COMPARISON OF *SALMONELLA* RECOVERY RATES BY USING PLATING AND POLYMERASE CHAIN REACTION METHODS ON SAMPLES OBTAINED FROM A ONE YEAR SURVEILLANCE SURVEILLANCE PROGRAM IN AN INTEGRATED PIG PRODUCTION SYSTEM

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INTRODUCTION

Many methods exist to recover *Salmonella* spp in food or non-food materials. Cultural methods comprise different phases consisting in pre-enrichment, selective enrichment, plating on selective solid media and finally, identification. One of the major drawbacks is the non-detection of viable, non-culturable bacteria, that still might be responsible for disease in the field (Candrian, 1995). The same author also notes how time-consuming are classical methods, in comparison with DNA hybridisation techniques. In last decades various direct and indirect methods have been marketed. Among these, PCR methods have several advantages, including: a sensitivity and a specificity estimated at nearly 100 %, high rapidity and automatisation. The aim of the present work was to compare two different Salmonella recovery methods in term of efficiency, rapidity and reliability.

MATERIAL

- **14 pig herds located in the Southern part of Belgium, were followed**
- **from 1st November 1999 to 31st October 2000**
- **6,800 slaughter pigs produced each year**
- **one herd, belonging to the production system and composed of only 600 sows, provides all weaned piglets**

METHODS

Table 1 : Sampling plan

Sample matrix	Method of sample	Volume of sample
Feeds	Random sampling when loading the lorry.	25 g of meal
Breeding	1x / month (every farrow should be inspected)	5 faeces samples pooled in 25 g
Weaned pigs (→ 20 kg)	Once on every batch 8 days before going out	5 faeces samples pooled in 25 g
Fattening	Twice on every batch (after 2 months and 4 months of fattening)	5 faeces samples pooled in 25 g
Slaughterhouse	Once on every batch	5 samples of contents of large intestine pooled in 25 g
Carcasses	Once on every batch	Pool of 5 surface swabs (5 X 600 cm^2) (1)
Cutting room	Random sampling	25 g of retail cut
Mincing room	Random sampling	25 g of ground minced meat
Butcheries	Random sampling	25 g of ground minced meat

(1) same pigs as those sampled for contents of large intestine. Areas of carcass swabbing were adapted from areas chosen by Korsak et al. (1998).

Classical bacteriological analyses (« Diassalm »)

A 18 hours Buffered Peptone Water (BPW) pre-enrichment step is operated at 37 °C (25 g + 225 ml BPW. After a streak on Diassalm and incubation at 42 °C during 24 hours, isolation is achieved on XLT4 medium. Suspected colonies appear red with a dark centre disc following a 22 hour incubation at 37 ° C. Confirmation is achieved with classical biochemical and serological methods.

PCR protocol (Probelia™)

Marketed PCR protocol was modified only for fecal matter by adding a second overnight enrichment in Rappaport-Vassiliadis broth after the BPW pre-enrichment

Test values

Since both methods were used on the same samples, it was possible to calculate a relative sensitivity and a relative specificity for different types of matrixes using Diassalm method as reference. *Kappa* coefficients were also calculated.

RESULTS

Table 2 : Relative sensitivity (SER) and specificity (SPR) for *Salmonella* recovery using PCR method at different sampling places

	n	SER	SPR	*Kappa*		n	SER	SPR	*Kappa*
Feeds	239	61.9 %	98.2 %	**0.657**	**Fattening pigs 2 m**	121	66.7 %	89.6 %	**0.48**
Pregnant sows	60	37.5 %	92.3 %	**0.315**	**Fattening pigs 4m**	114	43.8 %	93.9 %	**0.408**
Lactating sows	149	20 %	93.8 %	**0.093**	**Contents of large intestine**	110	36 %	96.7 %	**0.344**
Weaned pigs	69	0 %	94.0 %	**- 0.04**	**Pork meat**	259	91.7 %	95.5 %	**0.625**

DISCUSSION & CONCLUSION

PCR relative sensitivity of faeces average 46 %, it was very low for contents of large intestine at slaughterhouse and was excellent for pork meat. This constitutes a major drawback, as it does not guarantee certitude for a negative result. Thus, to know *Salmonella spp* status of pigs before slaughtering, this method is not suitable to detect positive herds. In contrast, PCR relative specificity averages 90 % and seemed not to be affected by faeces. For *Kappa* coefficients, values superior to 0.6 were only obtained for animal feed and pork meat

Probelia™ method appeared only reliable for pork meat and animal feeds.

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