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Albendazole and Triclabendazole Used as Treatment for Fasciolosis in Sheep

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ABSTRACT

The effects of Albendazole and Triclabendazole on 12 adult Pelibuey ovines infected by *Fasciola hepatica* in the province of Camagüey, Cuba, were evaluated. A reduction and fecal egg count test was performed. Two groups of animals were made for critical study. On day 0 (D0), the animals in group 1 were given Albendazole orally, and group 2 received Triclabendazole. The fecal samples were collected (rectal) on days 0 (D0), 14 (D14), and 28 (D28), after treatment. The McMaster technique was used for *F. hepatica* egg count using a $ZnCl_2$ solution (1.5 g/ml), at 10 eggs per stool gram. The group's mean results first, and the egg reduction per cent later, were calculated. On D14, 98.17 % egg reduction was observed in group 1, and 79.58 % in group 2. However, on D28, group 1 underwent 33 % reduction, whereas group 2 experienced 90.39 %. The treatment using Triclabendozole was more effective for *F. hepatica*.

Keywords:*trematode, parasite,* F. hepatica*, egg, resistance*

INTRODUCTION

Fasciolosis is a parasite infection that mainly affects bovines, ovines, caprines, and humans (Fairweather, 2011). The disease varies notably, depending on the geographical areas. These parasites can live throughout the year if factors like agricultural development, nutritional deficiencies, grass height, immune and nutritional status of the final host, presence of the middle host, and existing infecting forms in the environment, are favorable. Several negative effects by *Fasciola hepatica* have been reported in Cuba on bovines and ovines. It was the most widespread disease during a five-year period, causing huge economic losses in central Cuba (Reinaldo, 2002), according to slaughterhouse records, and seized livers (Ido, 2002).

Animal production in Cuba is hampered, among other causes, by this trematode. Accordingly, new strategies to control *Fasciola hepatica* are essential to increase livestock production. It is important to know the efficacy of antiparasitic medication before application in herds. To control parasite infection, Albendazole and Triclabendazole (Keyser *et al.*, 2009), were used. The purpose of this study is to evaluate the efficacy of Albendazole and Triclabendazole on ovines infected naturally by *F. hepatica.*

MATERIALS AND METHODS

A critical test was made on a farm near the University of Camagüey, Cuba, according to the World Association for the Advancement of Veterinary Parasitology (WAAVP) Guidelines (Lyons *et al.*, 1996). As part of the test, twelve adult Pelibuey bovines were split in two groups. On day 0 (D0), the animals in group 1 were given 10 mg/kg of Albendazole orally; the animals in group 2 received 10 mg/kg of Triclabendazole. Fecal egg count reduction test (HPG) was made. Rectal samples were collected on days 0 (D0), 14 (D14), and 28 (D28), after the treatment. The McMaster technique was used for *F. hepatica* egg count using a $ZnCl_2$ solution (1.5 g/ml), at 10 eggs per stool gram. Calculations were made of the group/stage mean results, first, and then the egg reduction per cent. Graph Prism software was used for statistical analysis. Simple ANOVA was performed, and the group's mean difference was determined by the Student Newman-Keuls Multiple Comparison test.

RESULTS AND DISCUSSION

On D14, 98.17 % egg reduction was observed for group 1 (Albendazole), and 79.58 % for group 2 (Triclabendazole). However, on D28, group 2 had 90.39 % egg reduction; whereas group 2 showed 33 % (see Figure). These results are similar to a study made by Stojevic *et al.* (2005), in Bolivia. The treatment with Triclaben-

dazole ensured more than 90 % egg reduction in weeks 2-8 after the treatment ($P < 0.05$), but drug resistance was clearly observed for Albendazole, as egg reduction was below 50 % in the weeks following the treatment. In the second herd,anthelmintic resistance to Triclabendazole was observed, with less than 65 % oviposition after treatment; whereas in the group treated with Albendazole, oviposition decreased less than 60 % in the first 4 weeks after the treatment. However, no differences were observed in week 7 in terms of oviposition in the control group (Laverde, 2007). One sheep in the control group of the second herd was sacrificed in week 7, due to severe acute Fasciolosis, but the animal data were not considered, including Fasciola counts.

So far, there are no resistant reports of *Fasciola hepatica* in Cuba. Over evaluation of this study's efficacy, on D14, Triclabendazole had lower Fasciolitic activity ($P < 0.05$) than Albendazole. It was different on D28, because Triclabendazole was significantly more efficient. Another study reported that Triclabendazole was very active against adult and immature forms of the trematode (Fairweather, 2005), making it the the most widely used medication to control fasciolosis. However, the loss of efficacy of Triclabendazole may occur under certain circumstances, mainly due to the wrong treatment or inadequate dose administration by farmers, without specialized veterinary assistance (Ortiz *et al.*, 2011). Internationally, a steady increase in anthelmintic resistance has been observed in ruminating livestock; hence, new preparations must be tested with the already existing medication (Boray *et al.*, 1983; Fairweather, 2005). However, in Cuba there are no reports on resistance. Albendazole resistance by ovine parasites has been reported in New Zealand (Leathwick *et al.*, 2006; Waghorn *et al.*, 2006). In Chile, Australia, and the Netherlands Triclabendazole resistance has been reported for *Fasciola hepatica* (Laverde, 2007; Overend and Bowen, 1995; Moll *et al.*, 2000; Gaasenbeek *et al.*, 2001).

Other studies in Bolivia (Villegas, 2012) also showed the efficacy of Triclabendazol against *F. hepatica*, using 10 mg/kg of Albendazole and 10 mg/kg of Triclabendazole orally. The animals in the study remained in their grasslands. In this study, the same or similar doses used by Mezo *et al.* (2004); Mezo *et al*. (2008); Flanagan *et al.* (2011) were used. The animals also remained in the grasslands; efficacy was observed. Moreover, Albendazole was effective to control *F. hepatica*, only to D14. However, the presence of immature trematodes at the time of parasite disinfection must not be excluded as the cause for an increase in the number of eggs on D28. Albendazole is a fasciolicide that acts only against adult trematodes (Buchanan *et al.*, 2003), besides being a nematicide. *F. hepatica* eggs are known to be freed unevenly in the stools, with a high level of variability (Fairweather, 2011), which may also alter HPG.

CONCLUSIONS

Triclabendazole was efficacious against *F. hepatica* over a longer period than Albendazole.

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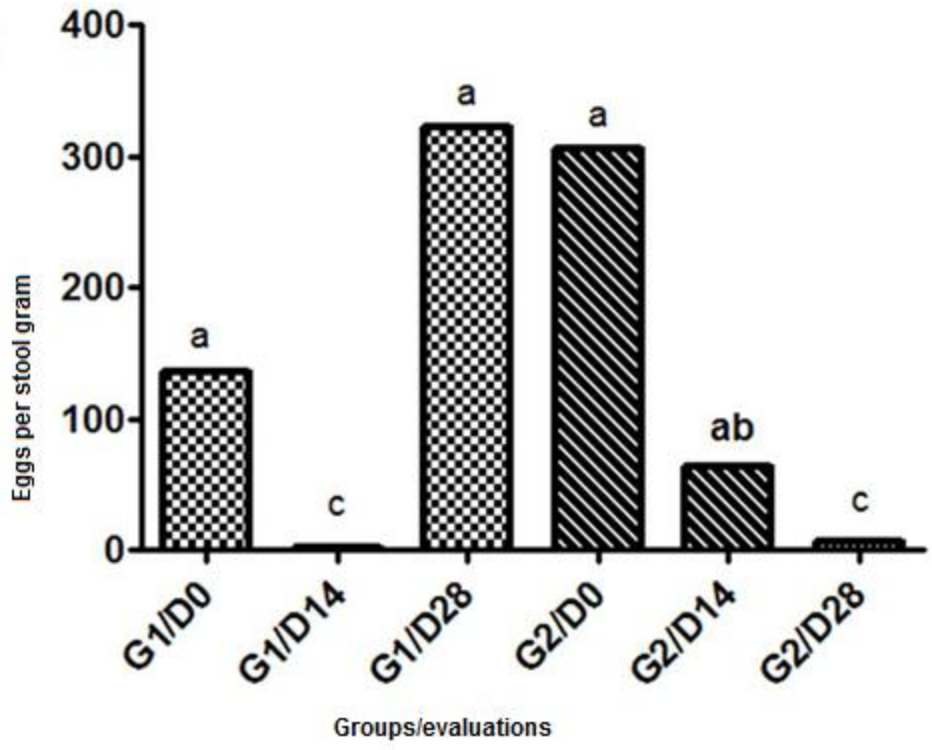

Evaluated groups: G1 Albendazole, G2 Triclabendazole
Daily treatment: D0, day 14 (D14), and day 28 (D28) ($P < 0.05$), Test of Multiple Comparison

Figure. Number of eggs per stool gram (HPG) after treatment with Albendazole ad Triclabendazole in adult sheep