



## Combination of *Areca catechu* , *Sauropus androgynous* , and Mineral Block is Effective to control Nematode in Goats

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### Abstract

A study has been conducted to investigate the effect of two local herbs in Indonesia; *Areca catechu* nut and *Sauropus androgynous* leaf, combined with mineral block to treat gastro intestinal nematode in goats. *A.catechu* is well known to have anthelmintic property due to its alkaloid and tannin content, and *S.androgynus* also contains tannin, alkaloid and steroid that will enhance the anthelmintic property of those herbals. As many as 80 goats had been divided into 4 groups; 20 were treated with albendazole (Group A), 20 were given *A.catechu* and *S.androgynus* (Group B), 20 were given combination of *A.catechu*, *S.androgynus*, and mineral block (Group C), and 20 as negative control (Group D). The result revealed that herbal treatment showed significantly effective toward nematodes in gastro intestinal, demonstrated by declining egg worm of Group B and C. Body weight improvement and overall performance in Group C was higher compared to other groups. However, goats treated with albendazole showed slightly better results in the decreasing amount of egg worms found after treatment. Nevertheless, *A.catechu* and *S.androgynus* are potential anthelmintic herbal; combination with mineral block will enhance the anthelmintic activity. Therefore they are good options for treating helminthiasis in livestock.

*Keywords: helminthiasis, Areca catechu, Sauropus androgynous, mineral block, nematodes*

### Background

Although backyard goat farm production which supports animal protein is needed significantly in Aceh, it is still being underestimated as backbone of livelihood. There is endeavor to increase mutton production in Aceh, nevertheless diseases, especially intestinal parasitic disease are still big constraint to increase the production. Gastro intestinal nematode such as *Haemonchus spp*, *Bunostomum spp*, *Oesophagostomum sp* causes big economic loss in livestock in Indonesia. Although helminthiasis is rarely associated with high mortality, there are easily identifiable clinical signs, usually characterized by lower outputs of animal products, by-products, manure and traction, which all contribute to production and productivity losses. The problems associated with gastro intestinal parasitism are often classified as production disease which results in feed intake reduction and alteration of gastrointestinal motility leading to diarrhea

reduce protein retention and disturb mineral and water balance (Blackburn *et al.*, 1991).

Controlling helminthiasis by using benzimidazole group has been carried out for years (Kwa *et al.*, 1994; Chandra *et al.*, 2014); nevertheless helminthiasis case is still high in Aceh (Hambal *et al.*, 2013). Another constraint is resistance to anthelmintic, and to overcome this problem, herbal medicine is one of the alternative ways to treat infected animals. Using plant as medicines will have more benefits due to its low cost and easy to obtain. Betel nut (*Areca catechu*) has long been known to have anthelmintic properties due to its alkaloid content such as arecaine and arecoline which is poisonous and addictive. It has been used as narcotic-analgesic, sedative, and anti-depressant (Dar and Khatoon, 2000; Pichini *et al.*, 2003). Its tannin content has been reported to have anthelmintic property with the ability to bind to worm's cuticle that causes paralysis and death (Tiwow *et al.* 2013; Goswarni *et*

al. 2016). Another plant that has been used as anthelmintic is sweet leaf (*Sauropus androgynus*). This plant contains tannin, sterol, alkaloids, and flavonoids (Suprayogi and Meulen, 2000). Razali et al. (2004) has reported that ethanol and water extract of *S. androgynus* have the ability to suppress the number of worm eggs on infected goat significantly.

Besides medicinal plants, livestock also need nutrients to keep their body in good conditions. One of nutrient sources used to maintain health condition of goat is mineral blocks. Mineral blocks are made of urea molasses as supplement that can fulfill the minerals and vitamins for livestock. They are in a form of solid block where animals can lick the block, not swallow it. Previous experiment has reported that mineral block has positive impact on animal nutrition and body weight as well as in defense and immunity system (Subar and Block, 1990; Hosamani et al., 1998). The combination of all these elements would make perfect treatment for helminthiasis case.

### Materials and Methods

Eighty goats were prepared for the treatment, caged and fed ad libitum. The goats were obtained from local citizens and diagnosed with helminthiasis from clinical symptoms and fecal examination. Measurement of body weight was conducted four times before and after treatment to see if there is good impact on goat performance. The goats were divided into four groups (n=20), group A as positive control was given albendazole per os; group B was treated with 15 mg of *A.cathecu* powder, 7.5 gr of *S.androgynus* powder, and 50 gr of palm kernel cake for 35 days, group C was treated the same as group B, with addition of

mineral block also for 35 days (Ferasyi et al. 2016), and group D as negative control. The treatment was carried out in July-August. On day 36, second fecal examination was conducted again to see whether the treatment had positive effect and if the parasites were still present or not in the feces. At the end of the experiment, two goats of every group were slaughtered for post mortem examination. Parasites found were collected and identified.

### Results and Discussion

The aim of this experiment is to find alternative treatment to control helminthiasis in goat by using combination of plants which are easy to obtain yet effective in eradicating eggs, larvae, and adult worms. *A. catechu* has been used in curing helminthiasis due to its alkaloid and tannin properties, causing paralysis and death of the worms. *S. androgynus* is high in tannin, alkaloids, flavonoids, and sterol, which will potentiate the anthelmintic properties of the mixture.

The first fecal examination confirmed that all goats are infected by various parasites which are presented in Table 1. *Strongyl* eggs were found in most of the goats with prevalence rate around 80-100%. *Trichuris* and *Moniezia* eggs were found with much lower prevalence rate, which was around 10 - 30%. *Capillaria* and *Strongyloides papillosus* were also identified; with prevalence rate around 10 - 20%. These results indicated that the goats had bad health condition due to poor sanitation and bad parasite management.

Body weight of the goats before treatment was lower than normal, ranging from 15 – 18 kg, the hair was faint, turgor was medium, and the conjunctiva was pale and unhealthy.

Tabel 1. Parasites found in fecal examination before treatment

No.	Parasites	Infected goats in average				Prevalence Rate (%)			
		Group A	Group B	Group C	Group D	Group A	Group B	Group C	Group D
1.	<i>Strongyl</i>	2955	8100	5190	12210	100	80	95	100
2.	<i>Trichuris Sp.</i>	600	900	1800	600	10	10	30	30
3.	<i>Moniezia Sp.</i>	300	0	0	300	10	0	0	20
4.	<i>Capillaria Sp.</i>	300	0	0	600	10	0	0	20
5.	<i>Strongyloides papillosus</i>	300	0	0	600	10	0	0	20

After 35 days of treatment, second fecal examination was conducted on all goats to evaluate the effect of the treatment (Table 2). The results indicated that in group A as positive control, the worm eggs were declined significantly, only *Strongyl* and *S. papillosus* were detected with prevalence rate 20% and 10%, respectively. In group B and C, eggs of *Strongyl*, *Trichuris*, *Capillaria*, and *S.papillosus* were still present. In group B, the prevalence rate of

*Strongyl* was 35%, followed by *Capillaria* at 10%, and *S. papillosus* at 5%. In group C, prevalence rate of *Strongyl* was 25%, followed by *Trichuris* and *S.papillosus* at 5%. The worm eggs decreased substantially in both group B and C, indicated that the treatment had positive impact in eradicating the worms. In group D as negative control, the prevalence as well as worm burden was still high.

Table 2. Parasites found in fecal examination after treatment

No.	Parasites	Infected goats in average				Prevalence Rate (%)			
		Group A	Group B	Group C	Group D	Group A	Group B	Group C	Group D
1.	<i>Strongyl</i>	45	510	420	11850	20	35	25	100
2.	<i>Trichuris Sp.</i>	0	0	90	300	0	0	5	30
3.	<i>Moniezia Sp.</i>	0	0	0	300	0	0	0	20
4.	<i>Capillaria Sp.</i>	0	300	0	600	0	10	0	20
5.	<i>Strongyloides papillosus</i>	0	300	0	600	10	5	5	20

The post mortem examination of gastrointestinal (GI) tract detected some parasites which were not identified from fecal analysis. Data in table 3 indicates interesting findings regarding number of worm burden and the amount of eggs founded in GI tract after treatment. While the number of eggs in feces was relatively high, the number of worm in GI tract was

significantly reduced due to treatment of anthelmintic. It could be assumed that although the worm had been expelled from GI tract, yet the eggs of nematodes were still found in the intestine in big amount. However, in group D (negative control), the number of worm burden is consistent with the number of eggs found in feces.

Table 3. Parasites found in gastrointestinal tract of the goat after treatment

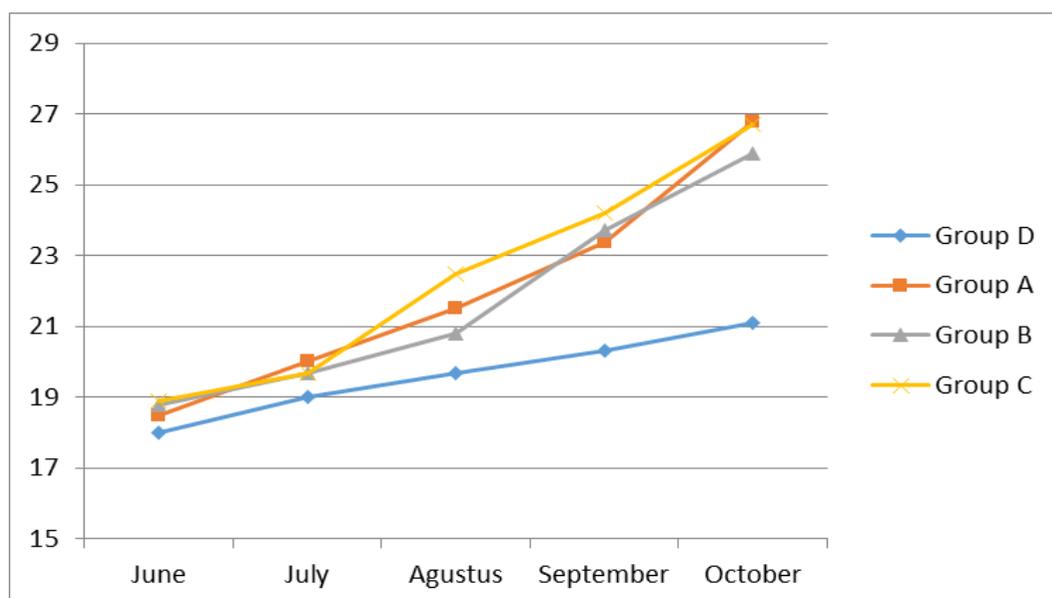
No.	Helminth	Average amount of parasites			
		Group A	Group B	Group C	Group D
1.	<i>Haemonchus</i>	1	2	1	96
2.	<i>Bunostomum</i>	1	1	1	87
3.	<i>Oesophagostomum</i>	2	0	1	117
4.	<i>Capillaria</i>	0	1	0	11
5.	<i>Strongyloides papillosus</i>	1	2	1	42
7.	<i>Trichuris</i>	0	0	1	5

Body weight of all goats in group A showed improvement after treatment, the average weight gain was 2.08 kg every month, the highest weight gain was occurred in the fourth month. In group B, the average weight gain was 1.78 kg, and in group C the average was 1.95 kg. Group D as negative control only have 0.78 kg average of weight gain every month. The weight gain of group C was higher compared to group B and D, however it was slightly lower compared to group A (Figure 1). This indicated that the addition of mineral block as food

supplement gave a better improvement in weight gain, compared to the treatment of *A.catechu* and *S.androgynus* alone.

This is not surprising since mineral block as food supplement will faster the recovery process, improve body weight and health performance, and eventually will increase selling value. It is believed that micro nutrient like mineral helps the recovery process in parasitic burden animal. Thus it is recommended to include mineral block in helminthiasis treatment for more comprehensive results.

Figure 1. Body weight gain after treatment



**Conclusion**

Treatment using *A.catechu* nut and *S.androgynous* leaf demonstrated positive

effect in treating helminthiasis, showed by decreasing number of worm eggs found on fecal examination after treatment for Group

B and C. Combination with mineral block on group C expanded the good impact in overall health conditions; body weight of goats increased rapidly and showed good performances. The combination of *A.catechu* nut, *S.androgynous* leaf powder plus mineral block has similar effectivity in term of weight gain, with albendazole.

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