CONTROL OF MYCOPLASMA SPECIES IN 'HIGH RISK' BROILER-BREEDER FARMS WITH TIAMULIN

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Introduction:

When breeding birds were treated with tiamulin (Denagard® - Novartis Animal Health Inc.) either by drinking water or feed, tiamulin was shown to accumulate in eggs at concentrations above the minimum inhibitory concentrations (MICs) against *Mycoplasma gallisepticum* (MG) and *M. synoviae* (MS) (Hannan *et al*, 1997) for several days (Laber, 1984; Burch, 2009) (see Figure 1). Horrox (1984) first described the repeated treatment of turkey breeders to successfully prevent the vertical transmission of MG to poults. Stipkovits *et al,* (1993) showed that broiler breeders treated on a monthly basis with tiamulin had improved egg production and hatchability in the face of an MG challenge. Stipkovits and Burch (1996) reported on the use of tiamulin treatment of grandparent breeder layers and selection of treated-eggs for hatching to prevent vertical transmission of MS, when establishing new parent layer flocks. This original work has been adapted for use under field conditions, in many countries.

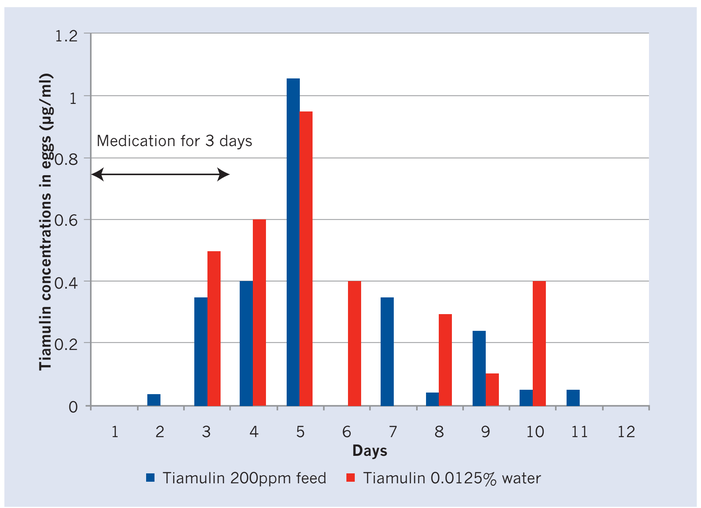

Figure 1. Tiamulin concentration in eggs (microbiological assay) after hen treatment at 0.125% in the water and 200ppm in feed for 3 days (Laber, 1984; Burch, 2009)

Objective:

In many parts of the world the poultry industry has grown up and developed in densely populated areas, with many different flock types (breeder, broiler and layer) situated closely together (less than 1km). As a result, there is a 'high risk' of cross-infection to broiler-breeder units, with organisms such as MG and MS. It was the purpose of this work to explore the use of tiamulin in preventing MG and MS infections in broiler breeders in Turkey, located in a densely populated 'high-risk' area.

Materials and methods:

Ten mycoplasma-free broiler-breeder flocks (Ross 308) were treated routinely with tiamulin at 250ppm in the feed, on alternate weeks during the rearing and laying period. This programme had been used for some time and appeared to control MG particularly well but most breeder flocks would break down with MS, serologically. To control the MS infection, which has a higher MIC_{90} (0.25µg/ml) than MG (0.025µg/ml) (Hannan *et al*, 1997), the concentration of tiamulin was increased to 500ppm for a week at certain stress times (see Figure 2) such as week 18 (pre-lay), week 25-26 (5% egg production), week 37-38 (after peak production) and after 45 weeks when they felt they were being stressed. Additionally, 2-3 applications were made before the flocks were slaughtered at 72 weeks. Ten breeder flocks were monitored and blood samples were taken at 48 and 69 weeks and submitted to ELISA testing for MG and MS.

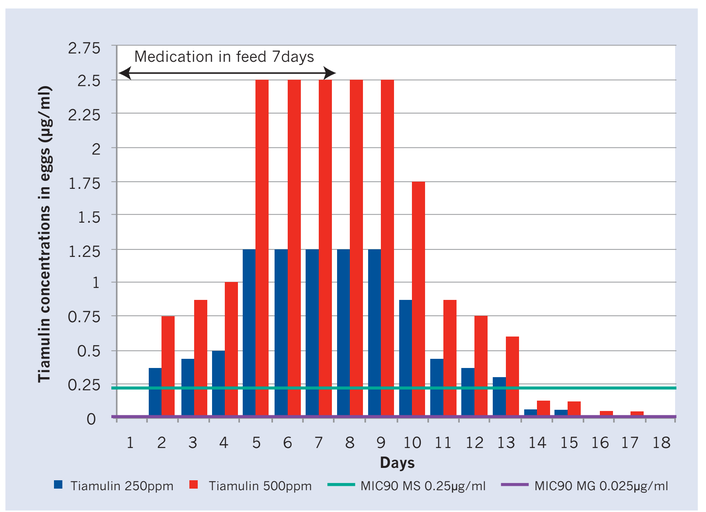

Figure 2. Extrapolated tiamulin concentrations in eggs for 250 and 500ppm tiamulin in feed

Results:

By 48 weeks, none of the flocks were sero-positive for MG (see Table 1), however 5/10 flocks were showing seroconversion to MS (55-80% samples positive) (see Table 2) but this had not been associated with any reported clinical disease. By 69 weeks, all 10 of the flocks had seroconverted to MS (50-100% samples). Regarding MG, 3/10 flocks showed a low level, positive result at 5% (1/20 samples), which was thought to be probably false positives associated with the MS results (Feberwee *et al*, 2005) demonstrating complete MG control throughout the whole rearing and breeding period.

Flock	Week 48 samples		Week 69 samples	
	Negative	Positive	Negative	Positive
1	20	0	19	1
2	20	0	19	1
3	20	0	20	0
4	20	0	20	0
5	10	0	10	0
6	20	0	20	0
7	20	0	20	0
8	20	0	20	0
9	20	0	19	1
10	20	0	20	0

Table 1. MG serology – ELISA results from 10 breeder flocks week 48 and 69

Flock	Week 48 samples		Week 69 samples	
	Negative	Positive	Negative	Positive
1	20	0	0	20
2	20	0	2	18
3	20	0	6	14
4	20	0	10	10
5	2	8	1	9
6	9	11	0	20
7	5	15	0	20
8	5	15	0	20
9	3	17	0	20
10	20	0	4	16

Table 2. MS serology - ELISA results from 10 breeder flocks week 48 and 69

Conclusions:

MG appears to be very well controlled in 'high risk' dense broiler-breeder producing areas with tiamulin at 250ppm in the feed used on alternate weeks during rear and lay. Against MS, additional higher concentrations of tiamulin at 500ppm in feed, given at stressful periods, helped control clinical infection in the breeders and chicks, but by slaughter, all of the flocks had seroconverted. However, chick quality and subsequent performance was reported as very good.

References:

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