BRIEF COMMUNICATION

Vaccination Against Coccidiosis in Commercial Roaster Chickens

Eng-Hong Lee

Vetech Laboratories Ltd., R.R. #4, Rockwood, Ontario N0B 2K0

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Coccidiosis in commercial roaster and broiler chickens in Canada has been so well controlled by the ionophore anticoccidials (monensin and salinomycin) that the disease has been designated by the poultry industry as low in priority for research (1). However, anticoccidials are still used in all roaster and broiler feeds until a few days before marketing. Producers cannot afford the risk of serious losses due to a sudden flare-up of clinical disease (coccidiosis) or economic losses due to poor performance caused by subclinical disease (coccidiasis).

In warmer countries, e.g. Brazil and Argentina, or where poultry farming is more intensive, e.g. France and the Netherlands, where in some farms over 20 broilers are produced per m^2, the reliance on ionophore anticoccidials is now threatened by the emergence of drug resistant strains of coccidia (2, 3). Alarmingly, fully one-third of the 90 isolates of mixed species of coccidia collected from 15 broiler growing areas of Brazil and Argentina were found to be either resistant or had seriously reduced sensitivity to monensin, salinomycin, and narasin (3). One isolate, resistant to maduramicin (Cygro, American Cyanamid), was also reported. Maduramicin had been introduced into these two countries only recently and had been previously concluded (4) to have little cross resistance to other ionophore anticoccidials. Comparable figures were also reported in France (2).

There is therefore, an increasing need to find other practical and longer-lasting alternatives for the control of coccidiosis in the event that total reliance on ionophore anticoccidials is no longer practical. Immunization against coccidiosis has been actively investigated. Various methods of vaccination using virulent strains of coccidia (5), attenuated strains (6) or subunit vaccines (7) have been assessed (5,6) or are at various stages of development (7), in addition to Coccivac (Sterwin Laboratories) which is available in the United States.

A new coccidiosis vaccine has been developed in Canada (8), and was recently licensed by Agriculture Canada to Vetech Laboratories Ltd., Rockwood, Ontario and distributed as Immucox by Cyanamid Canada Inc. It is a live vaccine and is administered through the waterers. I am reporting herein the use of this vaccine on seven consecutive crops of roaster chickens from February 1985 to October 1986 on a commercial farm in Ontario.

All birds were vaccinated at four days of age and again at seven days of age. The vaccinations of the first three crops were carried out or assisted by personnel from Vetech. The last four crops were vaccinated by the producers themselves. Anticoccidial drugs were not used either in the feed or for treatment throughout the seven crops. All results of performance were provided by the producers and based on the settlement sheets of the processor and those of the feed company as well as on records kept by the Ontario Chicken Producers' Marketing Board. Performance of seven crops given monensin and raised immediately prior to the vaccinated birds were used for comparison. The floor-space of one of the two barns was expanded by about 180 m^2 at the beginning of 1985 but an increased average number of birds (4,300) were also placed per crop (Table I). Aside from vaccination, all other management practices remained the same; the barns were cleaned out after each crop, and fresh wood shavings were used at the start of each crop. All chicks were bought from one hatchery and feeds, except for one crop, came from one feed company.

Overall, birds in the vaccinated crops grew about 3.2% faster than the medicated crops

An average of 65 days was required to raise a bird given monensin to 3.26 kg compared with 58.9 days for 3.04 kg for a vaccinated roaster. When adjusted to 3.26 kg, the vaccinated crops appeared to require about two to three days less than the medicated crops to reach market. The rates of feed conversion and the mortality rates were not significantly different ($p > 0.05$) between the two methods of control. It appeared though that the surviving vaccinated birds were much more uniform in weight. Mortalities in the vaccinated crops usually occurred at the end of the growing period where most of the birds died of causes other than coccidiosis.

Clinical signs of cecal coccidiosis appeared about two weeks after the first vaccination in most of the vaccinated crops. This may indicate heavy challenges from the floors. However, these clinical signs lasted only one to two days and no treatment was needed because the flocks appeared healthy and the mortality rate was either negligible or less than 0.2% per day (the "normal" rate is about 0.1%).

Overall, birds in the vaccinated crops grew about 3.2% faster than the medicated crops (Average Daily Gain, Table I). This faster growth was achieved despite the fact that the vaccinated crops were 20% more crowded (10.6 birds per m^2 vs 8.8 birds per m^2, Table I). It was possible that strain differences in chickens might have accounted for this faster growth. However, Kennedy (9) showed in 24 flocks of about 469,000 vaccinated broilers and roasters the

TABLE I
Comparison of Performance of Consecutive Crops of Roasters Raised on an Ontario Farm: Monensin versus Vaccination

No. birds placed	Date	Birds/m^2	Market age (days)	Mortality (%)	Ave. wt. kg	Feed conversion	Ave. daily gains (g)
Monensin							
10,000	83-2-28[a]	7.78	67	8.3	3.38	2.47	50.4
11,100	83-8-18	8.63	67	5.6	3.34	2.29	49.9
10,000	83-11-14	7.78	63	11.3	3.21	2.32	50.9
10,300	84-2-6	8.01	69	7.5	3.41	2.44	49.4
12,000	84-5-1	9.33	63	7.9	3.09	2.28	49.0
14,500	84-8-21	11.28	62	6.8	3.08	2.27	49.4
11,000	84-11-12	8.63	64	11.0	3.28	2.47	51.2
(mean ± SD)							
11,271 ± 1570		8.78 ± 1.24	65.0 ± 2.7	8.34 ± 2.1	3.26 ± 0.13	2.36 ± 0.09	50.1 ± 0.8
Vaccine							
14,500	85-2-14	9.87	61,62	7.6	3.16	2.41	51.3
15,500	85-5-6	10.55	60,66	10.5	3.23	2.30	51.2
14,000	85-8-15	9.53	56	9.9	3.01	2.16	53.7
16,000	85-11-11	10.89	58	9.0	3.05	2.25	52.5
17,000	86-2-11	11.59	58	7.4	2.85	2.35	49.1
16,000	86-4-29	10.89	58	9.5[b]	2.86	2.30	49.1
16,000	86-8-26	10.89	58	8.2	3.14	2.31	54.1
(mean ± SD)							
15,570 ± 1017		10.60 ± 0.69	58.9 ± 2.4	8.87 ± 1.18	3.04 ± 0.15	2.30 ± 0.08	51.7 ± 2.0

[a]No production in the summer of 1983.
[b]About 500 birds which died of heat stroke 2 days before shipment were included.

same faster growth over the accompanying monensin-medicated flocks or crops raised immediately prior to the use of the vaccine. When compared to 23 flocks of broilers and roasters of unrelated flocks fed by the same feed mill in the same period, the same faster growth was observed. These results suggested that the apparent faster growth was not due to differences in either the strain of chicks or in nutrition.

Although the results shown in Table I were not obtained from paired-barn studies they did come from seven consecutive crops or almost two years (four crops a year) of commercial rearing under all seasonal conditions. Furthermore, based on the performance of the last crop with the best average daily gains of 54.1 g (Table I), there was no apparent adverse effect of continued use of vaccination as a method of control. Such a conclusion can be drawn here but would not be obtainable from a one time study of paired-barns.

As recently as September 1986, Long and Jeffers (10) cast doubt on vaccination using live coccidia as a method of control for coccidiosis. They felt that such a method may not achieve the average weights and feed conversion shown by medicated birds. The results reported herein demonstrate, under commercial conditions, that vaccination can indeed be a viable alternative. Actually, vaccinated roasters appeared to grow significantly faster (3.2%) (t-test, $p < 0.05$) suggesting that vaccination may be preferable to, and, by nature, longer-lasting than chemoprophylaxis. On the other hand, faster growth in vaccinated birds may be due to the avoidance of appetite depression, which is known

The results reported herein demonstrate, under commercial conditions, that vaccination can indeed be a viable alternative.

to occur with the inclusion of ionophore anticoccidials in feed (11). Because the strains of coccidia used in the vaccine are sensitive to ionophore anticoccidials as well as amprolium, there is, perhaps, an added benefit in using this live vaccine. These drug-sensitive coccidia may replace those existing in the barns. If the coccidia existing prior to vaccination were resistant to ionophore anticoccidials or amprolium, the same medications could be used again after a few crops or when the resistant strains were shown to be replaced by the sensitive strains. Such a replacement was successfully shown by Jeffers (12) using a decoquinate-sensitive *Eimeria tenella*. The coccidiosis vaccine reported herein, which performed with no apparent inadequacies in comparison with monensin, can certainly be used for such a replacement.

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ERRATUM

Monensin toxicity in lambs.

Judy G. Bourque, Marion Smart and Gary Wobeser.

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Le résumé aurait dû se lire comme suit:

Résumé

Intoxication d'agneaux par le monesin

Un éleveur donnait à ses 10 agneaux pur-sang une moulée de croissance à laquelle on avait accidentellement ajouté dix fois la dose prescrite de monensin. Leur refus de manger cette moulée constitua le premier signe clinique qu'ils manifestèrent. Quand on les contraignit à en manger, après leur avoir enlevé leurs autres aliments, 15 à 20% d'entre eux développèrent, en l'espace de 48 heures, les autres signes cliniques suivants: décubitus, incapacité de se relever, démarche raide et tendance à marcher sur le bout des orteils. L'examen clinique, l'anamèse, les résultats des épreuves de laboratoire et des nécropsies, ainsi que l'analyse de la moulée, confirmèrent le diagnostic d'une intoxication par le monensin.

Mots clés: moutons, intoxication, monensin.