Potential Use of *Erythroxylum moonii* (Batakirilla) as an Antihelminthes Herb for Controlling Worms in Goat

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Abstract

Helminth infections are a major cause for reduced productivity of goats. Antihelmethes are expensive and the use of them has found to develop multi drug resistance in animals and human as well. Therefore cheap, safe and effective anti helmenthes are required. In ethno-veterinary practices, many herbal materials are used as anti helminthes. Objective of this study was to determine the effectiveness of *Erythroxylum moonii* (Batakirilla) as an antihelminthes in goat. The experiment followed a completely randomized block design with four replicate goats per each treatment. Two groups were given *E. moonii* powder mixed with water either at 10 or 20% of their daily concentrate allowance. The goats in control group received Interzan (Levamesole HCl 30mg/ml and Oxaclosanide 60mg/ml mixture). A booster dose was given to *E. moonii* treated animals 21 days after the first dose. Daily feacal egg count of the each animal was determined using McMaster Chamber technique for 35 days, commencing 7 days before the treatment. The initial feacal egg count (EPG) (before the treatments) of the goats were as high as 3200. The feacal egg count of the goats given *E. moonii* 10 and 20% were significantly lower than those given Interzan. 20% *E. moonii* was more effective than 10%. The percentage reduction in feacal egg count for 10 and 20% *E. moonii* treated goats were as high as 75 and 53% compared to 25% found for Interzan treated group. The weekly live weight gain of the goat treated with Interzan (450g), 10% *E. moonii* (770g) and 20% *E. moonii* (1060g) were significantly different from each other. 10 and 20% *E. moonii* resulted in 41 and 135% weight gain increase compared to the weight gain of Interzan group. It is concluded that *E. moonii* acts as an effective anti helminthes and improves the weight gain in helmenth infested goats.

Keywords: Batakirilla, Interzan, weight gain, EPG value, concentration

Introduction

Goat management plays an important role in rural farming systems in Sri Lanka. Gastro intestinal helminthes infestation was a common condition in kids (89%), young goats (94%) and adult goats (84%) (Faizal *et al.,* 1999). It was estimated that 14 percent of the total cost of the government goat farms in Sri Lanka spent to control of nematode infestation (Jayasinghe and Abeyrathne, 1996). Kothalawala *et al.* (2007) showed that nematode infestation in goat caused a loss of over 230 million rupees to Sri Lankan goat industry. Losses were attributed to mortality in kids, reduction of milk production, low kidding index, high return rate, high rate of abortions and still births in infected goats. Indirect cost items included cost on veterinary services and drugs, decreasing quality in animal product such as carcasses and hides.

Antihelminthes drugs are widely used all over the world to control worm infestation and are a great burden on goat farmers, particularly those in developing countries. Meanwhile, the emergence of resistance to anthelmintic drugs is now a worldwide phenomenon. Increased awareness of consumers about drug residues that potentially enter the food chain has stimulated investigation into alternatives such as medicinal plants, to commercially available anthelmintics (Hussain, 2008).

Naturally produced plant antihelminthes offer an alternative and cheaper helminthes control method. They insure animal health and human food safety.

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Indigenous medicine uses some medicinal plants as antihelminthes compounds. The plant based antihelminthes show narrow and broad spectrum of activity, and they are low in cost, easily accessible, no residue in feaces and causes no environmental pollution problems. Akkari *et al.* (2008) have shown that *Acacia cyanophylla* Lindl. (Acacia), a tanniniferous shrub species, as a biological way to reduce gastro-intestinal parasites in lambs. Tariq *et al.* (2009) showed *Artemisia absinthium* crude extract and methanolic extracts were as effective as albendazole.

In Sri Lankan ethno-veterinary practices *E. mooni* (Batakirilla) is widely used as an antihelminthes material. Rahman *et al.* (1998) showed that *E. moonii* have antifungal against *C. albicans*. Using an *in vitro* study Eranga, (2011) compared the efficiency of medicinal plant extracts against helminthes in goats and found *E.moonii* was more effective than others. Objective of this study was to determine the *in vivo* efficacy of *E. moonii* as an anti helminthes in goat.

Materials and Methods

The plant parts were collected from Matara, Akuressa, Dikwella and Athuraliya areas. The collected plant materials were washed with distilled water and dried in shade for two days, sun dried for hours and subsequently oven dried at 50 °C for six hours. The dried leaves were ground to make a powder. The experiment followed a completely randomized block design with four replicate goats (2.5 - 3 months and 10- 15 kg) per each treatment. Two groups were given *E. mooni* powder mixed with water either at 10 or 20% of their daily concentrate allowance. The goats in control group received Interzan (Levamesole HCl 30mg/ml and Oxaclosanide 60mg/ml) mixture. The control treatment was provided only at 1st day and *Erythroxylum moonii* were provided for seven days. A booster dose was given to *Erythroxylum moonii* treated animals 21 days after the first dose. The booster dosage was provided for three days. During the experimental period 100 g of dairy max were provided for the each animal at the morning in each day. Grasses were provided *ad libitum.*

The fresh feaces samples were collected to polythene bags. Feaces were stored at 4 °C in refrigerator until egg count was made. Egg count was taken within a day of the collection. Daily feacal egg count of the each animal was determined using McMaster Chamber technique for 35 days commencing 7 days before the treatment. Salt flotation method was used to prepare the feacal solution for egg count calculation. The body weight of the each animal was measured weekly for the calculation of the weight gain of the animal. The data from the *in-vivo* screening and growth performance test were subjected to analysis of variance using SAS program. The means were compared with Duncan Multiple Range Test (DMRT) with 5% significant level.

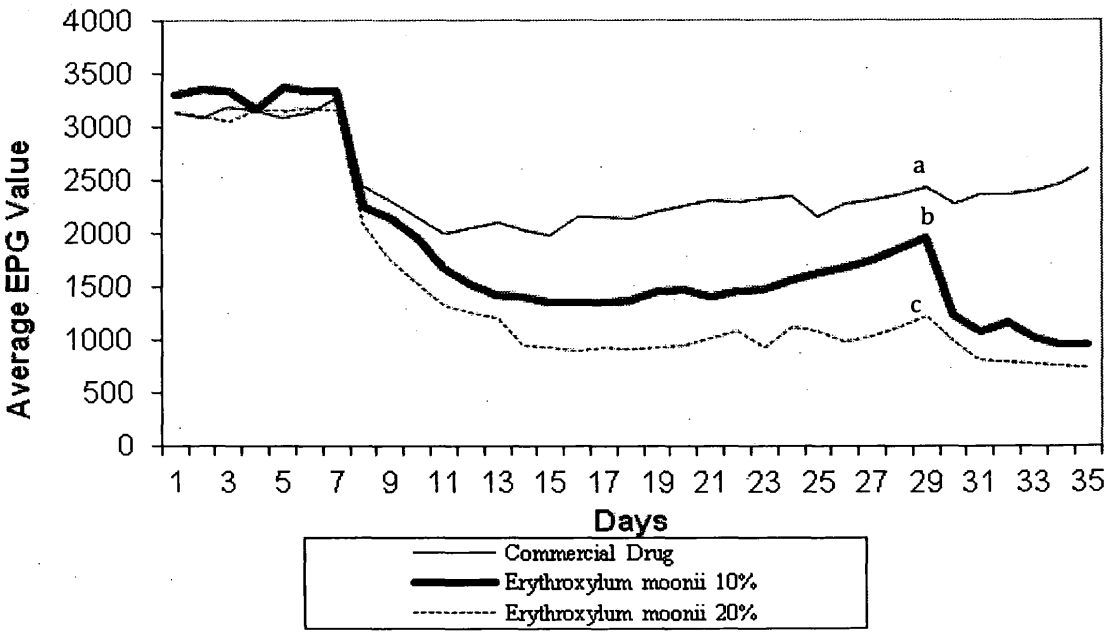
Results and Discussion

Feacal egg count (egg per gram) as affected by three anti helminthic treatments during the experiment is shown in Figure 1. The initial EPG values (before the treatments) of the goats were as high as 3200. Just before the booster dose, EPG counts of 10 and 20% *E. mooni* treated groups were around 1500 and 1000, respectively. The feacal egg count of the goats given *E. moonii* 10 and 20% were significantly lower than those given Interzan. 20% *E. moonii* was more effective than 10%. Interzan reduced the initial EPG value within four days and maintained at that level for next week. Subsequently EPG value started to increase gradually. In contrast, EPG value of 10% and 20% *E. Moonii* treated goats continued to decline 6 and 8 days, respectively. As in the case with Interzan, EPG count of the goats given 10% E. *Moonii* also commenced to increase after maintaining its lowest level for a few days. However, 20% *E. Moonii* maintained its efficacy relatively a longer period. Also, throughout the experiment, both *E. moonii* levels maintained a lower EPG level than Interzan. However it must be noted that, after successful reduction, rate of EPG increment of 10% *E. moonii* treated goats was higher than that of the goat treated with Interzan. The booster dose was effective and corrected the increasing EPG level of the *E. Moonii* treated goats. Further research extending for a longer duration are needed to determine whether EPG value of the goats given *E Moonii*, particularly 10% dose, could have increased to a level beyond that of the goats given Interzan, hadn't there been a booster dose. However, results of this experiment clearly show that at least for three weeks, *E. moonii* is more effective than Interzan. Findings of this study are contradictory to suggestions that efficacy of plant remedies are lower than (Githiori *et al.*, 2006) or similar (Tariq *et al.*, 2009) to anthelmintic drugs.

Akkari *et al.* (2008) showed that Accasia reduced the FEC by 15% compared to control. In contrast, the percentage reduction in feacal egg count for 10 and 20% *E. moonii* treated goats were as high as 75 and 53% compared to 25% found for Interzan treated group. This indicates among other herbal antihelminthics, *E. moonii* is more effective. Whether it is necessary to achieve very high efficacy depends on the economic considerations. Therefore, the most effective dose, duration of the treatment and the need of a booster dose should be determined after more detailed studies involving financial aspects as well.

Some of the active compounds of antihelminthes plants also contain anti-nutritional effects, such as reduced food intake and performance. Therefore, it is essential to validate the anti-parasitic effects of plant products, along with their potential anti-nutritional and other side effects (Githiori *et al.* 2006). The effectiveness of the *E. moonii* as an antihelminthes in goat is further supported by the weight gain data. The weekly live weight gain of the goat treated with Interzan (450g), 10% *E. moonii* (770g) and 20% *E. moonii* (1060g) were significantly different from each other. 10 and 20% *E. moonii* resulted in 41 and 135% weight gain increase compared to the weight gain of Interzan group. Faizal. (1999) showed that nematodes caused 37% weight gain reduction in goats. Therefore, the possible economic advantages of using *E. moonii* as an anthelmintic agent seem to promising. No feed refusal

Figure 1. Effects of Interzan, and two doses of *E. moonii* on feacal egg count of goats



or intake reducing was observed in this experiment. The results of this experiment prove that *E moonii* has no adverse effects on feed intake but improves the weight gain in helmenth infested goats while acting as natural anti helminthic agent.

References

Akkari H Darghouth MA and Ben Salem H 2008 Preliminary investigations of the anti-nematode activity of *Acacia cyanophylla* Lindl: Excretion of gastrointestinal nematode eggs in lambs browsing .cyanophylla with and without PEG or grazing native grass. Small Ruminant Research 74(1):78-83.

Eranga HGC 2011 *In vitro* efficiency of medicinal plant extracts for helminthes in goats A Bsc. Thesis Faculty of Agriculture University of Ruhuna

Faizal ACM 1999 A check list of parasites in Livestock in Sri Lanka: A review Veterinary Journal 42 (2):1-4

Githiori JB Athanasiadou S and Thamsborg SM 2006 Use of plants in novel approaches for control of gastrointestinal helminths in livestock with emphasis on small ruminants.Veterinary Parasitology 139(4): 308-320.

Hussain A 2008 Evaluation of anthelmintic activity of some ethnobotanicals, Phd thesis, Department of Parasitology, Faculty of Veternary science University of Agriculture Faisalabad Pakistan

Jayasinghe SR and Abeyratne Banda SK 1996 Fenendazole and Febental nematodes in goats in Sri Lanka Proceedings of the scientific sessions of 48 annual general meeting of the Sri Lanka Veterinary Association, Hotel Suisse Kandy

Kothalawala AKHM Fernando GKCN and Kothalawala H Estimation of economic losses on nematode infestation in goats in Sri Lanka Proceeding of the 13th International Congress in Animal Hygiene. PP.412-416

Rahman AU Khattak KF Nighat F Shabbir M Hemalal KD Tillekeratne LM 1998 Dimerictropane alkaloids from *Erythroxylum moonii*. Phytochemistry 48:377-383.

Tariq KA Chishti MZ Ahmad F and Shawl AS 2009 Anthelmintic activity of extracts of *Artemisia absinthium* against ovine nematodes. Veterinary parasitology 160(1): 83-88.