AN EPIDEMIC OF SALMONELLOSIS CAUSED BY SILAGE CONTAINING SALMONELLA AT A DAIRY FARM

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SUMMARY

The aim of the project was to eradicate salmonellosis in a loose-housing dairy herd. The ground principle of the eradication program is to assure good hygienic quality of feed and drinking water and to cut the infection chain from faeces to feed. During the eradication procedure it came up that the farm had been chronically infected with salmonella at least a year. Contaminated slurry had been spread on a field for silage production and the silage had been contaminated. When contaminated silage was fed to animals, it caused a new outbreak of salmonellosis, although special hygienic measures were kept on during the eradication procedure.

Keywords: contamination, dairy farm, enteric disease, eradication procedure, faecal samples, hygienic measures, infection chain, loose-housing system, silage, swab samples

INTRODUCTION

An epidemic of salmonellosis caused by *S. muenchen* was found in February 2006 at a dairy farm in Southern Finland. The infection was detected, when several calves had an enteric disease and samples from some dead calves were examined at a laboratory. The farm has a warm loose-housing system and about 120 dairy cows and 250 young animals. In Finland all farms detected to be infected with salmonella are put under restrictions by the authorities. The eradication program for salmonellosis was started at the farm immediately. The farm has insurance for the costs of salmonella eradication for the first half year since start of the restrictions.

ERADICATION PROCEDURE

The ground principle of the eradication procedure is to assure good hygienic quality of feed and drinking water and to cut the infection chain from faeces to feed. To investigate the situation all animals at the farm were examined at the beginning on March 2006 for salmonellosis by individual or pooled faecal samples. Individual samples were taken from the cows in the loose-housing system and pooled samples from the pens for young animals. In addition, several swab samples were taken from the production environment; entrance of the cow house, dairy room, corridors, feeding tables, drinking vessels, feeding equipment and feed stores. The faecal and swab samples were examined at the laboratory according to the NMKL 71/1999- method.

The animals at the farm are fed with TMR (total mixed ration) –system and the feed is delivered by a TMR-car pulled by a tractor. All feed components used for TMR and the TMR-feed itself were examined according to the ISO6579,2002-method for salmonella. The main

component of the TMR-feed is pre-dried silage harvested from the own fields of the farm. Swab samples were taken from the TMR-car and the tractor pulling it.

At the first sampling about 15% of the animals were positive for salmonella. Some swab samples taken from feeding tables and drinking vessels were also positive. All feed samples were negative for salmonella. The hygienic procedures were concentrated to the critical points measured by the results of the swab samples taken from the production environment. Feeding tables and drinking vessels were disinfected twice a day. The wheels of the TMR-car and tractor were disinfected every time before driving to the feeding table. It was not possible to isolate the positive for salmonella animals, neither considered necessary to remove those from the herd at this stage.

The progress of the eradication procedure was monitored by faecal samples taken at the interval of two to four weeks. A farm is considered to be free of salmonellosis, when two successive faecal samples from the whole herd are negative. The next faecal samples were taken at the beginning of April and only one young beef animal was found positive for salmonella. The animal was slaughtered at the farm and sent for destruction. The slaughterhouses in Finland do usually not take animals from farms that have restrictions because of salmonellosis. Milk is usually delivered to dairy, if the quality is good and the farm has no problems with milking hygiene.

Of the faecal samples taken at the end of April 2006, however, 30% were again positive for salmonella. For this reason new samples from the production environment and the feed were taken. Two swab samples taken from the bottom of a silage store opened and finished after the first sampling at March were positive for salmonella. The storage was already empty, so it was not possible to get a sample from the silage. Of the swab samples taken from the production environment itself only one swab sample taken from the feeding table was found positive. The hygienic measurements were further kept on.

When feeding with the contaminated silage was stopped the animals got rid of salmonellosis in one month. Faecal samples taken at the end of May and at the end of June were negative for salmonella and the restrictions were released. The silage store was washed and disinfected properly before the next harvest season.

The farm had four storages for liquid manure near the cowhouse and one storage at a distance of ten kilometres in the middle of the fields. The farmer usually transports the liquid manure to the storage located at the fields during the winter-time. All storages were examined for salmonella and found positive. The liquid manure was disinfected by mixing 30 kg lime per 1000 litres manure so that the pH of the manure was over 11. After that the slurry was ploughed into the field. The field was not used for silage production during the first year.

CONCLUSIONS

In the salmonella infected storage the silage harvested in summer 2005 was produced from a field, where in the same spring liquid manure had been spread. Hence, we can conclude that the farm seems to have been infected by salmonella already during the winter 2005. Salmonella had then been excreted into the liquid manure spread on the field mentioned before. The acidity in predried silage is not low enough to destroy salmonella in the silage. It always is a threat to feed hygiene to spread liquid manure on grassland for silage production especially if the status of salmonella at the farm is unknown.

Table 1. Cattle Farms under restrictions for salmonellosis in Finland; year 2005–2006

Serotype	**Number of cases (farms)**
– *S. infantis*	1
– *S. Konstanz*	1
– *S. muenchen*	1
– *S. typhimurium FT 1*	4
– *S. typhimurium FT 2*	1
– *S. typhimurium FT 9 var*	1
– *S. typhimurium FT 41*	3
– *S. typhimurium FT NST*	4
	Total:16

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