Anthelmintic Effects of Betel Nut and Tamarind Seeds to *Ascaradia galli* Worms

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Abstract:
The main focused of the study is to evaluate the Anthelmintic efficacy of the Betel nut and Tamarind seeds to *Ascaradia galli* worms in vitro in comparison to commercial anthelmintic. The study was distributed to 8 treatments, which consisted of 5, 10 and 15 grams of betel nut and tamarind seeds, commercial anthelmintic control and negative control treatment. The motility time, changes in sizes and microscopic changes at 24, 48 and 72 hours was observed. Results revealed that Betel nut at 15 grams were the most effective as the *Ascardia galli* worms were dead at 48 hours of observation compared to other treatments. Therefore, using Betel nut at 15 grams was comparable to commercial anthelmintic treatment and it is recommended to utilize to eliminate and as worm killer to *Ascaradia galli*.

Keywords: Anthelmintic, *Ascaridia galli*, Betel nut, Tamarind seeds, Motility.

Introduction

*Ascaradia galli* in Poultry is not uncommon in the countries were poultry raising is notorious. For a year’s *Ascaradia galli* worms has been a rampant problem. *Ascaridia galli* is a parasitic roundworm belonging to the ascarids. They occur worldwide and are very common in chickens. Infection by *Ascaridia galli* can occur in chickens of all ages, but the greatest degree of damage is often found in young birds under 12 weeks of age. Heavy infection by *Ascaridia galli* is characterized by retarded growth, emaciation, anorexia, anemia, diarrhea, dehydration, and decreases in body weight and egg production. Hence this study sought to measure the anthelmintic effects of Betel nut and Tamarind seeds against *Ascaradia galli* worms

Materials and Methods

The research employed the factorial completely randomized design and utilized a total of 40 *Ascaradia galli* adult worms allotted to 8 treatments as follows, T1- no dewormer applied, T2- Commercial anthelmintic, T3- 5 grams Betel nut, T4- 10 grams Betel nut, T5- 15 grams Betel nut, T6- 5 grams Tamarind Seeds, T7-15 grams Tamarind Seeds and T8 - 15 grams Tamarind Seeds. Pre width and Length was conducted before the administration of the different treatment. Betel nut and Tamarind seeds were weighed into 5, 10 and 15 grams mixed with 80% ethanol for 48 hours to get the concentrated extracts. Using a muslin cloth and Whatman no. 1 filter paper, the extract was double-filtered and was concentrated using a rotary evaporator machine. The extract was stored at 4°C until use.
Right after the parasites were exposed to the different treatments. The time of motility of the parasites and microscopic changes was recorded at 24, 48, and 72 hours of observations, the pre and post width and length of the parasites was also measured.

The motility of the parasites was obtained using the scoring criteria:

Score 3- whole body moving:
Score 2- 50% body moving:
Score 1- grossly immobile but microscopically alive:
Score 0- dead.

All parasites in all treatments were scored individually at 24, 48, and 72 hours intervals.

The interpretation of the parasite's motility to mortality was measured following the Mean score used by Yamson E. et.al (2019)

**Results**

**Motility Analysis of adult *Ascaridia galli***

The effect of betel nut and tamarind seed on the motility of the *Ascaridia galli* was recorded. The mean motility scores of the different treatments were calculated and were the basis of the efficacy interpretation. Changes in the microscopic structure of the *Ascaridia galli* were described in comparison with normal structure. This was done in all *Ascaridia galli* adult samples of the different treatments.

Table 1 reflects the efficiency of the different natural anthelmintics in terms of motility analysis via the In vitro method. Results show that *Ascaridia galli* at T2, T4, and T5 (commercial anthelmintic, Betel nut at 10 and 15 grams) obtained the highest mean of 2, thus means that 50% of the body of the *Ascaridia galli* was paralyzed and only 50% of the body was moving within 24 hours of observation, while the other treatment obtained the mean of 3 which means that the whole body of the *Ascaridia galli* was still fully moving.

This implies that the betel nut at 10 grams and 15 grams had the same effect as commercial anthelmintic at 24 hours of observation at 48 hours, the *Ascaridia galli* in T2 (commercial anthelmintic) obtained a mean of 0, which means that *Ascaridia galli* were already dead, on the other hand, the T5 (Betel nut at 15 grams) with a mean of 1, were grossly immobile but microscopically alive, while the *Ascaridia galli* assigned to T3, T4 and T8 (Betel nut at 5 and 10 grams, Tamarind seed at 15 grams) with a mean of 2 was in the state of 50% body moving, lastly, the T1, T6, and T7 (No dewormer applied, Tamarind seed at 5 and 10 grams) obtained the mean of 3 which means the whole body of the adult parasites assigned into this treatment was still moving.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>24 Hours</th>
<th>48 Hours</th>
<th>72 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1-No Dewormer Applied</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2- Commercial Anthelmintic</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>T3- 5 grams (Betel Nut)</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T4- 10 grams (Betel Nut)</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>T5- 15 grams (Betel Nut)</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>T6- 5 grams (Tamarind Seed)</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>T7- 10 grams (Tamarind Seed)</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>T8- 15 grams (Tamarind Seed)</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Legend:** 3 - Whole body moving; 2 - 50% body moving; 1 - Grossly immobile but microscopically alive; 0 - Dead
During the 72 hours of observation, the *Ascaridia galli* assigned to T2 and T5 were completely dead as they obtained the mean of 0, while the T3, T4, and T8 were grossly immobile but microscopically alive as represented by the mean of 1. For the T6 and T7 *Ascaridia galli* was 50% body moving while the T1 was observed as completely whole body moving.

*Ascaridia galli* Pre and Post Size

Table 2 shows the measurement of Adult parasites (*Ascaridia galli*) as affected by the different anthelmintic.

The average pre-width of *Ascaridia galli* had the highest mean of 0.73 of T2 (commercial anthelmintic), followed by T1 (No dewormer applied), T6 and T7 (Tamarind seed at 5 and 10 grams), T4 and T8 (Betel nut at 10 grams and Tamarind seed at 15 grams) while the T5 accumulated the lowest mean of 0.50. Analysis of variance revealed no significant result. This proves that before the administration of the different treatments the size of the adult parasites was uniform.

After the administration of the different treatments, the post-width of the adult parasites was gathered at 72 hours of observation. The result was that T2 and T5 (commercial anthelmintic and Betel nut at 15 grams) had the lowest mean of 0.23d, followed by T4 (Betel nut at 10 grams) with a mean of 0.33cd, T8 (Tamarind seeds at 15 grams) with a mean of 0.40b, T3 (Betel Nut at 5 grams) with a mean of 0.53abc, T7 (Tamarind seed at 10 grams) with a mean of 0.57ab, T6 (tamarind seed at 5 grams) with a mean of 0.60ab, while the T1 (no dewormer applied) earned the highest mean of 0.70a. However, the table shows also that between T2 and T5, T4 and T8, T6 and T7 had no significant difference in between.

On the Pre length of the *Ascaridia galli* the highest mean of 40.33 was revealed under T2, T3, T5, and T6, followed by T1 with a mean of 40.00, T4, and T8 with a mean of 39.00 and T7 with the lowest mean of 38.33. Analysis of variance disclosed no significant result among different treatments. This shows that the length of *Ascaridia galli* before treatment application were uniformed.

Table showed also the post length of the *Ascaridia galli*, where the T1 (No dewormer applied) acquired the highest mean of 40.00a, precede by T6 (Tamarind seed at 5 grams) with a mean of 39.33a, T7 (Tamarind seed at 10 grams) with a mean of 36.67ab) T3 (Betel nut at 5 grams) with a mean of 35.00ab, T8 (Tamarind seed at 15 grams) with a mean of 34.67ab, T4 (Betel nut at 10 grams) with a mean of 29.67b, T5 (Betel nut at 15 grams) with a mean of 16.33c while the T2 (Commercial anthelmintic) obtained the lowest mean of 15.67c.

Analysis of variance reveals a highly significant difference among treatments. However, the table also shows that between T2 and T5 had no significant difference in between, this reveals that the efficacy of betel nut at 15 grams and commercial anthelmintic was comparable in terms of length adjustment of *Ascaridia galli* within 72 hours.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Pre Width(mm)</th>
<th>Post width (mm)</th>
<th>Pre Length (mm)</th>
<th>Post Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interaction between kind of anthelmintic and different levels</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1-No Dewormer Applied</td>
<td>0.70</td>
<td>0.70a</td>
<td>40.00</td>
<td>40.00a</td>
</tr>
<tr>
<td>T2- Commercial Anthelmintic</td>
<td>0.73</td>
<td>0.23d</td>
<td>40.33</td>
<td>15.67c</td>
</tr>
<tr>
<td>T3- 5 grams (Betel Nut)</td>
<td>0.53</td>
<td>0.53abc</td>
<td>40.33</td>
<td>35.00ab</td>
</tr>
<tr>
<td>T4- 10 grams (Betel Nut)</td>
<td>0.60</td>
<td>0.33cd</td>
<td>39.00</td>
<td>29.67b</td>
</tr>
<tr>
<td>T5- 15 grams (Betel Nut)</td>
<td>0.50</td>
<td>0.23d</td>
<td>40.33</td>
<td>16.33c</td>
</tr>
<tr>
<td>T6- 5 grams (Tamarind Seed)</td>
<td>0.63</td>
<td>0.60ab</td>
<td>40.33</td>
<td>39.33a</td>
</tr>
</tbody>
</table>
Table 1 shows the recorded mean motility time of *Ascaradia galli* in all treatments. In 15 grams of Betel nut it was found to be highly effective against *Ascaradia galli* with a mean motility time average of 72 hours, categorized as completely dead, grossly immobile but microscopically alive for 48 hours, and 50% body moving for 24 hours respectively. The results showed that 15 grams of betel nut had no significant difference from commercial anthelmintic. This implies that Betel nut at 15 grams can be a substitute for commercial anthelmintic to destroy *Ascaradia galli* within 72 hours.

All *Ascaradia galli* under T3, T4, and T8 (betel nut at 5 and 10 grams, tamarind seed at 15 grams) have sudden paralysis then became immobile and stopped moving upon exposure to the extract treatments within 72 hours however they were not completely dead as they were microscopically alive.

On the other hand, all levels of tamarind seeds were found to be ineffective based on the results of observation within 72 hours, it was shown that Treatment 8 (Tamarind seed at 15 grams) exhibited paralysis however it was determined that the *Ascaradia galli* in the treatment is still alive, while the T6 and T7 upon exposure remained to be active for about 72 hours.

More so all of the treatments show a distinct adjustment in the width and length of the *Ascardia galli*.

## Conclusion

The Betel nut at 15 grams level had the highest efficacy based on the recorded mean motility time and changes of the sizes of the *Ascaradia galli*, while the Betel nut at 5 and 10 grams levels and Tamarind seeds at 15 grams levels evidently marked changes in the motility of the *Ascaradia galli* however it was not enough to make them dead within 72 hours of observation. On the other hand, the tamarind seeds at 5 and 10 grams were ineffective at all times although changes were observed microscopically. Furthermore, all of the treatments had changes in terms of the width and length of the *Ascaradia galli*.

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## Conflict of interests

No conflict of interest.

## References
