Efficacy of Tiamutin against M. synoviae

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This article describes a trial that was carried out on a farm with eight broiler breeder houses containing, in total, 29,056 breeders that were infected with Mycoplasma synoviae (MS).

Tiamutin 45% was administered in the drinking water in preventive pulse doses three days every 14 days over a period of 69 days. Blood samples for serological testing by rapid plate agglutination (RPA) for MS and Mycoplasma gallisepticum (MG) were taken per flock prior to, and monthly during, the trial period and, furthermore, egg production, chicks produced per hen and breeder livability was monitored. Data were compared with the Ross 308 breed standards.

The results of the trial demonstrated an initial rise followed by a decline of the proportion of MS RPA positive titres. No evidence of MG was present prior to the trial and titres to MG remained negative during the production period. Furthermore, no clinical signs of chronic respiratory disease occurred.

Performance parameters of egg production and number of chicks per hen increased by 4.80 and 3.25% respectively versus the Ross 308 breeder standards. Mortality in the treated group was 0.3% higher than the Ross 308 breeder standard. Application of Tiamutin 45% resulted in a return on investment of 6.8 times. In conclusion, the two-weekly pulse dosing with Tiamutin 45% on a 'high risk' farm with birds that were serologically positive for MS controlled the prevalence of MS and prevented clinical disease and performance losses that are typically associated with MS infection.

Total number of samples	Age (weeks)	Serologically positive (%)	
		MS	MG
		Dilution 1:8	Dilution 1:8
100	24	5	0
80	28	18	0
80	32	24	0
75	36	11	0

Table 1. MG and MS RPA test results.

Widely prevalent in Iran

On Iranian commercial broiler breeder farms MS is widely prevalent. The disease typically occurs in the broiler breeder flocks in the production period and it has a negative effect on the quantity and quality of the production of hatching eggs and day old chicks.

Tiamutin administration has been previously tested against MG and MS by giving it for three days a month as pulse doses.

Control of MS in Iran is more difficult due to its short incubation period (9-11 days), lack of biosecurity and the presence of infected flocks of different ages on the same farm.

The aim of the study was to test the efficacy of Tiamutin against MS on a farm with such 'high risk' circumstances and to see if the serological prevalence of MS could be reduced within two and a half months.

Tiamutin was applied in a programme which included five pulse doses of three days duration, every 14 days over a period of 69 days. It was hypothesised that with this programme, clinical signs of the disease as well as antibody titres could be reduced and that the production performance of breeder flocks would be improved.

Tiamutin 45% was administered at a preventive level of 0.0125% (12.5mg tiamulin hydrogen fumarate per kg body weight), equal to 100g Tiamutin 45% per 400 litres drinking water, over the three days.

This was then repeated 14 days later, and every 14 days thereafter until 5 treatments were completed, repetition of treatment.

The treatments took place from June until September and this corresponded with a bird age of 24-33 weeks (69 days).

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Fig 1. Proportion of samples serologically positive for MS and MG (RPA).

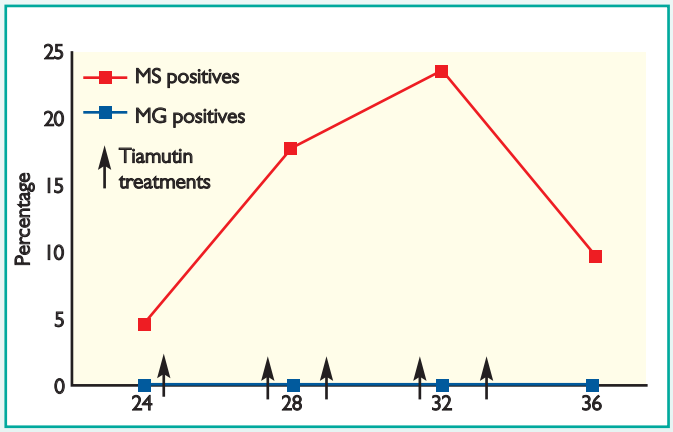
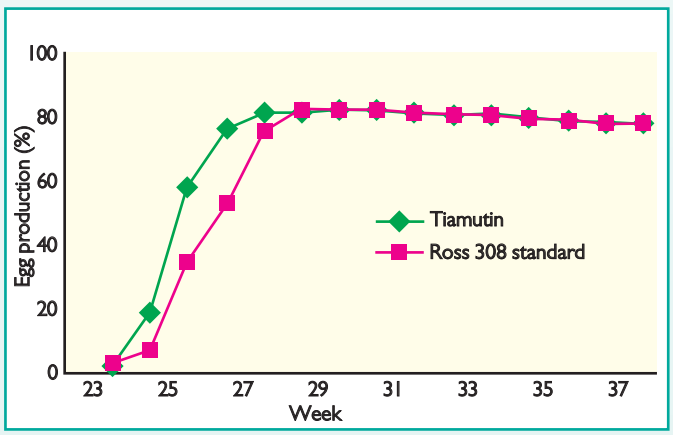


Fig. 2. Average egg production percentages in Tiamutin treated flocks and Ross 308 standard.



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The trial took place in eight houses with the total capacity of 29,056 breeders on one breeder farm that was serologically positive for MS. The farm was located in the region of Amol, Islamic Republic of Iran. Randomisation was not applicable and no control group was available as all houses were treated with the same programme. Production data of the Ross 308 standard were used as control.

During the trial production parameters were evaluated and recorded. This information was collected during monthly visits to the farm and was checked for accuracy and compliance with the protocol.

The following data were collected from each house – number of hens, weekly egg production, hatchability, number of chicks produced per hen, fertility, the number of hens which were culled or died, the presence or absence of clinical signs of respiratory disease and number of days of antibiotic treatment (other than Tiamutin).

The proportion of MS and MG positives was measured throughout the trial. Blood samples for serologic testing by RPA were taken prior to the beginning of the trial and monthly throughout the trial on house basis.

The total number of blood samples taken was 75-100 per month and these were taken during weeks 24, 28, 32 and 36 of age.

Serological tests (RPA) were carried out for the detection of antibody against MS and MG.

Clinical and RPA results

No clinical outbreaks of chronic respiratory disease (CRD) occurred during the trial period and no antibiotics, other than Tiamutin 45%, were used.

The results of the RPA serological testing showed an initial rise followed by a decline in the number of MS RPA positive breeders. No serological evidence of MG was found prior to the trial and this negative MG status remained during the production period. Weekly test results are provided in Table 1 and Fig. 1.

Production parameters

The average egg production between weeks 27 and 38 was 72.1% in the Tiamutin treated group as against a Ross 308 standard of 67.2%. The egg production percentage in the Tiamutin treated group was 4.8% higher (see Fig. 2).

The number of chicks produced per hen between weeks 25 and 35 was 46.70 in the Tiamutin treated group as against 43.45 in the Ross 308 standard. The chick production in the Tiamutin treated group was 3.25 chicks per hen higher (see Fig. 3).

The mortality percentage between weeks 25 and 37 was 4.2% in the Tiamutin treated group as against 3.9% in the Ross 308 standard. The mortality in the Tiamutin treated group was in 0.3% higher (see Fig. 4).

Discussion

Before the start of the trial there was a 5% prevalence of MS detected by RPA in the breeder flock. After three applications of Tiamutin 45% the prevalence had increased to 30%. This increase may have been due to the stress of production onset and lateral infections occurring from neighbouring houses. Furthermore, biosecurity was suboptimal on the farm.

Continued treatment with two more pulses of Tiamutin 45% decreased the seroprevalence to 14%. The total of five treatments (69 days), therefore, controlled the prevalence of MS.

The incubation period of MS is 9-11 days. Reduction of seroprevalence may be achieved quicker through shortening of the interval between Tiamutin 45% treatments from 14 to 10 days.

MS is prevalent in breeder flocks prior to production. This could be prevented through application of Tiamutin 45% in the rearing period. As a result, proportions of MS positives as well as the control of the disease may be improved during production.

To evaluate the effect of longer term usage of Tiamutin 45%, the duration of treatment should be longer than 69 days.

As the birds will ingest the mycoplasma, for example spread by faeces, re-infections readily occurs. Proper cleaning and use of a suitable and safe disinfectant at the appropriate times should decrease the re-infection of flocks. For the treatment of 29,056 breeders, 425 sachets of 100g of Tiamutin 45% were used, totalling 51,348,798 Rls (conversion rate 9,477 Rls/ USD). Thus the cost per breeder was 1,767 Rls.

The cost of a chick is 3,696 Rls. With an average improvement of 3.25 chicks per hen over the Ross standard, the total benefit was 12,012 Rls. As a result, the return is 6.8 times the investments vs. the Ross 308 standard. This return is an under estimation of the reality, as untreated flocks generally have lower performances than the Ross 308 standard.

Conclusion

A three day pulse treatment was carried out with Tiamutin 45% every two weeks during a period of 69 days. During the trial period no clinical signs of chronic respiratory disease (CRD) were observed and no other antibiotic treatments (other than Tiamutin 45%) were applied. The results of the trial demonstrated an initial rise followed by a decline of the proportion of MS RPA positive titres.

Furthermore, application resulted in an average of 4.8% increase of weekly egg production vs. the Ross 308 standard (72.1 in the Tiamutin group vs. 67.2 in the Ross 308 standard). Numbers of chicks produced per hen housed was 3.25 chicks more than the Ross 308 standard (46.7 in the Tiamutin group vs. 43.45 in the Ross 308 standard).

During this period breeder mortality was 0.3% higher than the Ross 308 standard (4.2% in the Tiamutin group and 3.9% in the Ross 308 standard). Pulse treatment with Tiamutin 45% provided a return 6.8 times higher than the investment vs. the Ross 308 standard. In conclusion, the two-weekly use of a Tiamutin 45% pulse programme on a 'high risk' farm serologically positive for MS, controlled the prevalence of MS and prevented clinical disease and performance loss due to MS. ■

Fig. 3. Number of chicks produced per hen housed.

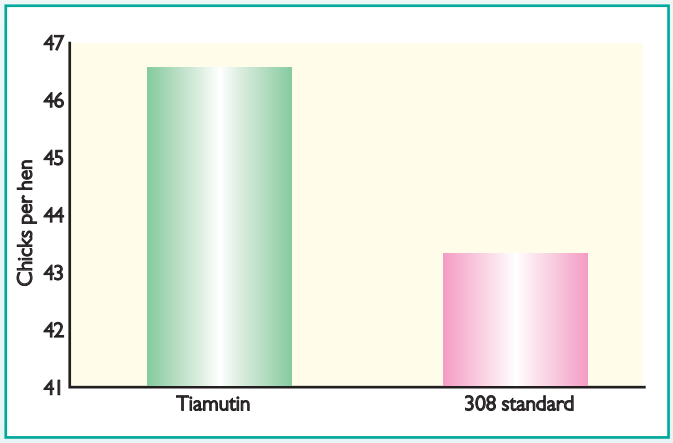

Fig. 4. Breeder mortality percentages.