

# Benefits to sows and their progeny of using mannan based feed supplements

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It has already been established from many research trials that using supplemental yeast mannan-oligosaccharide (MOS) products is important in pig nutrition for promoting correct gut microflora as well as interacting with the gut associated lymphatic tissue (GALT) in order to improve immune status in young and adult animals.

In addition, it has been shown that gestating pigs can express higher levels of immunoglobulins in their milk at parturition, increasing the transfer of immune protection to their young.

From this, it is well established that performance benefits result from such supplementation.

## Product development

In recent years, more complete understanding of the mode of action of mannan-based feed supplements has allowed further product development to produce more effective results in animals fed such products as Actigen.

This product is a second generation, unique, bioactive fraction derived from the outer cell wall of a specific strain of yeast, *Saccharomyces cerevisiae*.

Trial data regarding the impact of Actigen in pigs has been generated, concerned with both sow and piglet performance and immune status.

The main benefits seen in using this natural growth promoter for pigs include better sow body weight, and hence improved lactation and shorter return to service intervals, and reduced piglet mortality.

In-depth, highly specialised research into the impact of maternal Actigen supplementation on piglet gut development and gene expression as a result of improved immune responses was conducted by Brennan and Graugnard (2012).

They fed sows from parities 1-8 on commercial feed either as a control diet or supplemented with 0.9kg/t Actigen during gestation and lactation.

Ten days post farrowing, one piglet per litter was randomly selected, euthanised and jejunal gut sections removed for morphological and DNA assessment.

Various pathways were investigated in this trial as follows. Ephrin is responsible for cell signalling in pathways related to migration and angio-

Pathway	Significance (P value)
Ephrin receptor signalling	0.002
Cholecystokinin/gastrin-mediated signalling	0.003
Renin-angiotensin signalling	0.005
CXCR4	0.005
ILK signalling	0.009

**Table 1. Significant canonical pathways in piglets fed milk from sows supplemented with Actigen.**

genesis, and hence regulates the positioning of cells within the developing gut. The hormone cholecystokinin (CCK) stimulates digestion and prevents gastric emptying – allowing time for complete digestion. Gastrin is implicated as a growth factor in the gut tissue and mucosa. Renin-angiotensin signalling pathways regulate ion and fluid transport, with the latter being major growth factors in smooth muscle. Chemokine receptor (CXCR4) is expressed in the immune and nervous system, controlling migration of leukocytes. Finally, integrin linked kinase (ILK) is a protein responsible for cell signalling and transcription.

## Gene expression

The results of such specialised analysis revealed that feeding Actigen to sows resulted in 262 genes being upregulated and 397 downregulated in their piglets.

Table 1 shows the significance in specific gene expression changes of the above factors analysed in piglets from sows fed Actigen. Research conducted by Samuel and Brennan (2012) fed sows (blocked by parity) diets either without supplementation or containing 0.9kg/t Actigen.

Total amount of sows used in the trial numbered 657 during gestation and 633 in the lactation period. The trial was conducted over a six month period, incorporating the period before parturition, lactation and return to service.

Milk samples were taken during lactation, and analysed for

immunoglobulin levels. When statistics were applied to the trial data, a strong trend (P=0.09) for better conception rates was seen for the sows fed Actigen. This group lost less body weight post-farrowing compared to the control group (3.2 versus 11.3kg; P<0.05).

Milk analysis showed high protein (P<0.01) and total milk solids minus fat (P<0.03) as well as increased IgG in parity 1 sows and higher IgA in parity 3 and 6 sows (P<0.05) for the group fed diets containing Actigen. These improvements resulted in a significantly higher number of piglets weaned from Actigen-fed sows (P<0.02).

The researchers concluded that feeding this product significantly reduced body weight losses during lactation, which would increase sow health status, longevity and return to service/successful conception.

## UK farm trial

In a UK farm trial, a 150 sow unit was used to examine the impact of feeding Actigen and its impact on immune status, on salmonella prevalence, which had been established at a rate of up to 75% of animals being contaminated on this farm site.

Over a one year period (July to June) Actigen was included in the sow diets at a level of 0.8kg/t, and performance was monitored compared to the previous years statistics prior to supplementation (Table 2).

From the sow data it can be seen that feeding Actigen reduced replacement rates, improved fertility

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**Table 2. Influence of feeding Actigen on the performance of sows and piglets.**

Parameter	Control period	Actigen period	Difference
No. sows	150	151	+1
Sow replacement rate	43.3	36.5	-6.8
Conception (%)	92.4	95.8	+3.4
Farrowing rate (%)	89.9	92.0	+2.1
Litter per sow per year	2.14	2.25	+0.11
Empty days	29.2	21.8	-7.4
Sow feed used (t/sow/year)	1.17	1.22	+0.05
Piglets weaned/litter	10.9	11.4	+0.5
Piglets weaned/sow/year	23.0	25.8	+2.52
Age at weaning (days)*	27.7	25.8	-1.9

\*target 7kg weaning weight

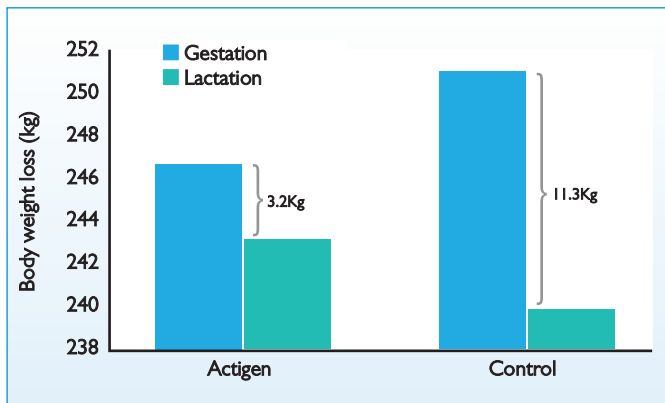


Fig. 1. Body weight loss of sows fed gestation and lactation diets without (Control) or with 900ppm Actigen.

Continued from page 7 and increased the numbers of piglets reared per sow per year.

In addition, levels of salmonella contaminated animals, which averaged 25% of the herd in the control period, was reduced to 15% during the period where Actigen was fed. Piglet performance data is shown in detail in Table 3.

For the 7-40kg growing period, piglets had increased weight gain post-weaning and better FCR. When analysed for the economics of such improvements, a return on investment of €28,000 per year was calculated for the unit.

The performance of Actigen under Asian commercial conditions has been documented. A farm in China was selected, and 50 Yorkshire sows were housed in a replicated pen trial, with 25 animals in the control or Actigen (0.8kg/t in sow gestation and lactation feed) groups.

The trial started at day 85 of gestation and concluded at weaning (20-30 days after piglets were born, depending on body weight). The results showed that 0.46 more piglets were born per litter, with 0.3kg higher birth weight, leading to 0.7kg higher weaning weight and 1.6% lower mortality for the piglets

Parameter	Control period	Actigen period	Difference
Weight at weaning (kg)	7.0	6.9	-0.1
Final weight (kg)	39.7	41.0	+1.3
Daily gain (g/d)	416	539	+123
Daily feed intake (g/d)	894	1013	+119
FCR	2.15	1.88	-0.27
Mortality (%)	1.7	1.5	-0.2
Days on unit	78.8	63.2	-15.6

Table 3. Piglet performance from weaning to a target weight of 40kg (growing period) for litters from the unsupplemented control period or period when sows were fed Actigen.

from sows fed the Actigen supplemented diet. In addition, the cost benefits of these improvements was analysed for the groups, and the sows fed Actigen had a net cost benefit of 91 Y, corresponding to a return on investment of 6.8:1.

### Conclusion

From the research conducted specifically on pigs in terms of productive performance of sows fed Actigen and their progeny, not only is gene expression in the gut and immunity improved, but real eco-

nomical gains can be made as a result of such benefits. As modern pig producers have increasing outgoings associated with higher feed prices, veterinary costs and meeting their own efficiency targets, such returns on investments are increasingly important. In addition, welfare controls in many parts of the world for controlling disease and mortality on farm make the choice of using a second generation, effective product such as Actigen essential. ■

References are available on request from the author