



Effect of Tiamutin[®] on the performance of broiler breeders in South Korea

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Broiler breeders were medicated with Tiamutin (Tiamutin 12.5% solution) at 125 ppm in water for 3 consecutive days from 22 ~ 53 weeks of age with 4 ~ 5 weeks interval. The production performance was recorded and the presence of MG and MS antibodies was monitored by RSA (Rapid Serum plate Agglutination). Production performance results are shown in Table 1.

Table 1. Effects of Tiamutin on the performance of broiler breeders (23week - 62week of age)

parameter	Ross 208 Standard	Flock 1 MG Vaccinated	Group 1 Flock 3 Non-treated	Flock 4 Tiamutin	Group 2 Flock 5 MG Vaccinated	Flock 6 Tiamutin
No. of hens housed (HH)	6,744	7,220	7,176	7,163	3,371	
Total Eggs (HHA)	176.42	171.35	184.1	185.76	166.26	180.82
Hatching Eggs (HHA)	167.64	163.36	176.95	178.9	158.12	172.22
% Hatching Eggs on Total Eggs	95.02	95.33	96.11	96.3	95.1	95.24
Chicks/hen Housed (at 23 weeks)	142.5	135.6	147.2	149.2	131.6	143.3
% Hatchability	85	83	83.2	83.4	83.2	83.2
Mortality + culls (laying period) %	6.65	10.36	9.8	4.89	10.74	5.13

The Tiamutin medicated group 1 produced 149.2 chicks, the MG vaccinated group 135.6 chicks and non-medicated group 147.2 chicks. Thus, the Tiamutin flock produced 13.6 and 2 more chicks per hen than MG vaccinated and non-medicated flocks respectively. Furthermore, mortality in the Tiamutin flock was 5.5 % and 4.9 % lower than respectively the MG vaccinated and untreated flocks.

Results in group 2 were similar as group 1, demonstrating an increase of 11.7 chicks per hen and a decrease of 5.6 % in mortality in the Tiamutin medicated flock.

All groups were MG and MS positive in the rearing period. From 2 months after the 1st medication, the Tiamutin flocks became MG and MS negative, and remained negative during production. One Tiamutin flock seroconverted for MS only after 57 weeks of age, 1 month after the end of medication. MG vaccinated and non-medicated control flocks remained positive or seroconverted after 43 weeks of age. Based on price levels in South Korea, return on investment of Tiamutin medication varies between 1.6 and 11.3.

Above results indicate that pulse medication with Tiamutin improves production performance and reduces infection in chronically MG and MS infected breeders.

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Study report

Materials and Methods

1. Trial design: Broiler breeders (Breed: Ross 208) were medicated with Tiamutin at 125 ppm in water for 3 days per month. The following performance parameters were recorded: total number of eggs produced and hatching eggs per hen housed, hatchability, number of chicks per hen housed mortality and culls. MG and MS serum titers were measured monthly during production. The trial took place from July. 21. 2002(breeder age: 23 week) to April. 14. 2003 (breeder age: 62 weeks).
2. Animals: Broiler breeders from a chronically MG, MS infected rearing farm were included in the trial. The production period of the broiler breeders lasted from 23 weeks until 62 weeks of age.
3. Farm: Kang Nam Dun-Po Broiler breeder farm. 3 tiers cage system. Artificial insemination took place to fertilise hens.

4. Groups included:

Group	House	Flock	Number of breeders (at 23 weeks)		Cooling system	Treatment	Feed
1			?	?			
	1	020226	6744		Fogging spray	MG Vaccination	Purina
	2	020226	7056		Fogging spray	MG Vaccination	Purina
	3	020227	7220		Cooling pad both side	Non-medicated control	Purina
	4	020227	7176		Cooling pad one side	Tiamutin	Purina
2	5	020226	7163		Cooling pad one side	MG Vaccination	Samyang (~35weeks), and Purina
	6	020227	3371		Spray	Tiamutin	Samyang (~35weeks), and Purina
	7	020301			1309	Tiamutin	Purina

5. Treatment groups:

(1) No antibiotic for MG until depletion.

(2) Tiamutin 12.5% solution (Novartis Animal Health Inc.)

The Tiamutin medication (125 mg/l of water or 12.5 mg/ kg BW) took place for 3 days starting at 22 weeks of age. Medication was repeated every 4 weeks for a period of 8 months.

(3) Live MG vaccine applied at 10 weeks of age via a eye drop administration according to the supplier recommendations.

6. Laboratory tests: Blood was collected from 50 birds per house every month from 21 weeks of age, and was tested for MG and MS titers using Nobilis MG and MS antigen (Intervet International BV).

Furthermore, ND, IB and AI titers were tested using antigen produced by NVRQS (National Veterinary Research and Quarantine Services). The controls for the laboratory tests consisted of SPF chicken's serum.

Results

Introduction

- Results of production performance, water consumption, proportion of birds that seroconverted for MG, MS, AI, ND and IB as well as agro-economics were compared between treated and control flocks.
- In group 1 results of the breeder standard, MG vaccinated (flock 1), non-medicated (flock 3) and Tiamutin treated (flock 4) hens were compared.
- In group 2 results of the MG vaccinated (flock 5) and Tiamutin treated (flock 6) hens were compared.
- The MG vaccinated hens of flock 2 were excluded from the trial. In this house a mechanical problem with a ventilator occurred during the trial, causing it to stop functioning. As the weather was very hot on that day, approximately half of the flock died. Therefore, results of this flock could not be compared with the other flocks.
- The Tiamutin treated flock 7 contained male birds only, and therefore production parameters could not be evaluated.

A) Performance of group 1 (See table 1 in the attachment 1)

- The Tiamutin medicated flock produced more eggs in total as well as hatching eggs than any other flock. Total egg production in the Tiamutin flock was 14.41 more than MG vaccinated flock, 1.66 more than non-medicated control flock and 9.34 more than the breed standard. Hatching eggs production was 15.54 more than MG vaccinated, 1.95 more than non-medicated control and 11.26 more than the breed standard.
- The hatchability was equivalent among flocks: 83.4% in the Tiamutin medicated flock, 83% in the MG vaccinated flock, and 83.2% in the non-medicated control flock. Consequently the number of chicks per hen housed in the Tiamutin medicated flock was 149.2, in the MG vaccinated flock 135.6, and in the non-medicated flock 147.2. Thus, the Tiamutin flocks produced 13.6, 2 and 6.7 more chicks than MG vaccinated, non-medicated and breed standard flock respectively.
- The percentage of mortality and culls were 5.47 %, 4.91 % and 1.76 % lower in the Tiamutin flock than the MG vaccinated, non-medicated and breed standard flock respectively

B) Performance of group 2 (See table 1 in the attachment 1)

- The Tiamutin medicated flock produced 14.56 more eggs in total and 14.1 more hatching eggs than the MG vaccinated flock.
- The hatchability was not significantly different among groups: 95.24 and 95.1 in the Tiamutin and MG vaccinated respectively. Consequently the number of chicks per hen housed was 143.3 in the Tiamutin flock and 131.6 in the MG vaccinated flock, resulting in a difference of 11.7 chicks per hen housed.
- The mortality was 5.61 % lower in the Tiamutin flock than in the MG vaccinated flock.

C) Water intake and laying rate during and after medication (See graphs in the attachment 2)

- Water intake was decreased by 2.9%~28.8% on the day of medication, and egg production was decreased by 1%~5% during 3~4 days following medication. The decrease in water intake and egg production occurred simultaneously. In winter, the water intake was lower resulting in a higher Tiamutin concentration in water. As a result, the decrease in water intake versus the control group in winter was higher (21.1% ~ 24.3% decrease). Water intake recovered 2~3 days after medication. The effect medication on water consumption and egg production was not observed after 48 weeks of age.

D) Serum titers

D-1) MG: (See graph 1 in the attachment 3)

- All groups were MG positive in the rearing period.
- The MG vaccinated flock became MG negative at 29 weeks of age and maintained negative until 40 weeks of age when the group sero converted for MG. After 40 weeks of age the proportion of positive samples gradually increased in MG vaccinated flocks in both groups 1 and 2.
- The Tiamutin flock in group 1 became MG negative from 2 months after the 1st medication, and it remained negative until 2 months after stopping medication at 53 weeks of age. The Tiamutin flock in group 2 remained negative during the entire production period.
- The non-medicated control flock remained negative until 47 weeks of age, after which the proportion of MG positives increased. The proportion of MG positives in the non medicated flocks decreased again after 60 weeks of age.

D-2) MS: (See graph 2 in the attachment 3)

- All flocks were MS positive in growing period.
- The MG vaccinated flocks in groups 1 and 2 remained negative from 29 weeks until 43 weeks of age , and became 100% positive from 47 ~ 55 weeks of age.
- The Tiamutin treated flock in group 1 maintained negative from 2 months after 1st treatment and remained negative till 1 month after stopping medication, after which 100 % seroconverted. The Tiamutin treated flock of group 2 remained negative during the entire production period.

- The non medicated flock remained seronegative up to 47 weeks of age after which 100 % seroconverted.

D-3) ND, IB and AI

- During the laying period, ND and IB titers remained normal, and no clinical signs of ND and IB infection were observed.
- No AI infection occurred during the laying period, although an (avirulent) AI infection was observed during the rearing period.

E) Agro economics

- The market price to the end user of the Tiamutin 12.5 % solution was KRW 45,000 per 500 ml. Cost of day old chick is KRW 450 ('04 YTD September average market price). Vaccine was provided free of charge by the Korean government.
- The amount of Tiamutin applied per breeder was 0.75 g, equivalent to KRW 540 per breeder. Break even for medication costs occurred at an increase of 1.2 chicks per breeder versus the controls.
- The return on investment of the Tiamutin treatment (ROI) was between 1.6 and 11.3.

Discussion

- MG and MS infected broiler breeders were medicated with Tiamutin (Tiamutin 12.5% solution) at 125 ppm in water during 3 days from 22 weeks to 53 weeks of age with 4~5 weeks interval. This pulse medication resulted in an improved production performance and reduced MG and MS sero-prevalence versus untreated and MG vaccinated control groups.
- Tiamutin pulse medication could be used for Mycoplasma eradication programs and complicated respiratory diseases prevention programs in breeders
- In case decrease of water intake in the first months of production could be avoided through enhancing palatability of the treatment, the production performance improvement is expected to be even more significant.
- It is assumed that MG vaccination and Tiamutin medication in flocks neighboring the non-medicated flock partly prevented MG infection in this flock. In winter, when ventilation was less optimal, the non-medicated flock seroconverted more rapidly for MG.

Conclusion

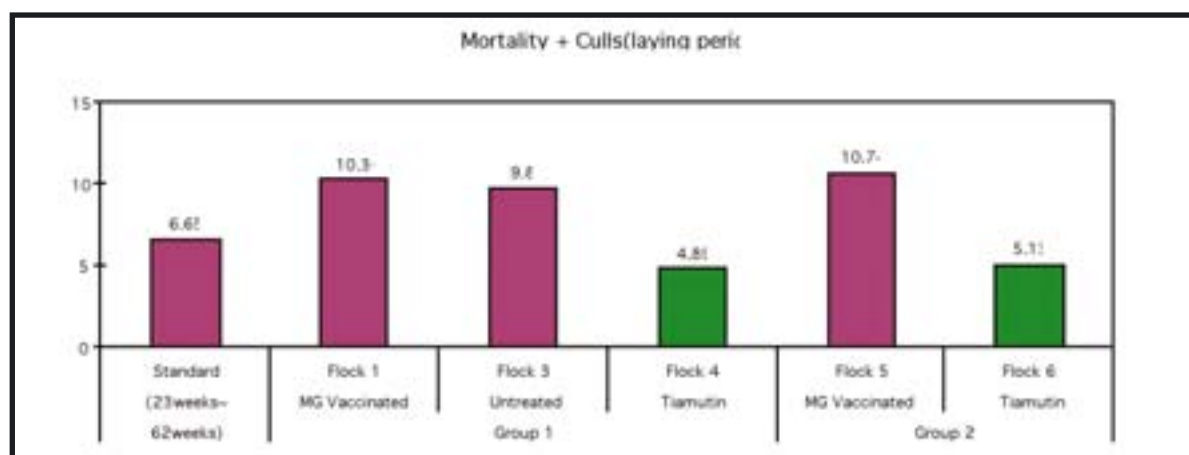
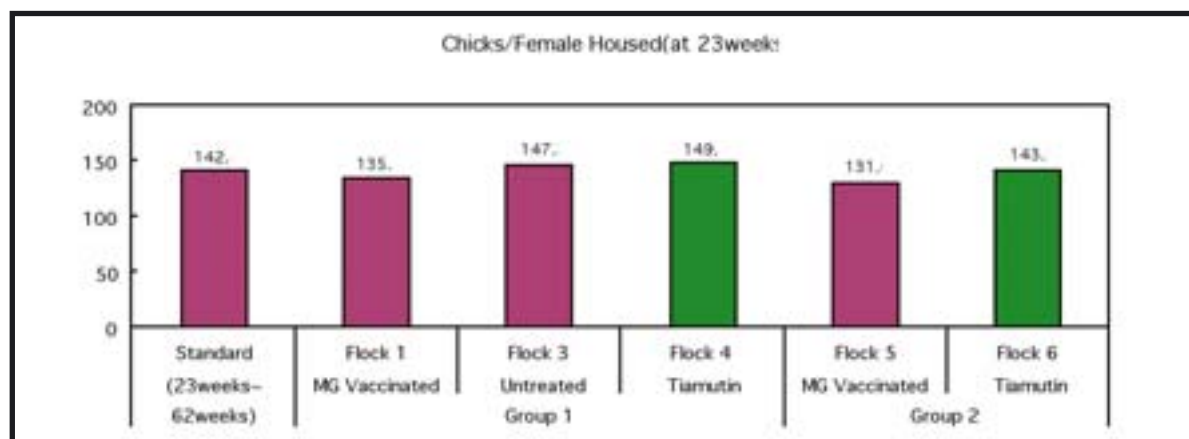
- The Tiamutin medicated groups produced 1.95 ~ 15.5 more hatching eggs than the MG vaccinated groups and non-medicated control groups, which resulted in 2~ 13.6 chicks more than these control groups.
- The percentage of mortality and culls in the Tiamutin groups was 4.91% ~ 5.61% lower than that of the control groups.
- Tiamutin pulse medication reduces the prevalence of MG and MS in positive flocks from 2 months after the start of medication until 1 month after the end of medication.
- Based on price levels in South Korea, return on investment of Tiamutin medication varies between 1.6 and 11.3.
- Above results indicate that regular medication with Tiamutin improve performance in breeders.

Attachment 1. Production performance

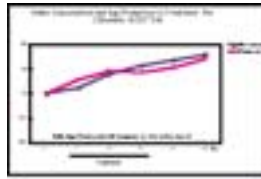
Table 1

Parameter	Ross 208 Standard	Group 1						Group 2		
		Flock 1	Flock 3	Flock 4				Flock 5	Flock 6	
		MG Vaccinated	Untreated	Tiamutin	var standard -Tia	var MG vacc -Tia	var Untreated -Tia	MG Vaccinated	Tiamutin	var MG vacc -Tia
No. of hens housed (HH)		6,744	7,220	7,176				7,163	3,371	
Total Eggs/HH	176.42	171.35	184.1	185.76	9.34	14.41	1.66	166.26	180.82	14.56
Hatching Eggs/HH	167.64	163.36	176.95	178.9	11.26	15.54	1.95	158.12	172.22	14.1
% Hatching Eggs on Total Eggs	95.02	95.33	96.11	96.3	1.28	0.97	0.19	95.1	95.24	0.14
Chicks/HH	142.5	135.6	147.2	149.2	6.7	13.6	2	131.6	143.3	11.7
% Hatchability	85	83	83.2	83.4	-1.6	0.4	0.2	83.2	83.2	0
Mortality + culls (laying period) %	6.65	10.36	9.8	4.89	1.76	5.47	4.91	10.74	5.13	5.61

Production performance graphs

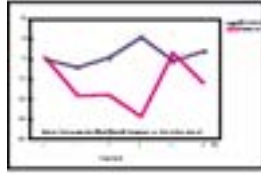


Attachment 2. Water consumption and egg production
Graphs -1

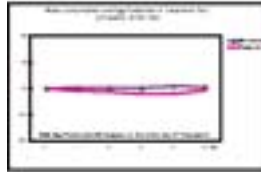


Egg production week 26

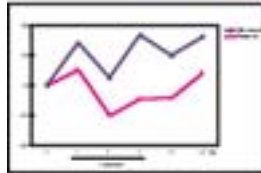
Water consumption week 26



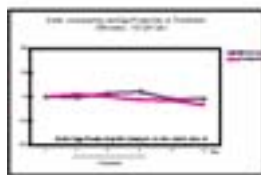
Egg production week 31



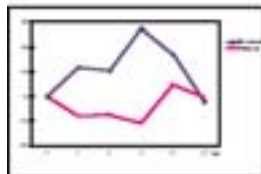
Water consumption week 31



Egg production week 35

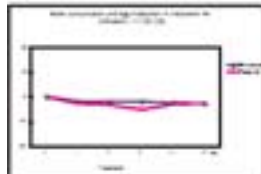


Water consumption week 35

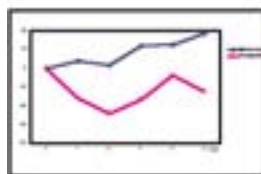


Egg production week 40

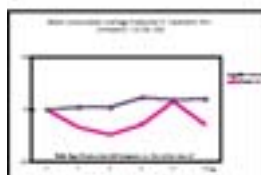
Water consumption week 40



Egg production week 44

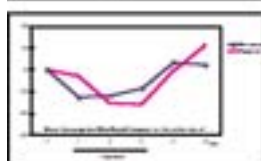


Water consumption week 44



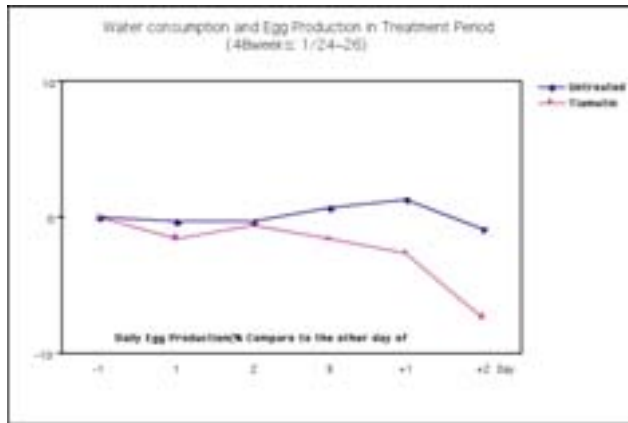
Egg production week 48

Water consumption week 48

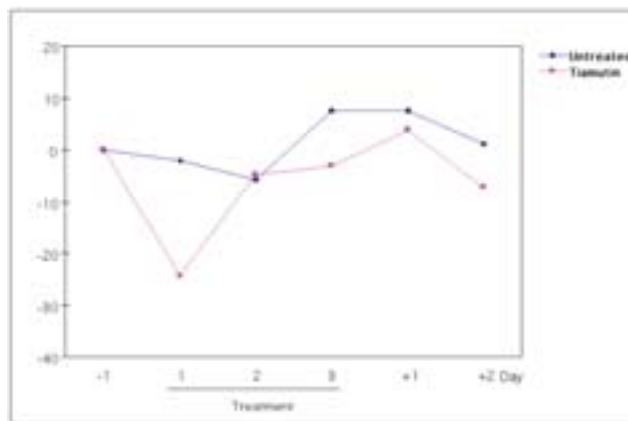


Egg production week 26

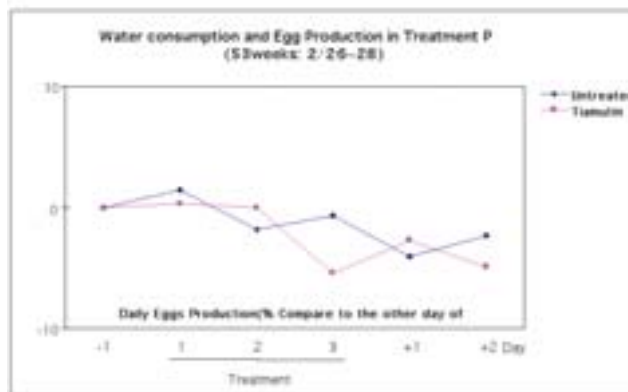
Attachment 2. Water consumption and egg production
 Graphs -2



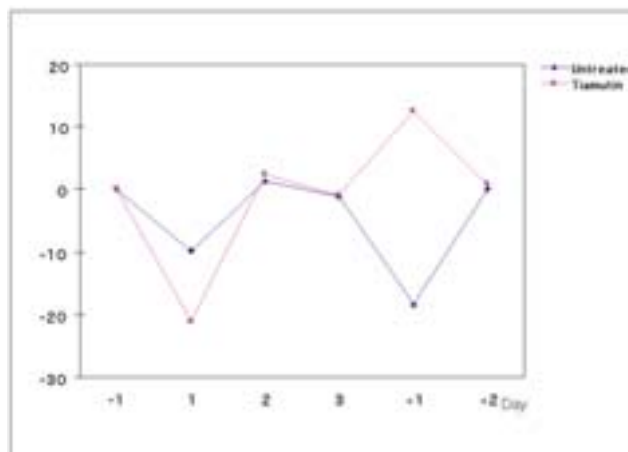
Egg production week 48



Water consumption week 48



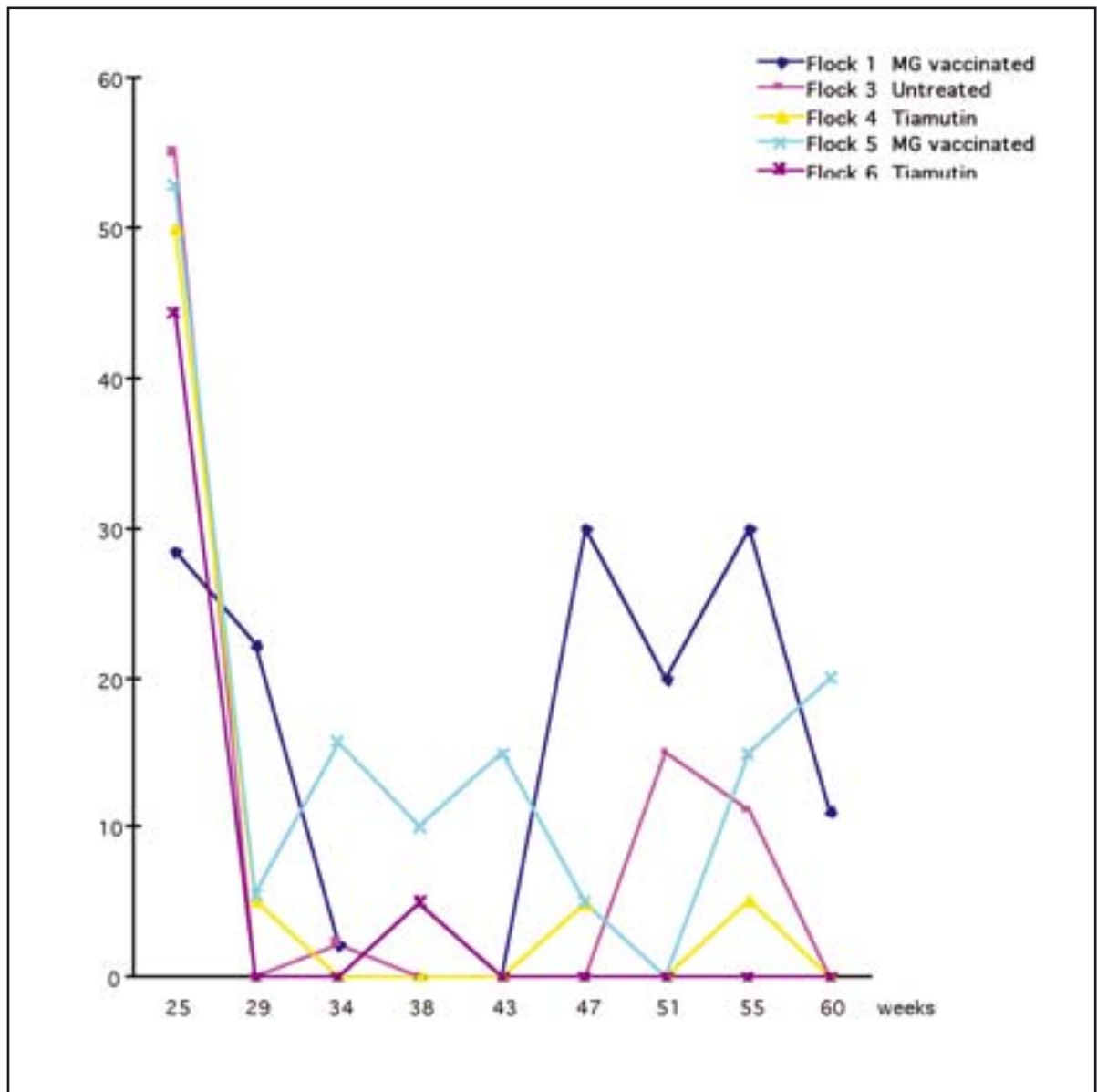
Egg production week 53



Water consumption week 53

Attachment 3. Seroprevalence of Mycoplasma

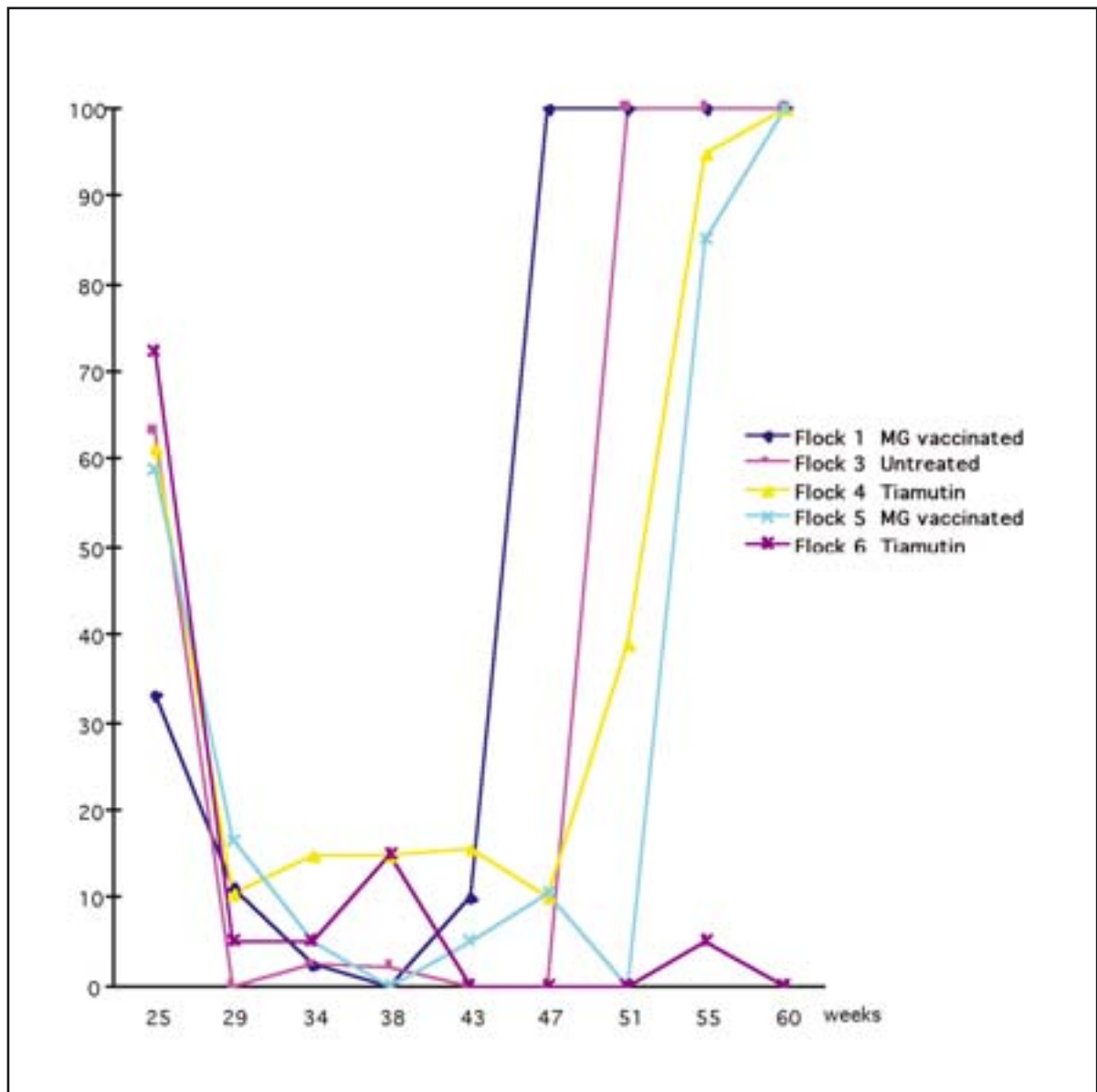
Graph 1. Development of proportion of MG positive SPA titers in untreated, MG vaccinated and Tiamutin pulse treated flocks.



End of Tia medication ↑

Attachment 3. Seroprevalence of Mycoplasma

Graph 2. Development of proportion of MS positive SPA titers in untreated, MG vaccinated and Tiamutin pulse treated flocks.



End of Tia medication ↑

Further information on the Tiamutin® (tiamulin) range of products is available from the Poultry Products Manager at Novartis Animal Health operations in over 50 countries worldwide.