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SHORT COMMUNICATION

Sustainability of Veterinary Drugs against Field Isolates of *E. Maxima*

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ABSTRACT

This experiment was conducted to determine the effect of anti-coccidials on the field isolates and laboratory strain of *E. maxima*. The five drugs tested were mixed in the feed and the level used in parts per million (ppm) were: Salinomycin (66pm), Monensin (121pm), Nicarbazin (125pm), ethopabate (40pm), now called amprolium + Lasalocid Birds were raised in batteries with continuous lighting and were fed and *libitum* 3 times daily. Each bird was weighted individually at (D-2, D, D+5, D+7 and D+14 (D=day of infection with sporulated oocysts). Of the five anticoccidial drugs studied, Amprolium plus ethopabate was found most efficacious. The least efficacious drugs were Nicarbazin and Lasalocid, whereas, Salinmycin and Monesin showed medium efficacy.

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INTRODUCTION

The first widely used anticoccidial drug was Renosal (Roxarsone), which was introduced in 1944 (Edgar, 1985). Since then, there has been a variety of anticoccidial drugs in the market being used as prophylactic or therapeutic agents in chickens. Total eradication of avian coccidiosis is impractical however, efforts have been directed to controlling the disease by chemotherapy, sanitation, nutrition and immunogenic methods (Fayer and Reid, 1982). Mc Dougald and Reid (1971) reported that 7-week-old broilers were susceptible to six species of coccidian following withdrawal of coccidiostatic medication (amprolium. 0.0125%, ethopabate 0.0004%). They concluded that on the basis of average lesion score, most treated flocks were susceptible to *E.maxima*, and *E.necatrix*, while most flocks were immune to *E.acervulina* and E. mivati. Control of coccidiosis is largely limited to good husbandry and prophylactic chemotherapy using a range of drugs (Akhter *et al.*, 2005). Ryley and Wilson (1972) reported that some coccidiostats exhibit activity against only one or few species of coccidian, while others have wide spectrum activity. That may be due to true variation in species response, or might be a reflection of difference in metabolism and distribution of different drugs in the various sites parasitized by the species of coccidian. Ruff. *et al* (1976) stated that with indirect seeding of pens with coccidian, 40 ppm of Monesin was as efficacious as compare to 100 ppm of Monensin in improving weight gain, lesion score and feed efficiency, However, with direct seeding, 84 ppm and 102 ppm gave maximum improvement of weight gain and feed efficiency in 8 weeks. From several battery tests, Edgar (1985) concluded that no single drug was best at all time, but a good anti-coccidial drug should protect the host from the effects of infection. Chapman (1999) reported that studies in the floor pens and the field indicate that broilers given various drug programs can develop immunity when exposed to natural infections. Evans and Petit (2002) showed that inclusion of Monensin sodium in the feed at consistent level with the label claim adequately controlled coccidiosis, as evidenced in the parameters evaluated. He further concluded that Sulphaquinoxaline and Pyrimethamine may be the best treatment available for broiler chickens and that this drug and Ampralium plus ethapabata may be of use for breeder birds. Studies have shown that pooled combination of two drugs may be more effective in preventing coccidiosis. The weight gain of rabbits treated with Salinomycin and Monensin was higher than those treated with Lasalocid and by about 22.6% higher than the control. Weight gain in animals

treated with Lasalocid was almost the same as in the control groups (Parkad, 1986). El-Banna *et al.* (2005) found that soluble formulation of Diclozuil induced a marked inhibitory effect on the different stages of parasite life cycle in experimentally infected birds. Ogbuokiri and Edgar (2010) found that resistance was dependent on the degree of infection and that the exponential increase in the inoculum produced a greater and longer lasting immunity than a single dose of inoculum.

The aim of this investigation is to determine the effect of five anticoccidial drugs on the filed isolates of *E. maxima.*

MATERIALS AND METHODS

The filed isolates used in this study were obtained from various farms in Umuagwo Ohaji, Eastern Nigeria. The oocysts were purified through single oocysts isolation as described by Prostowo (1965). The oocysts were later propagated through coccidian-free chicks. Faecal droppings were collected from 5-9 days post-inoculation (pi), washed with 2.5% Potassium dichromate [Potassuim heptooxochromate (VI) {$K_2Cr_2O_7$], filtered through 80 sieves, aerated and passed again through a 100 mesh wire to remove additional remaining debris. Counting of oocysts were made after concentration using a Spencer Bright Line haemocytometer, stored and re-propagated every 6 months to maintain oocysts pathogenicity.

This experiment was conducted to determine the effect of anti-coccidials on the field isolates and laboratory strain of *E.maxima.* The five drugs tested were mixed in the feed and the level used in parts per million (ppm) were: Salinomycin (66pm). Monesin (121pm), Nicarbazin (125pm) plus ethopabate (40pm), henceforth called ampreolium + Lasalocidl E. One hundred and sixty eight, 3-week-old broiler chickens were used. There were six birds per treatment with each bird being a replicate. The drugs tested were kept separate while the birds that received each strain of *E. maxima* (300,000 oocysts per bird) and the un-inoculated controls were mixed in the treatment pens to eliminate pen effect. Birds were raised in batteries with continuous lighting and were fed *ad libitum* 3 times daily. Each bird was weighted individually at (D-2, D, D+5, D+7 and D+14 (D=day of infection with sporulated oocysts).

Statistical analysis

All statistical analysis was performed using the Statistical Analysis System (SAS Institute Inc. 1982) with an alpha of 0.05.

RESULTS

The result of the drugs tested against isolate L of *E. maxima* are shown in figure 1 and table 1. There were no significant different at D+5, the un-inoculated, un-medicated birds had gained significantly more ($P<0.05$) weight than the Nicarbazin-treated birds. Weight gains of the birds treated with Salinomycin, Monensin, Lasalocid or Amprolium + E were also, significantly ($P<0.05$) greater than those of the Nicarbazin-treated birds. The differences in weight gains of the birds treated with Salinomycin, Monensin, Lasalocid, or Amprolium + E, did not differ significantly ($p>0.05$) from those of the un-inoculated, un-medicated controls and inoculated, un-medicated controls. At D+7 the un-inoculated, un-medicated controls were significantly different ($p<0.05$) from the inoculated, un-medicated controls and Nicarbazin-treated birds. Difference between the inoculated, un-medicated controls and the rest of the treatments were not significant ($P>0.05$). At D+ 14, however, the uninfected, un-medicated controls were only significantly different ($P<0.05$) from the inoculated, un-medicated birds and Nicarbazin-treated birds.

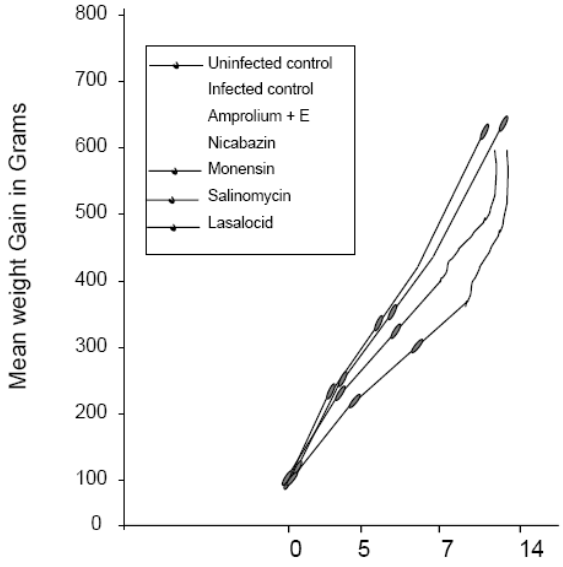

Fig. 1: Efficacy of Amprolium + E, Nicabazin, Salinomycin or Lasalocid for the control of coccidiosis in broiler chickens caused by a field isolate of *E. maxima*

Skins pigmentation among treatments at D were not significantly different ($P>0.05$). However, at D+5 the un-inoculated, un-medicated controls had significantly more ($P<0.05$) pigment than the Monensin-treated and Nicarbazin-treated birds. At D+7 the un-inoculated, un-medicated controls had significantly more pigment ($P<0.05$) than the Nicarbazin-treated birds and the inoculated controls. Differences in pigmentation among other treatments were not significant ($p>0.05$). By the 14^{th} day pi, differences in pigmentation of the un-inoculated, un-medicated birds were not significant ($p>0.05$) from the rest of the treatments, except for Nicarbazin-treated birds ($P<0.05$).

DISCUSSION

Poultry industries engaged in broiler production have at one time or the other fed their broilers with ionophores or other types of anticoccidial drugs. Yet, intestinal coccidiosis, especially *E. maxima* has been a problem. Previous studies have shown that amprolium alone was more effective in the control of cecal and intestinal species of coccidian (Bajwa and Gill, 1977). This study takes a different position. In the present study, a combination of Amprolium (105 ppm) + ethopabate (40 ppm) was the most efficacious of the five drugs against

Table 1: Efficacy of Amprolium + E, Nicarbazin, Monensin, Salinomycin or Lasalocid for the control of Coccidiosis in Broiler Chickens Caused by Isolate of *E. maxima*

		Medication	Skin pigmentation at:			
Treatment[1]	Inoculated[2]	(ppm)	D	D +5	D +7	D +17
1.	No	No	1.9^{a3}	2.1^{a}	2.2^{a}	2.7^{a}
2.	Yes	No	1.8^{a}	1.7^{ab}	1.4^{b}	2.0^{ab}
3.	Yes	66 ppm Salinomycin	1.9^{a}	1.9^{ab}	1.8^{ab}	2.4^{a}
4.	Yes	121 ppm Monensin	1.5^{a}	1.5^{b}	1.6^{ab}	2.0^{ab}
5.	Yes	125 ppm Nicarbazin	1.6^{a}	1.4^{b}	1.4^{b}	1.6^{b}
6.	Yes	85 ppm Lasalocid	1.9^{a}	1.9^{ab}	1.8^{ab}	2.0^{ab}
7.	Yes	125 Amprolium + E	1.7^{a}	2.2^{a}	1.8^{ab}	2.4^{a}

[1.] Six, 3-week-old, broiler chickens (males and females) per treatment. Each treatment is a replicate; [2.] Inoculated with 300,000 sporulated oocysts of filed isolate A; [3.] Means in column having different superscripts are significantly different.

this species as measured by body weight gain and skin pigmentation. The finding shows that Nicarbazin appeared to be the least effective against isolate L of *E. maxima.* The results obtained in this study supports the finding of Edgar (1985); that no single drug is best against all isolates or species at all times, but a good anti-coccidial drug should protect the host from the effect of infection, such as poor digestion and poor absorption of nutrients (Evans and Petit, 2002).

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