data from the primary production that are available (and/or need to be generated) for their usability as basis for the creation of the "relevant food chain information", which is not only serving the decision making process of the official veterinarian in the slaughter plant, but also the farmer and his veterinarian as basis for a continuous improvement of the herd health status and the animal welfare.

MATERIAL AND METHODS

The following steps were taken to reach the objective:

a) analysing the complex legislative texts that regulate the transition of the current meat inspection procedure into the risk-based inspection system (instructions relevant for the risk-based meat inspection including the food chain information are embedded in at least four EU-Regulations: Reg. No. (EC) 178/2002, 852/2004, 853/2004, and 854/2004);
b) analysing various sets of routinely generated food chain data (several slaughter plants with their suppliers) that are available from farm records, veterinary reports and the slaughter plant reporting system as well as developing and validating a new index for semi-quantifying the health status of finishing pigs;
c) developing a proposal for meaningful food chain information usable for the decisions on the meat inspection intensity and for benchmarking the health status of pig herds as basis for improvements of the animal health and welfare.

RESULTS

Legislation

The food business operator (= the slaughter plant) has to organise that he is provided with the relevant food chain information by the farmer on each slaughter pig batch that the farmer is offering him for slaughter. The slaughter house operator is also responsible to make this food chain information available to the official veterinarian at least 24 hours before the arrival of the animals. The contents and form of this food chain information has to be in a way that enables the

official veterinarian to make an "informed" decision on the intensity of the meat inspection that has to be applied for the pig batch in question. This means that the official veterinarian must be able to answer the following questions:

1) Do the animals come from a holding that is an "integrated system", and does the husbandry system fulfil the criteria of "controlled housing condition"?
2) Are the animal health status of holding of provenance and/or the regional animal health status indicating any severe disease?
3) What is (has been) the animals` health status?
4) Were veterinary medicinal products or other treatments with a withdrawal period greater than zero administered to the animals within a relevant period of time? Are dates of administration and withdrawal periods reported?
5) Did diseases occur that may affect the safety of meat?
6) Are there diagnostic results relevant to the protection of public health including samples taken in the framework of the monitoring and control of zoonoses and residues?
7) Do reports about previous ante- and post-mortem inspections of animals from the same holding of provenance, in particular reports from the official veterinarian, indicate a repeatedly low or a repeatedly high frequency of pathological lesions?
8) Are there production data that might indicate the presence of disease during the fattening period of the slaughter pigs?
9) Is the name and address of the private veterinarian normally attending the holding of provenance available?

If the official veterinarian can answer these 9 questions, he or she should be able to predict the risk level and the frequency of lesions, which leads to the decision: "visual", "traditional" or "more intensive" meat inspection.

Available data

Ad 1) If the farm in question has a steady supply relation with the slaughter house and/or a reliable information flow between the farm and the slaughter house exists; the relationship can be defined as an "integrated system". If the animals are routinely kept in a confinement system with daily attention and a reliable systematic recording system, the housing conditions can be defined as "controlled". If there is a special standing arrangement with the slaughter house, or if the farmer is participating in a quality assurance scheme, this information is needed only once until changes have to be reported. Animals from ***"non-integrated" systems and "uncontrolled" housing conditions are to be excluded from the visual inspection.***

Ad 2) Information on diseases in the area or in the holding of provenance (potentially influencing food safety and/or notifiable diseases) should be available from official disease recording systems (international and/ or national) and taken into consideration when slaughter pigs are announced for slaughter.

Ad 3) and Ad 7) The following criteria offer the opportunity of estimating the health of a pig herd (finishing group):

- the mortality rate,
- the amount of antibiotic substances used for therapeutic and metaphylactic purposes, and
- the frequency of lesions in organs and carcasses from previous shipments from the same herd.

Mortality: Our results have shown that only very high death losses during the finishing period (> 5%) indicate severe animal health problems potentially leading to food safety risks and/or to a very high frequency of lesions in the slaughter pigs stemming from this herd. Animals from herds (finishing groups) with ***mortality rates > 5% should be excluded from the visual inspection.***
The use of antibiotic substances: We (Blaha et al., 2006) developed the "simple" indirect indicator for animal health, the "Animal Treatment Index" (ATI):

$$ATI = \frac{\text{Number of treated animals X Number of treatment days}}{\text{Number of animals in the group}}$$

The ATI indicates the statistical number of days on which all animals of a herd or a group of pigs were treated with an antimicrobial substance. The basic idea is that animals are in the majority of all cases only treated for two reasons: a) disease (then the use of the antimicrobials is "therapeutic"), and b) the justified assumption of an infection, which will undoubtedly lead to disease (then the use of the antimicrobial is "metaphylactic").

Our results of collecting data on the use of antibiotics in a group of 20 farms delivering pigs to the same slaughter house, and consecutively calculating the ATI for each of the finisher groups from which slaughter pig batches came from, led to the astonishing outcome that the ATI's of about 200 slaughter pig batches varied between 0 and > 70 (!!). An ATI of 70 means that all pigs of the finisher group in question have been treated with antimicrobial substances over a period of time that covers about two thirds of the entire life span of these pigs (slaughtered approximately on day 110). Since an ATI of 30 means that all pigs of the group were treated with antimicrobial substances almost one third of the pigs' life (in the light of public health concerns quite high), it should be considered to ***exclude slaughter pig groups with an ATI > 30 from the visual inspection.***

The ATI and its potential use e.g. for a risk-based sampling scheme for monitoring systems for antimicrobial residues is explained in more detail in the paper by Dickhaus et al. (2007) published in these proceedings as well.

The frequency of pathological lesions in organs and carcasses from animals supplied to a slaughter house: Our manifold investigations of data collected on many slaughter houses in Germany show that the frequency of disease-related lesions is very consistent in animals from the same herd. This means that mostly, farmers that supply animals with lots of pathological lesions will be delivering animals with many lesions (unless they drastically change their management procedures), and, vice versa, farmers that deliver animals with only few lesions will be delivering animals with few lesions in the following shipments as well. This consistency provides the opportunity to record the lesion frequency of animals that had already shipped from the herds that supply a slaughter house (e.g. in the previous 6 moths) and to categorise the herds according to their lesion frequency into e.g. "very few animals with lesions", "an average number of animals with lesions", and "many animals with lesions". Following the logic of our so far explained approach to make a decision on the intensity of the meat inspection for slaughter pig batches, those herds that are in category ***"very few animals with lesions" can be assigned to "visual inspection", those that are as in category "an average number of animals with lesions" to "traditional inspection", and those that are in category "many animals with lesions" to "more intensive inspection".***

Figure 1 demonstrates how many herds were assigned to the three levels of intensity of the meat inspection in case the frequency of lesions per herd would be normally distributed.

Figure 2 shows how determining the real distribution of the herd-related slaughter check and meat inspection data can easily lead to a tool for the decision making process for the risk-based meat inspection.

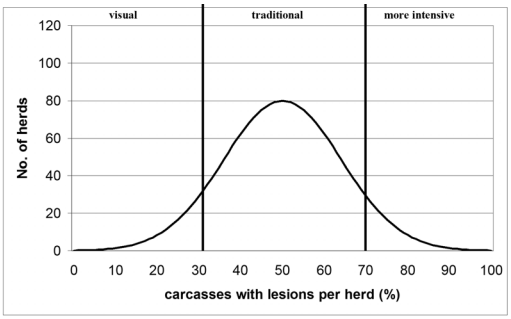

Figure 1. Theoretical distribution of carcasses with lesions per herd
(The assumption: lesions are normally distributed)

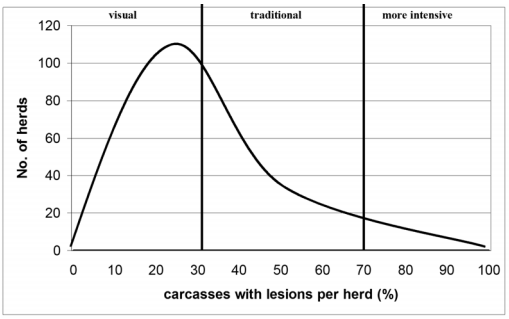

Figure 2. Real distribution of carcasses with lesions per herd
(The reality: data of several German slaughter houses indicate a non-normal distribution)

Ad 4) The food business operator should negotiate with the competent authority and the supplying farmers how long the "relevant period of time" (Reg. 853/2004) is to be (e.g. the longest withdrawal time, two or three times the longest withdrawal time, or just 40 or 60 days…). The food chain information can easily contain a paragraph, assuring that this period of time without antibiotic treatments has been complied with. In cases with this assurance, but very high ATI's, the visual inspection should be excluded and targeted samplings for residue testing may be initiated.

Ad 5) Since farmers cannot be expected to know and/or to notify any diseases that "may effect the safety of meat" (Reg. 853/2004), the already discussed indirect criteria such as mortality, herd prevalence of lesions at slaughter and the ATI (cf. Ad 3 and 7) should serve as possible indicators for disease and "trigger" targeted investigations into the herd health of herds with excessively high mortality rates, lesions in carcasses at slaughter and ATI's e.g. higher than 30.

Ad 6) In the light of the Dir. 2003/99/EC and the Reg. (EC) 2160/2003, there will be an increasing impact of monitoring schemes for control of zoonotic pathogens in the EU member states and are to be used in the framework of the risk-based meat inspection. Monitoring schemes for the Salmonella control in poultry and pig production already exist in a growing number of states. Other monitoring schemes for e.g. *Campylobacter* and *Mycobacteria* are being developed, validated, and implemented. It is a must to take into consideration (= adding to the food chain) the results of any available monitoring scheme as well as any laboratory result pointing to zoonotic infections and/or residues in animals from the herds in question.

Ad 8) Except of using the data on the mortality rate, it is necessary to add to the food chain information any production data that are extremely out of the herd-specific range of variation (e.g. a fattening period of > 150 days in a herd with regularly 100 days, or > 200 in a herd with

regularly 150 days). However, a herd with always ***fattening periods of e.g. > 150 should be excluded from the visual inspection*** anyway.

Ad 9) The private veterinarian should be accessible any time by the official veterinarian in case a decision needs more information on the herd in question.

DISCUSSION AND CONCLUSIONS

It is of utmost importance to underline that the threshold values for the mortality, the ATI and the frequency of lesions in carcasses and organs per herd are "food chain specific". This means that every slaughter house operator has to calculate and regularly re-evaluate the real distribution of the herd prevalence of lesions at "his" slaughter house with its set of supplying pig herds. Once the threshold values are set for a slaughter house with its set of suppliers (e.g. as in Fig. 2), the following decision tool will be available:

1. all three criteria (mortality, ATI and frequency of lesions) of the finishing group, from which a slaughter pig batch comes from, are below the threshold values between "visual" and "traditional": the decision for the meat inspection **can be** visual inspection;
2. one, tow or all three criteria are above the threshold values between "visual" and "traditional", but below the threshold values between "traditional" and "more intensive": the decision for the meat inspection **should at least be** traditional inspection;
3. one or more of the three criteria is above the threshold value between "traditional" and "more intensive": the decision for the meat inspection **must be** more intensive inspection.

A clear request of the Reg. (EC) No. 854/2004 is to use the food chain information additionally to its use for the risk-based meat inspection also for a process of continuous improvement of the animal health status of slaughter pig producing herds. Combining the three criteria into a "Herd Health Score" (Dickhaus et al., 2007) provides for a benchmarking tool for pig herds (at least of those herds that deliver pigs to the same slaughter house), which in turn is a basis for a targeted consulting for improvement measures in the herds with a high "Herd Health Score" (HHS). The HHS does not lead to a "diagnosis", but it indicates that a herd has a problem and it already points to "problem areas". The detailed analysis of the reasons for the suboptimal score and, if applicable, the diagnosis of underlying diseases must then be done on the farm in question. Thus, the creative use of specific parts of the relevant food chain information for not only improving the safety of the produced food, but also for improving the health and welfare of the animals kept for food production.

REFERENCES

BLAHA, T.; DICKHAUS, C.-P.; MEEMKEN, D. (2006): The "Animal Treatment Index"(ATI) for benchmarking pig herd health. 19th Congr. Pig Vet. Soc., Copenhagen, 16.-19. July 2006, Vol.1, 189