The evaluation of Stalosan®F in farrowing accommodation

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A report on a
research project conducted by
QAF Meat Industries Pty Ltd

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Summary

Stalosan F has been used in the European pig industry for over 40 years, and is currently available on the Australian market. The Australian suppliers of the product (Chemiplas) state that this product is unique compared to other bedding conditioners available on the market, as over time it breaks down the breeding cycle of bacteria, fungi, viruses and parasites (internal and external). Furthermore, the absorptive capacity of the product has been shown to reduce the concentration of ammonia and moisture in the environment, and reduce the population of flies.

The aim of this experiment was to compare the use of Stalosan ® F to standard farrowing house hygiene procedures on piglet growth, incidence of scours, piglet mortality and morbidity. Three hundred and eighty four gilts and sows and their litters were used in the experiment.

The application of Stalosan ® F to the farrowing accommodation prior to sow entry to the farrowing house and at weekly intervals, significantly reduced the incidence of scouring litters, reduced the severity of scouring and reduced the number of medical treatments and piglet deaths (12% down to 9% pre-weaning mortality). Furthermore, there was a strong trend for piglet rate of gain to be improved from fostering to weaning in the Stalosan ® F treatment (215g to 221g/day).

The use of Stalosan ® F is a management tool that may be implemented in the farrowing house to improve the survivability of piglets from birth to weaning.

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Introduction

Stalosan ® F has been used in the European pig industry for over 40 years, and is currently available on the Australian market. The suppliers of the product (Chemiplas) state that this product is unique compared to other bedding conditioners available on the market, as over time it breaks down the breeding cycle of bacteria, fungi, viruses and parasites (internal and external). Furthermore, the absorptive capacity of the product has been shown to reduce the concentration of ammonia and moisture in the environment, and reduce the population of flies (Chemiplas, 2007).

Schou and Permin(2003) showed that Stalosan ® F had a sub lethal effect on the eggs of parasites that are evident in free-range poultry systems (*A. galli*, *H. gallinarum* and *C. obsignata*). Chickens within pens treated with Stalosan ® F harboured less adult internal parasites then their counterparts in untreated pens. The authors proposed that the Stalosan F arrested the development of larvae to adult worms within free-range chickens.

Pre-weaning mortality of piglets continues to affect the Australian pig industry. One of the major causes for death and/or poor growth performance prior to weaning is pre-weaning scours. The industry is continuously researching management methods for reducing these problems. The aim of this experiment was to compare the use of Stalosan ® F to standard farrowing house hygiene operating procedures on piglet growth, incidence of scours and piglet mortality and morbidity.

Materials and Methods

This experiment was conducted at a large commercial piggery in southern New South Wales, Australia, between June and November 2007. Three hundred and sixty six Large White x Landrace gilts and sows and their litters were used in the experiment. The sows were moved into the individual farrowing pens, within a farrowing shed at approximately 110 days of gestation.

There were two treatments in this experiment:
Treatment A-Control-Standard farrowing shed cleaning practice (power washing pens and disinfecting pens prior to sows being moved in) and Bentonite added to creep areas (approximately 1 cup) once farrowing was completed and on a daily basis.

Treatment B-Standard farrowing shed cleaning practice (without Bentonite) plus Stalosan ®F was applied to the whole farrowing shed at a rate of 50 g/m^2 using the blower vacuum supplied by Chemiplas. There were three applications of Stalosan ®F within the first week (one prior to sow entry to farrowing house and two more applications once the sows had entered the farrowing accommodation), and then the product was applied once per week thereafter until weaning. Footbaths containing Stalosan ® F were also placed at the entry to the Stalosan ® F treated shed to ensure that there was maximum coverage of the product within the shed.

Two farrowing sheds were chosen for this experiment. These sheds were similar in environments and had a similar amount of stockperson movement through them. The total area of each shed was 600m^2. A particular shed was allocated to a treatment, to investigate carry-over effects of Stalosan ® F between batches of sows. There were six batches of 64 farrowing sows used (6 weeks x 64 sows = 384 sows and their litters). The batches of sows were moved into the sheds over consecutive weeks. i.e. week 1 Control, week 2- Stalosan ® F etc. Each treatment could not be represented within a week of sows since the Stalosan ® F had to be applied to the whole shed, and it was not possible to divide the shed with an impermeable barrier to the Stalosan ® F. There were three batches of sows used per treatment. For the first batch of sows in the Stalosan ® F treatment, some older product was used that has been sitting in the warehouse - ("old") Stalosan ® F. The product was physically different to the fresher product ("new") that was used in the second two batches. The older product appeared lumpier and was more difficult to blow through the applicator. The farrowing houses were power washed and cleaned between each batch of sows. The piglets were fostered within the first 24 hours post birth and were fostered within the same farrowing shed (i.e. within the same treatment).

The sows were fed *ad libitum* once they had farrowing using a commercial lactation diet. The pigs were weaned at approximately 26 days of age.
The following measurements were recorded:

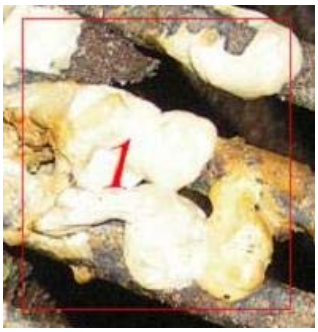
Pig performance

The number of piglets born alive, litter birth weight of piglets (post fostering, within 24 hours post birth), litter weaning weight of piglets, incidence of mastitis of sows during lactation, medical treatments and mortality of sows and piglets was recorded.

Scour score

The incidence and severity of scouring within a litter was recorded within the first 12 days post farrowing. A standard operating procedure was used to measure the incidence and severity of scouring within a litter of piglets. The incidence and severity of scouring was scored as follows:

Score 0: Normal consistency



Score 1: Pasty consistency.

Score 2: Sloppy consistency.

Score 3: Watery consistency.

Once scouring was detected in a litter the scour score was taken and the individual piglets were treated with either Trisoprim-480® (intramuscular injection) or Tribrissen® (oral drench). If a whole litter was scouring then electrolytes were also provided via a creep drinking unit.

Shed environment

The presence of flies within the shed were recorded by counting the number of flies that were stuck on a standard fly trap (1m length of fly tape) within a 24 hour period at weeks 2 and 4 of the experiment.

The Ammonia and Hydrogen Sulphide concentrations were recorded using instantaneous sampling (one sample taken in the middle of the shed) using a Dragger Tube were recorded the day prior to weaning.

Statistical analysis

Analysis of variance was used to analyse treatment effects on growth, with the litter of piglets used as the experimental unit. Chi-square analysis was used to determine the effects of treatment on number of piglet medical treatments, number of piglet deaths from birth to weaning and number of litters affected by scouring and severity of scouring (on a daily basis from birth to 12 days post birth).

Result and Discussion

Twenty eight sows were removed from the experiment (12 from Control treatment and 14 from the Stalosan ® F treatment were used as dame sows within the farrowing accommodation, and two sows in the Control treatment had agalactia (milk production dried up). There was no significant difference between treatments in number of sows removed because their milk production dried up. There were no sow deaths recorded and no cases of mastitis in sows observed in either treatment in the current experiment.

There was no significant difference ($P>0.05$) between the “old” and the “new” Stalosan ® F product that was used between batches one to three, in terms of piglet rate of gain, incidence of scours, number of piglet medical treatments and deaths. These data also indicate that there were no positive carry-over effects of the Stalosan ® F within a shed. The farrowing house was power washed between batches, therefore any carry-over effects may not have been observed.

Table 1. The average piglet rate of gain (fostering to weaning), % pre-weaning mortality and number of medical treatments for gilts and parity 1 sow litters.

	Control	Stalosan®F	SEM
Piglet rate of gain [1] (kg/day)	0.215	0.225	0.003
Number of piglet deaths[2]	238/2045 piglets born alive (12% mortality)[a]	172/2034 piglets born alive (9% mortality)[b]	-
Number of piglet medical treatments	622/2045 piglets born alive[a]	375/2034 piglets born alive[b]	-

[1] Foster weight used as covariate
[2] Piglet deaths from birth to weaning. Deaths include piglets overlain from sows, scouring, runt piglets, unviable and unthrifty piglets.
[a, b] Within rows, means with different superscripts are significantly different (P<0.001)

Table 1 shows the piglet growth performance and number of deaths (pre-weaning mortality) and medical treatments from birth to weaning. There was a strong trend (P=0.104) for an increase in piglet rate of gain from fostering to weaning in the Stalosan ® F treatment. There was a highly significant (P<0.001) reduction in the number of deaths from birth (i.e. number of piglets born alive) to weaning in the Stalosan ® F treatment. It is speculated that the Stalosan ® F provided a drying effect on the piglets in the first 24 hours post birth and improved the piglet thermal environment and allowed them to begin to suckle the sow's colostrum. There may have also been additional benefits of applying Stalosan ® F throughout lactation, drying out the environment if there were scouring litters, and causing reduction in disease load in the environment. Furthermore, there was a highly significant (P<0.001) reduction in the number of piglets medically treated in the Stalosan ® F treatment. These data are supported by the scouring data (Figures 1 to 3) which show that the number of litters affected by scouring in the first 12 days post birth, and the severity of scouring were reduced in the Stalosan ® F treatment. One would expect that a reduction in scours would result in improved growth performance and obviously a reduction in piglet medical treatments.

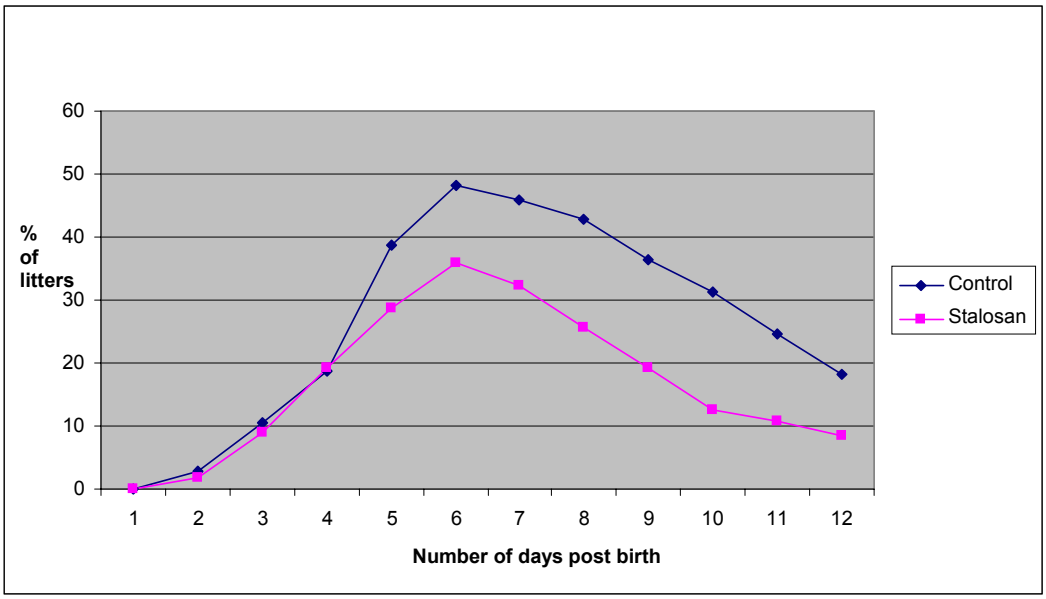


Figure 1: The percentage of total litters (gilts and parity 1+) within each treatment which had scouring piglets within the litter.

Figure 1 shows that there was no significant difference (P>0.05) between treatments in terms of percentage of litters affected by scouring within the first four days post birth. However, from four days post birth to weaning, the control treatment had a significantly higher number of litters affected by scouring (on average 15% more litters affected). Regardless of the treatment, the incidence of scouring decreased from day six post birth onwards, which is expected due to medical treatment regimes.

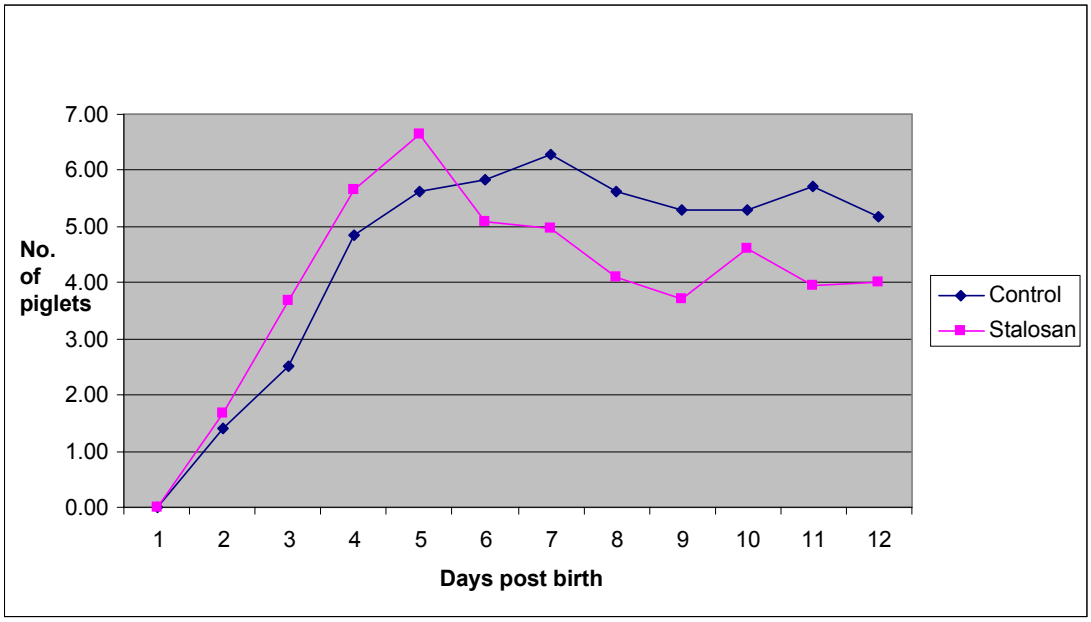


Figure 2: The average number of piglets scouring within a litter.

Figure 2 shows the average number of piglets scouring within a litter. From approximately day 4 onwards the number of piglets affected within the litter was significantly ($P<0.05$) reduced in the Stalosan ® F treatment.

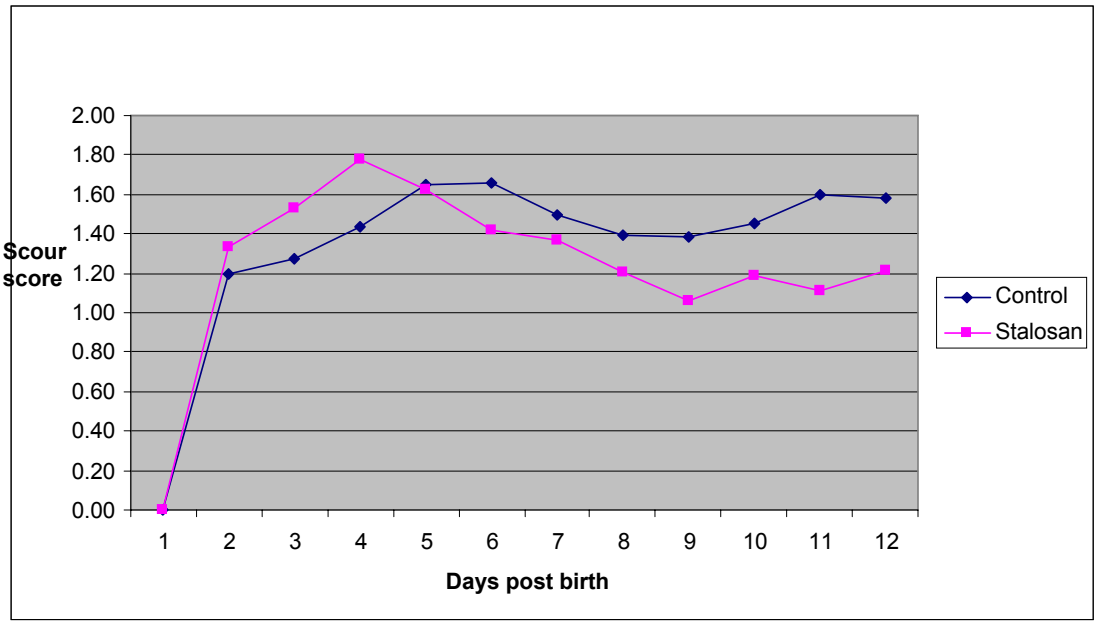


Figure 3: The average scour score of those piglets scouring within a litter

Figure 3 shows the average scour score of piglets. From 5 days post birth, the severity of scouring was significantly ($P<0.05$) reduced the Stalosan ® F treatment.

In terms of the shed environment, anecdotal observations from stockpeople working within the farrowing sheds were that sows did not change their behaviour when the Stalosan ® F was being applied using the blower (i.e. sows did not jump up and appear restless). Furthermore, they noted that the environment in the Stalosan ® F treated shed smelt fresher and appeared to have reduced odour compared to the control shed. There was no significant difference ($P>0.05$) between the number of flies between the control and Stalosan ® F treatment (30 and 33 flies counted on the fly trap, respectively). The average ammonia concentration was significantly higher in the Stalosan ® F treatment compared to the control treatment (10ppm and 0ppm respectively); however there was one sampling point that was an outlier with a reading of 18ppm. This was in the shed with where the "old" batch of Stalosan ® F had been used and perhaps the older, lumpier product did not have the absorptive capacity of the fresher product, since the surface area of the product was less. This may have resulted in higher ammonia concentration. There were no significant ($P>0.05$) time effect (i.e. carry-

over effects) of batch on the ultimate growth performance of the piglets between the batches of piglets where the "old" and "new" product had been used. Further, more comprehensive measures of the environmental effects of Stalosan ® F would need to be conducted with hydrogen sulphide and ammonia measured more regularly over time, using a greater number of sampling points within the shed.

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Conclusion and Implications

- The application of Stalosan ® F to the farrowing environment significantly reduced the incidence and severity of gilt and sow litters affected with neonatal scours.
- Pre-weaning mortality was reduced from 12 to 9% in the Stalosan ® F treatment.
- There was a trend for improved piglet growth performance in the Stalosan ® F treatment.
- Stalosan ® F is a powder disinfectant that can be implemented in the farrowing house to improve pre-weaning survivability.

References

Chemiplas (2007). Personal communication.

Schou, T.W and Permin, A. (2003) The effect of Stalosan F on selected poultry parasites. Helminthologia, 40. 1: 15-21.