3 - 18 h to eliminate *Salmonella* or *E. coli* from feed at 20 °C compared with 30 min – 2 h at 30 °C and less than 30 min at 37 °C. Lactic acid concentration also plays an important role in the elimination of enteropathogens from FLF and in this study high concentrations of lactic acid were achieved via inoculation with *Lb plantarum*. With proper management, i.e. temperature control and inoculation with lactic acid bacteria to ensure adequate lactic acid production, FLF systems have the potential to play an important role in the reduction of enteropathogens in the food chain.

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**References:**


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**Population of a farrowing unit by *Salmonella* negative animals**

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**Summary:** In order to obtain a better control of *Salmonella* in swine herd, it is important to ensure introduction of negative replacement animals. The objective of this project was to introduce negative sows in a new farrowing unit by use of a protocol based on a combination of bacteriology and serology to select replacement gilts in the finishing unit of origin. Animals were selected from a finishing unit known to be moderately contaminated by *Salmonella* based on previous bacteriological and serological analysis. Based on the results, animals were separated in 2 groups. The first group (group A) consisted of seronegative gilts from *Salmonella* negative pens, designed NP/NS. Group B was composed of seronegative gilts from positive pens, was designed PP/NS and gilts were treated with neomycin to reduce *Salmonella* shedding. All animals were also washed at their arrival in the farrowing unit. Results demonstrated that it is possible to populate new herds by negative animals (NP/NS) coming from a positive herd by selecting animal using bacteriology and serology, and by application of biosecurity and prophylactic measures.

**Keywords:** biosecurity, prophylactic, serology , excretion, salmonella-free

**Introduction:** Pork products have been associated with many cases of salmonellosis in human (Beran et al., 1995). Since Salmonella is a facultative intracellular pathogen, following the infection, many animals will remain healthy carrier up to the end of the fattening period (Letellier et al., 1999). When stressed (eg transport to slaughter), many healthy carriers will shed the bacteria and contaminate other
animals, trucks and packer’s facilities. Carcasses from animals positive to *Salmonella* are three times more likely to be contaminated by this bacteria following the slaughter process (Beran et al., 1995). The control of this foodborne pathogen at the pre-harvest level in swine is thus a critical step to decrease the prevalence of foodborne salmonellosis in humans. In most instances, measures applied on swine farms to reduce prevalence of *Salmonella* have been based on the control of various risk factors and improvement of hygiene. In order to obtain a better control of *Salmonella* in swine herd, it is important to ensure introduction of negative replacement animals. The objective of the study was to develop and verify the effectiveness of a protocol based on a combination of bacteriology and serology to select *Salmonella* negative gilts for population of a new farrowing unit.

**Materials and methods:** Animals were selected from a finishing unit known to be moderately contaminated by *Salmonella* based on previous bacteriological and serological analysis. Bacteriological status of pens and serological status of animals were evaluated twice, one month and one week before transportation to the new unit, after stress periods such as genetic selection. Bacteriological status of pens was evaluated by conventional enrichment and culture procedures performed using 5 g (5 X 1g) of feces. Briefly, fecal samples were homogenized in nutrient broth (NB) and incubated 18 h at 37°C. One mL of NB of each specimen in the primary enrichment was transferred to 9 mL of tetrathionate brilliant green and incubated for 24 h at 37°C, for selective enrichment of *Salmonella* spp. Then, one loopful (10 mL) of the selective enrichment media was inoculated in brilliant green sulfadiazine agar (BGS) containing novobiocin at 20 mg/mL and incubated for 24 to 48 h at 37°C. Typical colonies were tested biochemically and tested by agglutination with a polyvalent O-antisera (Poly A1-Vi). *Salmonella* isolates were serotyped at the Office International des Épizooties (Olá) Salmonella Reference Laboratory, Health Canada in Guelph, Ontario. Serological analysis were performed on each gilt using an ELISA test (Maxivet Inc) for detection of antibodies against *Salmonella* (group B, C, N and E). Sows were considered positive at 30% cut-off value (40% value is the positive cut-off for the test and 30 to 39% values are considered doubtful). Based on the results, animals were separated in 2 groups. The first group (group A, n=754) consisted of seronegative gilts (<30% cut-off) from *Salmonella* negative pens, designed NP/NS. Group B was composed of 184 seronegative gilts from positive pens and were designed PP/NS. Based on the antimicrobial agent profile of the *Salmonella* strain recovered from pens, gilts were treated with neomycin (50 mg/kg) during 5 days after transportation. All animals were also washed at their arrival in the farrowing unit and housed separately in individual stall. A sub-population of each group was followed by bacteriological cultures to evaluate the presence of *Salmonella* in selected animals.

**Results:** In group A, 144 individual fecal samples were collected and all gilts were found negative. In group B, only one sample was positive to *Salmonella*. This gilt was then removed to prevent the dissemination within the room. Strict biosecurity measures were in place during all the experiment.

**Table 1. Recovery of Salmonella in the farrowing unit after arrival of sows (farm B)**

<table>
<thead>
<tr>
<th>Group</th>
<th>No of gilts</th>
<th>Percentage of positive animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (NP/SN)</td>
<td>754</td>
<td>0% (0/144)</td>
</tr>
<tr>
<td>B (PP/SN)</td>
<td>184</td>
<td>1% (1/100) S. Tennessee</td>
</tr>
</tbody>
</table>

**Discussion:** So far, most on farm *Salmonella* control programs are targeted against the appropriate management of known risk factors such as presence of rodents, lack in hygiene. However, it is known that the status of incoming animals and the number of sources for replacement animals are important features to consider for appropriate management of *Salmonella* in swine herds (Letellier et al., 1999; Quessy et al., 1999). The identification of sows status is thus critical for the reduction of *Salmonella* in farrowing unit and to produce *Salmonella* free piglets. Optimal identification of positive animals is thus imperative in order to avoid introduction of positive animal in a herd. Since it may be difficult to obtain replacement animals from herds with a confirmed...
negative status for *Salmonella*, we were interested in this study to determine if it was possible to develop a protocol that would allow the population of a negative farrowing unit by use of animals from a herd known to be moderately contaminated by *Salmonella*. Since serology can not detect recently infected animals and since bacteriology can not detect most healthy carriers, we used a combination of serology and bacteriology, ensuring that the last sampling was done after the stress period caused by the selection process.

In the first part of this study, we observed that all sampled animals from NP/NS pens were negative after introduction in the new farrowing unit. Interestingly, it was also possible to populate an almost negative section of the new unit by use of PP/NS animals. To do so, few basic measures were applied to these animals such as a Neomycin treatment in water and the washing of gilts at their arrival to the new unit. In addition, few special precautions such as maintenance of the integrity of pens and biosecurity measures such as changing/washing boots between positive and negative pens, were applied throughout the experiment.

**Conclusions:** Results obtained in this study demonstrated that it is possible to populate a swine herd with animals negative to *Salmonella* coming from a positive herd by selecting animal using bacteriology and serology combined with application of biosecurity and prophylactic measures. Further studies will be possible on seronegative gilts from positive pens, to investigate their possible resistance to *Salmonella* infection.

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**Field trials to evaluate the efficacy of mash feed to reduce *Salmonella* shedding in swine**

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**Summary:** The objective of this study was to evaluate the effect of corn based mash feed as a pre-harvest intervention strategy to reduce shedding in pigs herds contaminated by *Salmonella* spp. In this study, three nurseries previously found contaminated by *Salmonella* in successive production cycles were selected to evaluate the effect of mash feed. Pelleted feed was administered for the first part of the experiment and mash feed was then introduced in all herds for a period of four production cycles. Samples from pens were cultured to evaluate the prevalence of *Salmonella* in each production cycle. A total of 195 samples for the period corresponding to pelleted feeding and 68 samples for the period corresponding to mash feed were collected. Results indicated a significant reduction of *Salmonella* shedding in herds following mash feed utilization.