

## **Comparative efficacy of Selected Anticoccidial Drugs in Ambarorow Sheep Naturally Infected with Enteric Coccidia in South Darfur, Sudan**

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### **ملخص البحث**

أجريت هذه الدراسة علي ثلاث مجموعات من نعاج الامبرورو تبلغ من العمر 6 - 14 شهر و تزن 13-19 كجم، مصابة طبيعياً بطفيليات الكوكسيديا من جنس ايميريا تم علاجها بالسلفا دياميديين و الامبروليوم. تم حساب متوسط طرح البيوضات الكوكسيديا في الروث قبل و بعد يوم، يومين، ثلاثة، أربعة، سبعة، أربعة عشر، احدى و عشرون و ثمانية و عشرون يوماً بعد المعالجة. قلل عقار السلفادياميديين من طرح البيوضات في الروث بنسبة بلغت 93.89% أما عقار الامبروليوم قلل معدل طرح البيوضات بنسبة بلغت 98.44% و ذلك في اليوم 14 عقب اعطاء الدواء. غالبية النعاج التي حقنت بعقار السلفادياميديين وصل متوسط اخراج البيوضات فيها الي الصفر عند اليوم السابع. اعطاء العقارين لم يحدث اختلاف معنوي في متوسطات اوزان الحيوانات المعالجة و حجم الخلايا المتراصة. أوضحت الدراسة أن تجريع الامبروليوم و حقن السلفادياميديين اظهر فاعلية عالية ضد الكوكسيديا المعوية في نعاج الامبرورو.

### **Summary**

Three groups of Ambaroro ewes 9-14 months old, weighing 13-19 kg, naturally infected with *E. ovina*, *E. ovinoidalis*, *E. parva*, *E. ahsata* and *E. faurei*, were treated with Sulphadimidine (200 mg/Kg b. wt.) or Amprolium (25 mg/Kg body weight). The third group was kept as infected control. Faecal oocyst counts were performed for four days pretreatment, and on day 1, 2, 3, 4, 7, 14, 21 and 28 post-treatment. Sulphadimidine produced significant ( $P \leq 0.05$ ) reduction in mean oocyst counts on day 14 post-treatment equal to 93.89%. Amprolium treatment resulted in a significant ( $P \leq 0.05$ ) decrease in mean oocysts count equal to 98.44%. All ewes given sulphadimidine had almost zero oocysts count on day 7 after treatment. The selected drugs produced significant changes in mean live bodyweight or packed cell volume (PCV) of treated animals.

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**The oral administration of Amprolium and parenteral administration of Sulphadimidine were highly efficacious against intestinal coccidiosis in Ambararow ewes.**

### **Introduction**

In South Darfur State, the sheep production represents the most important component of income for pastrolists and the government as well. Infections of sheep with coccidia and other helminth parasites are not uncommon (Abakar *et al.*, 2001; Bashar *et al.* 2002). Coccidiosis in intensively-raised sheep peaks around the age of 6 weeks (Gregory *et al.*, 1980) and the oocysts intake responsible for this peak would occur between 2 and 4 weeks of age (Wacha *et al.*,1971). The possible source of infection during this period include contamination of the environment by ewes and by lambs (Gregory *et al.*, 1983). Most drugs used for control of coccidiosis have suppressive effect on the early developmental stages (McDougald,1982). Foster *et al.* (1941) reported that sulphaguanidine at a dose rate of 2 gm/day for 6 consecutive days suppressed oocysts out put in sheep. Amprolium has a good prophylactic activity against small ruminants coccidiosis and intake of 50-62.5 mg/kg for four days prevent mortality and reduced morbidity resulting from infection with *E. ovina* and *E. faurei* (Ross,1968). Other drugs used for controlling coccidiosis include Monensin (Gregory *et al.*,1983) and Lasalocid (Foreyt *et al.*,1979). Anticoccidial products form the basis of coccidiosis control practices in animals at present. Regular evaluation of the efficacy of these products is advisable, as it will provide information on the oocysts reappearance period and the resistance status in the coccidian population.

The present Study reports on the effect of Sulphadimidine and Amprolium on Ambararow ewes naturally infected with *E. ovina*, *E. ovinoidalis*, *E. parva*, *E. ahsata* and *E. faurei* in South Darfur.

### **Materials and Methods**

Animals for this trial were obtained from Nyala University farm during the second week of July, 2000. 29 naturally *Eimeria*-infected Ambararow ewes (9-14 month - old) and weighing 13-19 kg were selected for this study. Animals were kept in clean pens at the premises of Nyala University farm. They were ear-tagged. A fresh faecal sample was collected from each ewe and examined to determine the oocysts per gram of faeces (OPG) count using the modified McMaster technique (Anon, 1977). The identification of *Eimeria* to species level was made according

to Anon (1977). The mean count number of oocyst per gram (OPG) for each sheep was determined for four days prior to treatment. Blood for PCV was collected in heparinized vacutainers and PCV for each animal was calculated in accordance to Jain (1986).

#### **Experimental design:**

The animals were allotted into three groups according to their mean OPG counts and bodyweight. The first group (N = 9) remained as infected untreated control. The second group (N = 10) was injected intramuscularly with sulphadimidine (Bimidine injection, Sulphadimidine Sodium BP. 33½ ) (Bimed, Broomhill Road, Dublin) at a dose rate of 200 mg/kg b.wt. in the first day and then at 100 mg/kg for the second and third day as recommended by the manufactures. The third group (n = 10) was drenched once with Amprolium (Amprolium 200<sup>®</sup>) (Pantex, Holland B.V) with dose rate of 5 gram per 20 Kg b.wt. as recommended by the manufauers for sheep. The animals were held in confinement for 28 days after treatment. Sorghum hay and water were provided *ad. libidum*. Faecal and blood samples were collected 4 days before treatment and then on day 1, 2, 3, 4, 7, 14, 21 and 28 post-treatment. The live bodyweight of the experimental animals for the same period was also recorded.

The percent efficacies were calculated by faecal oocysts per gram counts reduction (FOCR) test with arithmetic mean of OPG according to the following formula:

$$\text{FOCGR}\% = \frac{\text{Mean pre-treatment OPGC} - \text{Mean post-treatment OPGC}}{\text{Mean pre-treatment OPGC}} \times 100$$

Mean pre-treatment OPGC

#### **Results**

Identification of oocysts revealed the presence of *Eimeria ovina*, *E. ovinoidalis*, *E. ahsata*, *E. parva* and *E. faurei*.

Reduction in faecal oocysts counts of ewes treated with Sulphadimidine and Amprolium are shown in Table 1 and Table 2, in Amprolium-treated group, faecal oocyst counts decreased to almost zero by day 14 post treatment. The percentage reductions in faecal oocyst counts were >95 on day 14 to the end of the observation period.

No clinical signs of coccidiosis were observed in any of the three groups. The effects of the two drugs on PCV and live bodyweight are shown in Table 3. Both drugs produced a significant (P < 0.05) increase on the live bodyweight of treated animals by the end of the observation

period. However, no significant difference ( $P > 0.05$ ) was observed between Amprolium and Sulphadimidine-treated ewes.

**Table 1: Oocyst per gram counts (OPGC) and percent reduction in OPG for Sulphadimidine-treated Ambararow ewes (N=10) in South Darffur.**

Day Pretreatment	Mean OPG	Range	Efficacy (%)
zero	7190	1000-9200	-
1	2740	0100-5800	61.89%
2	1410	0100-6000	80.39%
3	0620	0000-2300	91.37%
14	0439	0000-0900	93.89%
21	0357	0000-1600	95.03%
28	0410	0000-0800	94.29%

**Table 2: Oocyst per gram counts (OPGC) and percent reduction OPG for Amprolium-treated Ambararow ewes (N=10)**

Day Pretreatment	Mean OPG	Range	Efficacy (%)
zero	6420	5400-7500	-
1	4871	600-5800	24.12%
2	2925	000-2700	54.43%
3	2982	000-1300	53.50%
14	0100	000-100	98.44%
21	0320	000-1000	95.02%
28	0266	000-700	95.85%

**Table 3: Effects of treatment with Sulphadimidine and amprolium on live bodyweight and PCV of Ambararow ewes naturally infected with defined *Eimeria* spp.**

Measurements	Animals group	Days 0	Day 7	Day14	Day 21	Day 28
Live Bodyweight (kg)	Control	23.48	25.80	27.84	27.50	27.00
	Amprolium	25.53	28.31	28.24	28.26	28.82
PCV (%)	Sulphadimidine	25.16	27.82	27.36	27.80	28.64
	Control	15.4	15.33	19.60	19.20	19.55
	Amprolium	18.10	20.80	20.75	21.33	20.66
	Sulphadimidine	16.85	17.12	20.00	20.88	21.85

### Discussion

The west african dwarf sheep or Ambararow sheep were kept under nomadic system and pastrol grazing, they are owned by uda'falata and sankara tribes. These tribes followed different migratory routes and

stay at Sasiban and Tomat during winter and reach to Raja, Central Africa and Chad during summer season (Musa, 2002).

The present study revealed the presence of *E. ovina*, *E. ovinoidalis*, *E. parva*, *E. ahsata* and *E. faurei*. These species have previously been reported to affect sheep in the study area (Abakar *et al.*, 2001). Furthermore, *E. ovinoidalis* and *E. faurei* are recognized to inflict serious pathological changes in lambs (Abakar, 1996).

In the present study, in Amprolium-treated group the oocysts counts decreased to almost zero by day 14 post treatment. The percentage reductions in faecal oocysts counts were >98% and it is in line with that of Ross (1968) who observed that 50-62.5 mg/kg Amprolium given to sheep had good prophylactic effect against small ruminants coccidiosis.

Sulphadimidine treatment revealed efficacies of 61.89%, 80.39% and 93.89% on days 1, 2 and 14 post treatment, respectively. The effect of sulphadimidine on oocyst counts reduction reported here was strongly supported by the findings of Foster *et al.* (1941). The authors showed that sulphaquidine given at a dose rate of 2 g/kg for 6 days suppressed oocysts output in subclinical coccidial infection of sheep and goats. The reduced efficacy for sulphadimidine treatment on day 21 and 28 could be related to the short duration of medication in this practiced study (3 days). The difference in efficacies of the two drugs recorded between days 1-14 might be related to effect of route of administration of the selected anticoccidial drugs used. Several researches reported on different effects of other anti-coccidial drugs on the reduction of faecal oocysts counts (Abakar, 1996; Gregorey *et al.*, 1983; McDougald *et al.*, 1978). They have shown that Monensin treatment drastically reduced oocysts output in ewes over pregnancy / lactation period and also in lambs.

sheep and goats owners, in the area of this study, frequently drench their animals with anthelmintics to control helminth infections with no consideration being given to any concurrent infections with coccidia. This trend is likely to be a contributory factor in the failure of many helminths control programmes on pasture and in intensively managed farms.

Coccidia are ubiquitous parasites. It is impossible under natural conditions to prevent sheep from harbouring at least a few oocysts, so prevention of coccidiosis depends mainly on eliminating the source of infection. The most obvious initial source of infection is ewe. Coccidial

oocysts shed by ewes then cycle through lambs leading to a rapid build up of oocysts and environmental contamination. Therefore, effective control programmes must include changes in management hygienic standard and should not rely on medication alone.

#### Acknowledgements

This work was supported by a grant from Faculty of Veterinary Science, University of Nyala. The authors would like to thank the animal attendant Mr. Abakar for his assistance in management of the experimental animals.

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