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RESULTS OF THE SWEDISH SALMONELLA SURVEILLANCE PROGRAMME IN CATTLE AND PIGS DURING 1996

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Les résultats de la surveillance en élevage bovin et porcin en 1996 montrent que les animaux vivants envoyés à l'abattoir, ainsi que la viande produite à partir de bovins et porcins suédois puis abattus dans des abattoirs suédois, sont pratiquement exempts de salmonelles.
Seulement quatre échantillons (ganglions lymphatiques intestinaux) sur 8279 provenant de bovins et de porcs abattus normalement ont révélé des salmonelles. Pour les porcs, l'échantillonnage consiste également en un prélèvement fécal par troupeau. Seul un des 1295 troupeaux prélevés est apparu positif. Dans les abattoirs, aucune contamination par salmonelles n'a été détectée lors de l'analyse de 8287 prélèvements par écouvillonnage des carcasses de bovins et de porcs; dans les ateliers de découpe, aucun des 5510 échantillons de viande ne présentait de salmonelles.
Une recherche de salmonelles est pratiquée sur tous les animaux abattus pour raison sanitaire. Celles-ci ont été retrouvées sur 12 des 16810 carcasses bovines examinées mais il n'y en avait pas sur les 2398 carcasses de porcs étudiées.
Les coûts des systèmes de surveillance sont également détaillés.

INTRODUCTION

During the negotiations for membership in the EEC, a surveillance programme aiming at documenting the low prevalence of salmonella in Sweden, was initiated. The programme, which started in 1995, covers live animals, eggs and meat. Within the programme sampling for salmonella is performed in herds/flocks, at slaughterhouses and at cutting plants. In the present abstract the results of the surveillance programme in cattle and pigs during 1996 is presented.

MATERIALS AND METHODS

Surveillance at slaughter houses and cutting plants

Sampling of normal and sanitary slaughtered animals and sampling of meat at cutting plants is described in the Swedish salmonella control programme (1). In brief, annually approximately 3000 swab samples and 3000 lymph node samples are collected from cattle, adult pigs and fattening pigs, respectively. From each sampled animal, at least five intestinal lymph nodes are collected or an approximately 1400 cm^2 area is swabbed, where faecal contamination can be expected to occur. Three lymph node samples and three swab samples are collected daily at all major slaughter houses. At cutting plants sampling is performed daily, weekly, monthly or twice annually depending on the capacity of the plant. All samples are kept, and sent, refrigerated to The National Veterinary Institute within five days. At the bacteriological examination up to 10 lymph node samples or up to 15 swab samples may bee pooled. If salmonella is isolated in a pooled sample each of the individual samples, included in the pool, are examined separately.

Surveillance in pig herds.

From weaner pig producing, integrated and fattening herds affiliated to a health control programme (representing approximately 40% of the Swedish pork production) one faecal sample from each of ten boxes are collected annually. From elite breeding and gilt producing herds 59 faecal samples are collected annually and from sow pools 59 samples are collected biannually. At the bacteriological examination five faecal samples are pooled.

Sanitary slaughter

At sanitary slaughter samples from the liver and spleen or body lymph nodes are collected from all carcases.
Analysis are performed according to a modified ISO 6579:1993. The most essential modification is the exclusion of the selenite broth enrichment step.

Measures if salmonella is isolated.

Any finding of salmonella is compulsory notifiable. Restrictions are laid on the farm of origin and an epidemilogical investigation, including repeated faecal sampling of the whole herd, is performed.

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RESULTS AND DISCUSSION

Results from the surveillance in cattle and pigs during 1996, show that meat produced from Swedish cattle and pigs, and slaughtered at Swedish slaughter houses, is virtually free from salmonella (Table I). It also proves that live animals sent for slaughter are virtually free from salmonella.

Within the surveillance programme, lymph node samples from normal slaughtered cattle and pigs and faecal samples from pig herds reflects the salmonella status of live cattle and pigs. During 1996, only four out of 8279 lymph node samples were positive for salmonella (Table I). In pigs, in addition to sampling at slaughter houses, surveillance is also performed on herd basis. During 1996, 19,306 faecal samples originating from 1295 herds were analysed and one salmonella infected herd was detected (Table III).

Swab samples reflect the faecal contamination of salmonella that may occur in slaughter houses if salmonella infected animals are slaughtered. As can be seen in table I, no contamination of salmonella was detected when analysing swab samples from 8287 animals.

Meat samples collected at cutting plants reflect the salmonella status of beef and pork before delivery to the consumer. None of 5510 meat samples were positive for salmonella indicating that contamination with salmonella did not occur (Table I).

Table I

Results from the EEC approved surveillance programme in cattle and pigs at slaughter houses and cutting plants during 1996

Place of sampling	Animal species	Sample	No. of samples	No. of positive
Slaughter houses	Cattle	lymph nodes	3,571	1
"	Adult pigs	"	2,009	3
"	Fattening pigs	"	2,699	1
"	Cattle	swab samples	3,591	0
"	Adult pigs	"	1,994	0
"	Fattening pigs	"	2,702	0
Cutting plants	Beef and pork	meat	5,510	0

Salmonella examination at sanitary slaughter (Table III), is performed to ensure that any carcass from sanitary slaughtered animals contaminated/infected with salmonella will be deemed unfit for human consumption. Although it might be expected that the proportion of salmonella infected/contaminated carcasses in sanitary slaughtered animals should be higher compared to normally slaughtered animals this does not seem to be the case in pigs. Identification of salmonella infected pig herds at sanitary slaughter is uncommon and during 1996, no salmonella was detected at bacteriological examination of 2398 sanitary slaughtered pigs (Table III). A reason for this might be that salmonella infected pigs are not sent to sanitary slaughter as salmonellosis in pigs usually is a subclinical disease. In addition only the liver and spleen or body lymph nodes so far have been examined for salmonella. Since January 1997, intestinal lymph nodes and, if necessary, swab samples are also collected. In cattle the bacteriological examination at sanitary slaughter is a valuable tool for detecting salmonella infected cattle herds. During 1996, five infected cattle herds were identified.

When salmonella is isolated an epidemiological investigation, including bacteriological examination of faecal samples, is performed in the herd of origin. As can be seen in table II and III, salmonella could not always be re-isolated in the herd of origin. The reason for this is probably that the sampled (and positive) animal has been exposed to salmonella but the infection has not been established in the herd.

During the last ten years, the number of notified salmonella infected cattle herds have decreased from 70 (1987) to 14 (1996) and less than four pig herds have been notified annually (2). As can be seen in table II and III most salmonella infected cattle herds are found at bacteriological examination at sanitary slaughter, autopsies and investigations due to other causes. The most cost effective way of finding infected cattle herds seems to be by investigations due to other causes. This seems reasonable as clinical disease among calves often is observed in infected herds. In pigs herds the salmonella prevalence is lower compared to cattle and as salmonellosis usually is a subclinical disease in pigs there is, at present, no cost efficient way of detecting the few infected herds that may occur.

Table II

Results of salmonella surveillance of live cattle. Surveillance, no. of positive (examined) samples, estimated cost of surveillance, no. of positive (examined) herds in the epidemiological investigations

Surveillance	No. of positive (examined) samples	Estimated total cost in thousands (SEK)	No. of positive (examined) herds
At normal slaughter (lymph nodes)	1(3,571)	250	0(1)
At sanitary slaughter	12(16,810)	2,500[1]	5(12)
At autopsies[2]	5(231)	50[1]	4(5)
Other[3]	n.i.	n.i.	5

1) Costs for bacteriological examinations

2) Autopsies not performed due to salmonella suspicion

3) Investigation in connection with a human case (1), routine bacteriological examination of milk sample (1), trace back investigation

(1) and investigation due to observation of clinical symptoms (2)

n.i. not investigated

Table III

Results of salmonella surveillance of live pigs. Surveillance, no. of positive (examined) samples, estimated cost of surveillance, no. of positive (examined) herds in the epidemiological investigations

Surveillance	No. of positive (examined) samples	Estimated total cost in thousands (SEK)	No. of positive (examined) herds
At normal slaughter (lymph nodes)	4[1] (4708)	330	0 (2[2])
In herds	1 (19,306[3])	430	1 (1)
At sanitary slaughter	0 (2398)	360[4]	0 (0)
At autopsies[5]	1 (275)	60[4]	0 (1)
Other[6]	n.i.	n.i.	2 (n.i.)

1) Two isolates originated from one herd.
2) One isolate from a pooled sample could not be re-isolated from the individual samples.
3) Originating from 1,298 herds
4) Costs for bacteriological examination.
5) Autopsies not performed due to salmonella suspicion
6) Investigation in connection with a human case (1) and a trace back investigation (1)
n.i. not investigated

It may be concluded that the existing salmonella surveillance shows that the situation is very favourable. Should the situation change it is expected to be detected by the programme.

REFERENCES

1. The Swedish Salmonella Control Programmes for Live Animals, Eggs and Meat. Commission decision of 23 February 1995 (95/50/EC)
2. The Swedish Board of Agriculture, Records of outbreaks of Salmonella.