

Salmonella Workshop – control in poultry from feed to farm

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Scope of the workshop

Under the auspices of Med-Vet-Net, a workshop “Salmonella Workshop – control in poultry from feed to farm” was held from 13-17 March 2006 at the National Veterinary Institute in Uppsala, Sweden. With the salmonella control regulation (2160/2003) coming into force, a need had been identified for exchange of best practices and better knowledge between all stakeholders. The regulation will begin gradually, starting with salmonella control in poultry.

The objectives of the workshop were to have an exchange on best practices by presenting salmonella control programs including surveillance, feed control, and clean-up control options in primary production. Based on presented facts, participants were expected to contribute in the workshop by discussing their own experience of implementing salmonella control in their countries. It was envisaged that by the end of the workshop, the participants should be able to suggest strategies and programs for salmonella control in feed and primary production adapted to their local circumstances.

Participants

In total, there were 41 participants on the workshop from 14 countries (Picture 1). Both, participants from Med-Vet-Net partner institutes and from outside were present. Most of them were microbiologists, but also epidemiologists and scientists working in administration, government or in industry participated in the meeting.

General structure of the meeting

The workshop was organised in sessions with invited presentations. This was completed by short presentations by the participants. In the evening, in discussion rounds identified specific topics were discussed in more detail. During the workshop, a feed mill and a broiler farm was visited (Picture 2). This was combined with a guided tour to a ‘typical’ farmhouse (Picture 3).

Details on the programme

In total, there were 15 lecturers from Sweden and the United Kingdom. Unfortunately, the speaker invited from Denmark could not participate. The speakers covered the full range of actors involved in the Salmonella control, dealing with the different parts of the chain as well as reflecting different responsibilities.

In the beginning, Diane Newell, the project manager of Med-Vet-Net, gave a brief overview on Med-Vet-Net and the activities to develop scientific skills and expertise.

The specific part of the program started with a broad overview on the Swedish Salmonella control program, covering its background, the overall strategy as well as its development over the last 50 years. This built the frame for the more specific presentations during the week with details on each of the relevant steps in the production chain.

In the Swedish approach, feed must be heat-treated before delivering to a poultry farm. Feed mills are an important player as they provide a huge amount of feed, which is distributed to many farms. Thus, if a problem occurs in one feed mill, it may lead to an enormous spread of

the problem. It was pointed out that although the contamination rate in compound feed usually is quite low, due the amount of feed consumed by chickens, its importance as route of introduction of Salmonella into poultry houses should not be underestimated. Several examples were presented where feed contamination caused infections in poultry. In addition, as raw ingredients for feed are traded around the world, it may become a vehicle for introducing completely new strains into a region.

Laboratories are also an important player as they have to apply appropriate methods. In the European Union, quality control is ensured by a system of National reference laboratories assisted by a Community Reference Laboratory for Salmonella. Within poultry main focus was given to the production lines, table egg production and chicken meat production. Finally, economic aspects of Salmonella control were considered in the programme.

In summary, the Swedish approach is quite ambiguous, covering all Salmonella types and all types of poultry production. In case of any Salmonella finding, the flock has to be destroyed. The full program of the workshop is presented on the webpage of Med-Vet-Net.

Key messages, lessons learnt

There are three key elements for successful salmonella control:

- ◆ Feed has to be free from Salmonella.
- ◆ Animals have to be free of Salmonella when they are delivered.
- ◆ Biosecurity on the farm is important, and this should avoid any recycling between consecutive flocks as well as the introduction of the agent from the environment.

All three elements have to be thoroughly taken into account, otherwise the control may not be very efficient.

There were several important issues highlighted during the meeting:

Salmonella control takes a long time and needs to be adjusted over time to comply with recent developments. To get a program started some incentive is quite important. The Swedish program was started in a situation of an increasing problem and after dealing with the actual situation, they managed to keep the topic on the agenda and to continue the program up to now. The special local situation of Sweden with a quite closed market over a long time may have supported this.

Salmonella control involves many different players. The roles and responsibilities of the players may change over time but a continuous dialog with a clear fixing of the roles is extremely important. Responsibilities have to be shared between all players. They should act as partners working together to find appropriate solutions which fit to the local situation. There is no general solution for everybody, everywhere and every aspect.

The producers have to be involved and have a clear understanding of the problem. A driving force is necessary, in Sweden the consumer is one of the driving forces. The consumer's demand for safe food is driving politicians and may help to financial contribution by the administration and others.

Several approaches may be combined, some elements can be voluntary (but clearly defined) others need to be compulsory. Financial incentives to participate in voluntary programmes are quite useful. Compulsory elements need adequate supervision. In Sweden, compensation (70 or 50%) for destruction of a positive layer flock may cover the animal value, the production loss as well as the costs for extra cleaning and disinfection. The Government applies a risk based approach meaning that farmers participating in the voluntary components get a higher compensation compared to those committing themselves to the compulsory elements only. Coverage of the overall costs is split between the

authorities, the insurance and the owner. In broilers the costs are covered by the owners/insurance companies.

Although Sweden is importing a considerable amount of food, which may be not totally free from Salmonella, the impact on human infections seems to be limited. The reason for the limited impact may be seen in the low contamination load of the imported products due to the guarantees to be complied with and the procedures applied by the industry/consumers within the country to handle the food.

In Sweden, a very strict feed control program is run building on heat treatment of the compound feed and regular checks at defined critical control points (CCP). The following CCPs have been identified and are strictly checked: for the raw materials the bottom of the elevators of the intake system; aspiration filter ingredients; top of cooler; cooler room; top of bin for final feed. It turned out that cooling harbours a risk of recontamination of the heat-treated feed. Technical equipment of the feed mill has to be well designed to allow cleaning. Special attention should be focused on the mill hygiene during shut down periods.

Breeding flocks free of Salmonella have been considered as a fundamental pre-requisite. Continuous flow of information is important, so that each stage is informed on what may be relevant from previous stage. To avoid any risk, no floor eggs are used for hatching. In addition, the eggs are disinfected immediately at the storage room at the farm. The storage room has to be completely separated from the poultry houses, including a separate entrance. Attention should be given to the trays and trollies used for transporting the eggs to avoid recycling the problem.

One of the important elements of any control strategy is to break the infection cycle between consecutive flocks. To achieve this, the best is to empty all houses at the same time, and to clean them as soon as possible. This helps to reduce the spread of infection into the environment. Manure should be removed from the house, and at best, removed from the holding as quick as possible. It should be composted or spread and immediately ploughed into the fields.

Hygiene barriers are a further important element and this should be respected in an empty house in the same way as in a stocked building. Attention has to be laid to the equipment used, i.e. the machines used to remove the manure should not spread it around the building to the environment and not the same un-cleaned machine should be used to bring in new bedding material (i.e. wood shavings, straw). Disinfection can only work properly on clean surfaces, therefore much attention has to be laid on the cleaning process.

Layer houses harbour special problems. For example, the equipment used in these flocks is frequently difficult to dismantle. In consequence, high efforts are necessary to clean them. Failure may cause continuous contamination of flocks. The equipment used for regularly removing manure from the houses offers openings for mice etc. Attention should be laid to the transport crates used for the transfer of the rearing flocks to the laying houses. Similarly to those used to deliver broilers to slaughterhouses, these crates are difficult to clean and disinfect. In laying houses, a link between different houses, i.e. the egg collection belts should be avoided. This may support the spread of the infection between houses.

Good experience was made with vaccination in UK (which is not applied in Sweden). It was emphasised that this does not substitute good hygiene and management practices. But vaccination may also hide the problem existing as the level of contamination in a flock may be reduced and difficult to detect with routine testing schemes. Those flocks may contribute to the spread of the infection.

In broiler production, a special risk is introduced by thinning procedures. Typically, harvesting machines or persons catching the birds are moving from farm to farm and may contribute to

the spread of Salmonella. This gets especially important if not all birds are removed at the same time (thinning), allowing newly introduced Salmonella to spread among the birds.

Some discussion focused on special aspects related to outdoor systems. Some experience indicated that risk for Salmonella infection may be lower for outdoor farms and infection may even disappear during a production cycle. Rodent control is considered an important element in this production type.

The Salmonella control program applied in Sweden needs financial efforts at all stages. It is hard to break out additional specific Salmonella costs when a salmonella-free status is established, as these costs mainly are mixed/covered within the costs of GMPs and biosecurity programs. Some specific costs related to the Salmonella control program applied in Sweden are: For example, the running costs for feed control is estimated are around 0,14 Euro-cent / kg live weight chicken. Supervision of Salmonella control (sampling and analysis) costs around 0,25Eurocent / kg live weight. During production, the highest costs in case of destruction of a positive flock are related to the production losses and the cleaning and disinfection process.

Knowledge gaps identified

Some knowledge gaps were identified.

Especially in the feed sector, further research is considered necessary. Sensitive analytical methods to detect *Salmonella* in feed are still lacking and some commodities (i.e. palm kernel meal) seem to cause special problems. Rapid methods are necessary to allow a quick feedback and taking appropriate action.

Knowledge on the procedures for decontamination of Salmonella positive batches of raw materials could be improved. Acids may be used to achieve this, but sound data on the time-temperature scheme to be applied, efficacy of the product taking into account the moisture and fat content of the material to be treated are lacking.

Recontamination is a considerable problem in feed mills. Any introduction of salmonella into coolers with a high humidity may support the survival and spreading of Salmonella.

Another knowledge gap is related to the long term environmental effects of the usage of disinfectants. Currently, it is not fully understood whether some tolerance to these products may be developed in bacteria, especially in Salmonella. In general, knowledge on cleaning and disinfection protocols needs to be improved and communicated to the players. Cleaning protocols avoiding the usage of water are necessary.

The cost-effectiveness of the program needs to be assessed and the economics involved in it. In Sweden, an update of the previous evaluation is under progress.

Remarks from the participants

During the discussions it became quite obvious that the approach taken in Sweden is quite unique and not directly transferable to most of the participating countries.

In other countries, the willingness to pay for such an approach is much lower, the interest in preventing the risk of Salmonella infection is not that high. For regions with a very high density of animal population, the Swedish approach may not be applicable and needs to be adjusted.

There was agreement that Salmonella control is an important issue and measures have to be taken. No quick solution of the problem can be expected, it will be along way to go, but it has to be started and continued.

Discussion also emphasised that the target can not be eradication of Salmonella at country level, however at farm level the aim should be to eliminate salmonella. Initially at country level, the focus should be on control of the problem and reduction to a very low level. It became obvious, that each country has to develop their own approach, for sure considered all the elements discussed but combining them in a individual way. This has to take into account the poultry structure in the country, as well as the administrative structure. For sure, the salmonella situation at the point of start has to be considered too. Destruction of positive flocks, regardless of the Salmonella type, is economically not feasible in a region or country with a high prevalence.

Another point discussed was the role of the consumer. Some kind of education of the consumer was considered relevant.

The legal framework of Regulation 2160/2003/EC will define the common target to be achieved in *Salmonella* control. The way to go there will within the responsibility of the country and quite different approaches may proof to be useful. The time limits to be set for this have to be realistic, but currently nobody has a clear view on how much time will be needed to achieve a certain reduction level.

A close cooperation of the different disciplines, involving among others risk assessors, risk managers, epidemiologists and molecular biologists to exploit all tools might support to find a suitable approach. All participants were encouraged to publish their experience to provide the information to others dealing with the problem. One of the resources hardly accessible is the knowledge within the industry. Involvement of industry is therefor very important. Regular stakeholder meetings turned out to be very successful.

Evaluation by participants

In general, the participants considered the course contents appropriate and the time scale applied for lectures and excursions about right. Three of the questions in the evaluation sheet were answered as follows “*Has the workshop fulfilled your expectations?*” (88%-yes) “*Do you feel that you have got any new ideas how salmonella control could be improved in your country?*” (76 % yes) and “*Do you think there would be a need for a follow-up workshop to share knowledge obtained when salmonella control is implemented in the EU?*” (76% yes). A summary of the evaluation can be found at on the [internal website](#) of Med-Vet-Net.

Participants also expressed their interest in an informal network of contacts. This should support continuation of discussion as well as discussion of specific problems.

Course material

The Program and the proceedings can be found on the [internal website](#) of Med-Vet-Net.