

# Comparative Efficacy of Amprolium, Toltrazuril and Neem Leaf Powder against Caprine Coccidiosis

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## ABSTRACT

Coccidiosis is commonly observed in kids shortly after weaning because of the stress due to sudden separation from their dam. The objective of the study was to assess the comparative efficacy of amprolium, toltrazuril and neem leaf powder against caprine coccidiosis. In the present study, based on oocyst per gram (OPG) values, it was found that toltrazuril is more efficacious than amprolium as reduction in OPG was higher in toltrazuril treated kids (97.81%) when compared with amprolium treated kids (95.83%). The efficacy of neem leaf powder was recorded as 57.62%. Significantly higher ( $p < 0.05$ ) gain in body weight was recorded in toltrazuril and amprolium treated kids whereas non-significant changes were observed in neem leaves treated kids.

**Keywords:** Body weight gain, Coccidiosis, Efficacy, Kids, oocyst per gram (OPG).

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## INTRODUCTION

Coccidiosis is one of the most ubiquitous and economically important diseases of the goats. It causes severe economic losses to goat production by affecting growth of kids during their early growth phase (Agyei *et al.*, 2004). Several drugs were effective to treat and control coccidiosis in goats, including amprolium (Young *et al.*, 2011) and toltrazuril (Mundt *et al.*, 2009). With limited success neem leaf powder was found to be cheap, effective and economic substitute for treating and controlling caprine coccidiosis (Premaalatha *et al.*, 2016). The present study was conducted with the objective to evaluate the comparative therapeutic efficacy of toltrazuril, amprolium and neem leaf powder in goats naturally infected with coccidiosis.

## MATERIALS AND METHODS

The study involved 24 naturally infected kids of 3–6 months of age (OPG count  $> 500$ ) and they were divided into 4 groups each having 6 kids. Animals of group-A were treated with amprolium @ 50 mg/kg body weight orally once a day for 5 days. Animals of group-B were treated with toltrazuril @ 20 mg/kg body weight once orally. Animals of group-C were treated with neem leaf powder @ 0.5 gm/kg body weight once orally for a period of 5 days. Animals of group-D were kept as healthy control. Freshly passed or rectal faecal samples of kids were collected in individual numbered polythene bags. These faecal samples were taken to the laboratory at the earliest for further examination on ice. Qualitative examination of faecal samples (flotation and sedimentation techniques) was performed for detection of coccidian oocysts (Soulsby, 1982). The OPG of faeces were recorded on day 0, 7, 14, 21 and 28. The body weight gain was recorded on day 0 and 28. Efficacy of the drug was ascertained

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on the basis of percent reduction in OPG and growth performance. The data obtained in the present study were statistically analyzed using completely randomized design (CRD) as per the method, described by Snedecor and Cochran (1994).

## RESULTS AND DISCUSSION

The mean OPG of amprolium treated kids at day 0 was  $4800.00 \pm 278.09$  while on day 7, 14, 21 and 28, was  $341.67 \pm 61.12$ ,  $216.67 \pm 66.67$ ,  $208.33 \pm 66.35$  and  $200.00 \pm 61.91$ , respectively (Table 1). Significant decrease ( $p < 0.05$ ) in OPG count was recorded on day 7 whereas non-significant decrease was observed from day 7 to 28. The mean OPG of toltrazuril treated kids at day 0 (before treatment) was  $4200.00 \pm 304.41$  while on day 7, 14, 21 and 28, was  $150.00 \pm 42.82$ ,  $116.67 \pm 30.73$ ,  $100.00 \pm 25.82$  and  $91.67 \pm 27.13$ , respectively. In this case also, there was significant decrease ( $p < 0.05$ ) in OPG count on day 7 post-treatment and subsequently

**Table 1:** Mean values ( $\pm$  SE) of OPG and body weight gain after treatment in kids

Observations (day)	Groups		
	A	B	C
0	4800.00 <sup>ab</sup> $\pm$ 278.09	4200.00 <sup>ac</sup> $\pm$ 304.41	4916.67 <sup>aA</sup> $\pm$ 351.58
7	341.67 <sup>bb</sup> $\pm$ 61.12 (92.88)	150.00 <sup>bc</sup> $\pm$ 42.82 (96.42)	3866.67 <sup>bA</sup> $\pm$ 278.89 (25.02)
14	216.67 <sup>bb</sup> $\pm$ 66.67 (95.49)	116.67 <sup>bc</sup> $\pm$ 30.73 (97.22)	3583.33 <sup>bca</sup> $\pm$ 341.97 (27.12)
21	208.33 <sup>bb</sup> $\pm$ 66.35 (95.66)	100.00 <sup>bc</sup> $\pm$ 25.82 (97.62)	2666.67 <sup>cdA</sup> $\pm$ 327.28 (45.76)
28	200.00 <sup>bb</sup> $\pm$ 61.91 (95.83)	91.67 <sup>bc</sup> $\pm$ 27.13 (97.82)	2083.33 <sup>dA</sup> $\pm$ 276.18 (57.63)
Mean values ( $\pm$ SE) of body weight (kg) after treatment in kids			
0	8.21 <sup>bb</sup> $\pm$ 0.02	8.12 <sup>bb</sup> $\pm$ 0.02	8.06 <sup>bb</sup> $\pm$ 0.02
28	9.91 <sup>ab</sup> $\pm$ 0.02	10.11 <sup>ab</sup> $\pm$ 0.01	8.12 <sup>bc</sup> $\pm$ 0.05

Means with different lower-case superscripts in column and upper-case superscripts in row differ significantly at ( $p < 0.05$ ). Figures in parenthesis are per cent reduction in OPG count

non-significant decrease from day 7 to 28 was observed. The mean OPG count in neem leaf powder treated kids on day 0 was  $4916.67 \pm 351.58$  while on day 7, 14, 21 and 28, was  $3866.67 \pm 278.89$ ,  $3583.33 \pm 341.97$ ,  $2666.67 \pm 327.28$  and  $2083.33 \pm 276.18$ , respectively. After treatment, the significant decrease ( $p < 0.05$ ) in the OPG count was observed throughout the study period of neem leaf powder treatment.

Toltrazuril was found to be effective in treatment of caprine coccidiosis as 97.81% reduction in mean OPG count in the present study. These findings agree with Iqbal *et al.* (2013), Rehman *et al.* (2011) and Mundt *et al.* (2009). The effectiveness of toltrazuril is attributed to its effect against all intercellular stages (schizogony and gamogony) of eimeriosis (Balicka-Ramisz 1999). Subsequently, Mundt *et al.* (2003) reported treatment of coccidiosis in calves by toltrazuril during the prepatent period (metaphylactic treatment) produced high anticoccidial effect.

Amprolium and neem treated kids showed 95.83 and 57.62% reduction of mean OPG counts, respectively. These findings are in concurrence with Young *et al.* (2011), Gibbons *et al.* (2016) in amprolium treated kids and Affian *et al.* (2017) and Dkhil *et al.* (2013) in kids treated with neem extract. The low activity of neem leaf powder observed in the present study could be due to low amount of anticoccidial compounds in neem leaves. Adamou *et al.* (2016) also opined that, the neem leaf and seed are less effective against coccidia.

Significant body weight gain in group A and B was observed at the end of 28<sup>th</sup> day whereas non significant increase in body weight was noted in neem leaf treated group (Table 1).

In the present study significantly higher ( $p < 0.05$ ) gain in body weight was recorded in toltrazuril and amprolium treated kids whereas non significant changes were

observed in neem leaf treated kids. Findings of the present study corroborate with the findings of Iqbal *et al.* (2013), Adamou *et al.* (2016) and Affian *et al.* (2017). The coccidiosis caused reduced body weight partly due to fluid loss and reduced feed intake and malabsorption (Dauguschies and Najdrowski, 2005).

Radostitis *et al.* (1994) stated that coccidiostat must be given early in the life cycle of the coccidia to suppress the development of life cycle of the parasite. As per Le Seuer *et al.* (2009), treatments with toltrazuril found effective against coccidia in lambs. Moreover, Radostitis *et al.* (1994) stated that the susceptibility to coccidiostats varied with the different stages of life cycle of *Eimeria* when the drug is given during the susceptible stage (before 13–15 days). However, drugs given after 16–17 days appear to be less effective. Interaction between the drug and timing of the treatment, suggested that toltrazuril (20 mg/kg BW orally once) on first day of treatment is the most effective way to overcome eimeriosis in goat kids.

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