

NUMBER 4

DOSE-TITRATION STUDIES SHOW ECONOR[®] TREATS AND PREVENTS SWINE DYSENTERY

INTRODUCTION Challenge studies conducted in the United Kingdom demonstrate that Econor[®] (valnemulin) can rapidly treat clinical swine dysentery and prevent recurrences. The studies also show that Econor can prevent the development of clinical swine dysentery even when exposure to the infection is severe.

Treatment Study

The efficacy of Econor for treatment of swine dysentery was tested by artificially challenging swine with *Brachyspira hyodysenteriae*.¹

Conventionally reared pigs ranging in age from 3.5 to 4 weeks were used in the study. They were fed unmedicated food for 14 days and then challenged orally with *B. hyodysenteriae* P18A, a common strain of the pathogen.

After clinical signs of the disease developed, pigs were allotted to one of six treatment groups with eight pigs per group. Each group contained pigs with a range of clinical signs, such as soft feces to blood in the stool. The various treatments are presented in Table 1.

Once signs of clinical disease began, researchers assessed pigs daily and assigned a clinical score. In addition, they took rectal swabs twice weekly for isolation of *B. hyodysenteriae*, weighed pigs at regular intervals and recorded food intake.

The scientists then conducted post-mortem examinations 24 days after challenge to examine the large intestine of each pig for lesions and to take mucosal scrapings for culture.

Results

- > During the trial, all Econor-treated pigs survived, but three pigs in the tiamulin group and all pigs in the control group died or were euthanized due to severe dysentery.
- > Clinical signs of disease quickly resolved in all Econor-treated pigs and were gone by Day 5 of the trial; resolution of signs in tiamulin-treated pigs took 3 days longer.
- > In the Econor group, mean clinical scores ranged from 4 to 10. This was statistically significant compared to the mean score of 30 in the tiamulin group.

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KEY POINTS

- > Swine dysentery in pigs artificially challenged with *B. hyodysenteriae* rapidly responded to in-feed treatment with Econor administered at the rate of 50 ppm and above.
- > Econor administered at 100 ppm was more effective for the treatment of swine dysentery than tiamulin at the same dosage.
- > Econor at rates as low as 10 ppm was effective in preventing the clinical signs of swine dysentery, post-mortem lesions and shedding in feces; it was more effective than tiamulin at 30 ppm.

Table 1
Groups and Treatments

Group	Treatment*
1	50 ppm Econor
2	75 ppm Econor
3	100 ppm Econor
4	150 ppm Econor
5	100 ppm Tiamulin
6	Unmedicated control

* Treatment period 10 days

> Upon post-mortem examination, no swine dysentery lesions were seen in the groups that received 75, 100 or 150 ppm of Econor; lesions were seen in only two pigs from the Econor 50 ppm group. There were three pigs with such lesions in the tiamulin group and lesions in all control pigs.

> *B. hyodysenteriae* could not be isolated from any of the pigs that received 100 ppm or more of Econor. It was isolated from mucosal scrapings in five pigs that received Econor 50 ppm, in one pig that received Econor at 75 ppm, in three tiamulin-treated pigs and in all eight controls.

> Weight increased in all Econor-treated pigs during the treatment period and all had a daily live weight gain greater than the tiamulin group.

Researchers' observations: "In this trial, [Econor] in-feed at 50, 75, 100 and 150 ppm successfully treated experimentally produced swine dysentery with the prevention of mortality and elimination of clinical signs... [Econor] at 50 and 75 ppm did not completely eliminate [*B. hyodysenteriae*] from all pigs but at 100 ppm was more effective than tiamulin at the same dosage."

Prevention Trials

In a study designed to evaluate the effectiveness of Econor for the prevention of swine dysentery, there were five groups with nine pigs each aged 5 to 6 weeks old.² They received unmedicated feed for 14 days and were then challenged with *B. hyodysenteriae* P18A.

Treatment was then initiated. Each group received either Econor at the rate of 20, 30 or 40 ppm, one group received tiamulin fed at the rate of 30 ppm, which is the lower recommended dose, and the last group served as controls and received nothing.

In the same study, a second trial was initiated to determine the lowest effective dose of Econor. The trial design was similar to that of the first trial except that four groups of about nine pigs were used. Three of the groups received Econor at the rate of either 5, 10 or 20 ppm and the fourth group served as controls.

In both trials, the severity of disease was determined with a clinical disease score based on body condition, feces consistency and composition. Other factors considered were excretion of the pathogen in feces, post-mortem lesions, growth rate and feed conversion ratio.

Results

> In trial 1, evidence of disease was not seen in pigs that received Econor at the 20 or 40 ppm rate and developed in only one pig in the 30 ppm Econor group. In contrast, eight of nine controls developed clinical signs of swine dysentery and so did two of nine pigs in the tiamulin group.

> The mean clinical scores were significantly better in the treated groups than in controls.

> *B. hyodysenteriae* was isolated from rectal swabs taken from all control pigs and from two clinically ill pigs in the tiamulin group. It was also isolated from two pigs that received 30 ppm Econor, although this coincided with dysentery and an incidental infection in this group.

> *B. hyodysenteriae* was not isolated from pigs in the 20 and 40 ppm Econor groups.

> No lesions of swine dysentery were seen in pigs from the 20 and 40 ppm Econor group; only one pig from the Econor 30 ppm had lesions of swine dysentery and *B. hyodysenteriae* could not be isolated from mucosal scrapings.

> Lesions were seen in tiamulin-treated pigs and controls that had signs of swine dysentery. They were also found in one tiamulin-treated pig and one control that had no signs of clinical disease.

> In the second trial, all nine control pigs had signs of swine dysentery, compared with five of nine in the Econor 5 ppm group and none in the 10 and 20 ppm Econor groups.

> Nevertheless, the mean clinical score for the 5 ppm group was 11, which was significantly less than the score for controls, which was 77.

> *B. hyodysenteriae* was isolated from all control animals, but from only two in the 5 ppm Econor group.

> Pigs fed Econor at all levels were significantly heavier than controls by the end of the trial.

> On post-mortem, lesions typical of swine dysentery were seen in the remaining control pigs; lesions also were seen in two of the five pigs that received Econor at the 5 ppm rate and had clinical signs, but *B. hyodysenteriae* was not isolated. Lesions also were seen in two pigs from the 5 ppm group that had not shown clinical signs of disease.

> No lesions were seen in the pigs fed Econor at the 10 ppm or 20 ppm rate, nor was *B. hyodysenteriae* isolated from any of these pigs.

Researchers' observations: "[Econor] at inclusion rates down to 10 ppm was effective in preventing the clinical signs of swine dysentery, the shedding of spirochaetes in feces and the presence of lesions on post-mortem examination...in feed medication with [Econor] at 10 ppm was more effective than tiamulin at 30 ppm in preventing swine dysentery."

SUMMARY The results of the first study show that Econor, when used at levels of 50 ppm or more, rapidly treated the signs of swine dysentery. At 100 ppm, Econor appeared to be more effective than tiamulin at the same dosage. Econor administered at the rate of 75 ppm or more prevented relapses of swine dysentery and, at 100 ppm or more, completely eliminated *B. hyodysenteriae* from the gut.

Table 2
Dose-Titration Study — Econor 20-40 ppm*

Inclusion Rate (ppm)	No. of Pigs with SD	Re-isolation of <i>B. hyodysenteriae</i> Pre- or Post-Mortem
0	8/9	9/9
Econor 20	0/9	0/9
Econor 30	1/9*	2/9*
Econor 40	0/9	0/9
Tiamulin 30	2/9	3/9

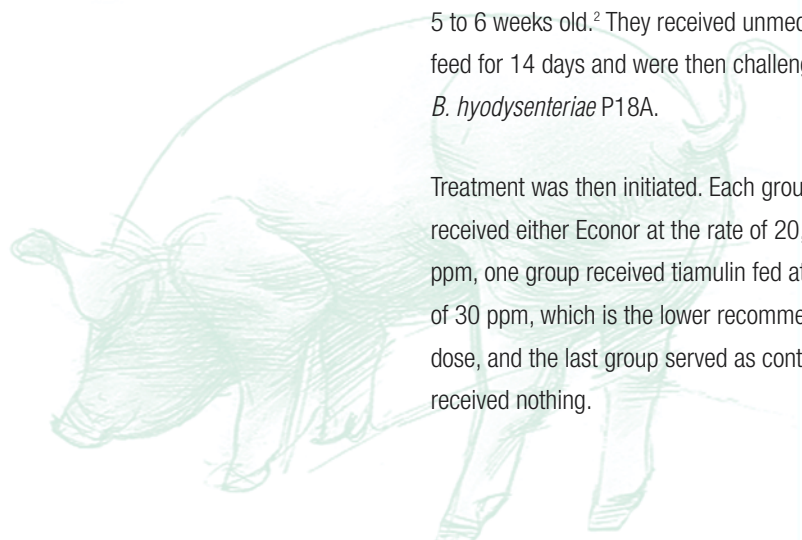
*Following an incidental infection

The results of the second study show that despite a severe challenge with *B. hyodysenteriae*, Econor prevented swine dysentery when fed at levels as low as 10 ppm.

Econor also prevented shedding of *B. hyodysenteriae*, even at 10 ppm. Previous results from field trials have shown that tiamulin fed at 20 and 30 ppm prevented clinical swine dysentery. However, when used at 20 ppm, tiamulin did not prevent shedding.

Weight gain in pigs treated with Econor was comparable to those that received tiamulin, and all treated animals had significantly better weight gain than untreated animals.

For more information on this study, please contact your local Novartis Animal Health representative or Dr. Ulrich Klein at ulrich.klein@ah.novartis.com.



“Econor ... at 100 ppm or more completely eliminated *B. hyodysenteriae*.”

REFERENCES

¹ Burrows MR et al. The comparison of a new compound SDZ PMD 296 (Econor — Sandoz Ltd) and tiamulin for the treatment of swine dysentery. *The 14th International Pig Veterinary Society Congress*. 1996.

² Burrows MR et al. The comparison of a new compound SDZ PMD 296 (Econor — Sandoz Ltd) and tiamulin for the prevention of swine dysentery. *The 14th International Pig Veterinary Society Congress*. 1996.