
Effect of Neem and Tamarind Leaves as Anthelmintic in Cattle

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Abstract: Neem (*Azadirachta indica*) and Tamarind (*Tamarindus indica*) leaves are used worldwide for their wide range of medicinal properties like antibacterial, antiprotozoal, hepato-protective and other properties. The present study was conducted to observe the effects of Neem (*Azadirachta indica*) and Tamarind (*Tamarindus indica*) leaves as anthelmintics in cattle. Animals were selected and grouped into four groups where Group A was considered as control, Group B was treated with grinded Neem leaves, Group C was treated with grinded Tamarind leaves and Group D was treated with both grinded Neem leaves and Tamarind leaves and the efficacy rate was calculated. It was observed that Neem and Tamarind leaves had a significant effect on the number of fecal eggs count. On day 0 average egg counts of A, B, C and D were recorded 7.50 ± 0.45 , 7.80 ± 0.50 , 7.95 ± 0.38 and 8.00 ± 0.52 respectively. However, on the 15th-day number of eggs was significantly decreased ($P \leq 0.05$) in treatment groups. Moreover, considering efficacy it was observed that Neem: Tamarind (1:1) was more efficient (68.15%) than individual Neem (29.93%) and Tamarind (42.67%). Hence, Neem and Tamarind leaves were found effective as anthelmintics in cattle.

Keywords: Neem, Tamarind, Anthelmintic, Cattle

1. Introduction

In Bangladesh, many people directly or indirectly depend on dairy farming, beef fattening, sheep and goat farming for their livelihood. Protein is very essential for the proper growth and development of the human being. Meat and milk from this sector meet that protein demand. However, according to the socio-economic conditions of the country, the knowledge of farmers is very little because most of them are not properly trained for modern livestock farming. Sometimes various bacterial, viral, fungal and parasitic disease occurs in the livestock sector, as a result, increasing the mortality rate and decreasing production performance. Gastrointestinal (GI) parasitic infections are one of the major constraints for the profitable dairy industry in Bangladesh. Most of the farmers use chemical anthelmintic for controlling parasitic infection,

but these are generally expensive and not available to those farmers who live in the rural area of the country. By using chemical anthelmintic and maintaining withdrawal period economic losses occur. Moreover, by using various types and dosages of chemical anthelmintic, the development of resistance in helminths to various anthelmintic compounds will worsen the condition. To avoid the condition, the use of medicinal plants as anthelmintic in cattle remains of great scientific interest [1-3]. Neem (*Azadirachta indica*) and Tamarind (*Tamarindus indica*) are the indigenous plants of the Asian subcontinent known for their useful medicinal properties since ancient times [4-6]. Neem and Tamarind have attracted worldwide prominence for their varieties of medicinal properties like antibacterial, antiprotozoal, hepato-protective and many other properties without showing any adverse effects [3, 7, 8]. The Neem tree (*Azadirachta indica*) from the family

Meliaceae [9-11] contains azadirachtin which is a biologically active compound, found in its seeds, leaves and bark [12-14] which is responsible for its varieties of medicinal uses [7, 10, 12]. Tamarindus indica is a tree under the family Caesalpiniaceae whose different parts are used as traditional medicine as an analgesic [15], anti-inflammatory [16], diuretic [17], febrifuge [18], and anthelmintic, antifungal and in gastrointestinal problems [19-21]. Hence, the present study was undertaken to observe the effects of Neem and Tamarind leaves as anthelmintics in cattle.

2. Materials and Methods

2.1. Statement of the Experiment

The experiment was accomplished in Belkuchi Upazila of

Sirajganj district under the Department of Physiology, Biochemistry and Pharmacology, Sirajganj Government Veterinary College, Sirajganj.

2.2. Selection of Animal, Grouping and Experimental Design

Four farmers were selected in the experimented area having at least five indigenous cows aged between two to three years with the same (2.5) body condition score and not treated with anthelmintic before this study. Animals were selected randomly and grouped into four groups where Group A was considered as control, in Group B grinded Neem leaves were treated, in Group C Tamarind leaves were treated and in Group D both Neem leaves and Tamarind leaves were treated according to experimental design Table 1.

Table 1. Experimental design.

Parameters	Group A	Group B	Group C	Group D
Treatment	No treatment	Neem leaves @ 2gm/kg feed	Tamarind leaves @ 2gm/kg feed	Neem leaves: Tamarind leaves=1:1 @ 2gm/kg feed
Number of experimented animal	5	5	5	5
Experimented time	30 days			
Data collection	3 time 15 days interval			

2.3. Collection and Preparation of Leaf Powder

Mature Neem and Tamarind leaves were collected from local sources and processed according to [22]. In a brief, after collection leaves were washed with clean water, dried under the sun for 5 days @ 8 hours per day. Finally, grinded and kept in an air-tight container.

2.4. Fecal Examination

For the determination of parasitic infection, fecal samples were collected from the rectum of the studied cows of all groups on 0, 15 and 30 days and parasitic eggs were counted by direct smear method. In a brief, 5 grams fecal sample were collected, mixed with a drop of water, spread out, clean the mixture by removing the coarse particle of the feces, covered with a slip and examined directly under the microscope with low power. Three slides from each fecal sample were used for counting the number of eggs. Finally, anthelmintic efficacy was calculated by the fecal egg count reduction (FER) test [23] according to the following formula:

$$\text{Efficacy rate (ER\%)} = (\text{Control count} - \text{Treatment count}) / \text{Control count} \times 100$$

2.5. Statistical Analysis

The data were analyzed by one-way analysis of variance (ANOVA) and when ANOVA indicated significant effects ($p < 0.05$), the DMRT was used to compare the mean.

3. Result and Discussion

After completing the study it was observed that Neem and Tamarind had a significant effect on the number of fecal egg count (Table 2). On day 0 average egg counts of A, B, C and D were recorded 7.50 ± 0.45 , 7.80 ± 0.50 , 7.95 ± 0.38 and 8.00 ± 0.52 respectively. However, on the 15th-day number of eggs was significantly decreased ($P \leq 0.05$) in the treatment group and considering efficacy it was observed that Neem: Tamarind (1:1) (68.15%) was more efficient than individual (Neem (29.93%), Tamarind (42.67%)).

Table 2. Fecal egg count and efficacy rate.

Groups	No. of eggs (Mean \pm SEM) (ER%) In day 0	No. of eggs (Mean \pm SEM) (ER%) In day 15	No. of eggs (Mean \pm SEM) (ER%) In day 30
A	$7.50^a \pm 0.45$	$7.85^a \pm 0.34$	$8.50^a \pm 0.32$
B	$7.80^a \pm 0.50$	$5.50^b \pm 0.53$ (29.93)	$2.00^b \pm 0.00$ (76.47)
C	$7.95^a \pm 0.38$	$4.50^b \pm 0.49$ (42.67)	$1.50^b \pm 0.50$ (82.35)
D	$8.00^a \pm 0.52$	$2.50^c \pm 0.32$ (68.15)	$0.00^c \pm 0.00$ (100)

Note: Values followed by the same superscripts in the same column are not statistically significant ($p > 0.05$), different superscripts indicate that difference is significant ($P < 0.05$).

Neem and Tamarind leaf contains natural antimicrobial and anti-protozoal substances which may decrease the

parasitic load in the rumen, consequently, less number of the egg was observed in the treatment group [7, 13]. On the 30th-

day efficacy, the present was highest in group D and no egg was observed on the fecal sample. Although, throughout the study, it was observed that the anti-protozoal property of Tamarind leaf was higher than Neem leaf and a combination of Neem and Tamarind perform better than the individual.

4. Conclusion

Neem (*Azadirachta indica*) and Tamarind (*Tamarindus indica*) leaves both individually have an antimicrobial effect which significantly reduced the microbial load in cattle. It is more effective when both Neem and Tamarind leaves were used combinedly. Further studies are necessary to find any other effects concerning histopathology before reaching a definite conclusion.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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References

- [1] Akhtar, M. S. (2000). Anthelmintic activity of medicinal plants with particular reference to their use in animals in the Indo-Pakistan subcontinent. *Small Ruminant Research*. 38 (2): p. 99-107.
- [2] Baker, R. (1995). Genetic resistance against helminth infections in cattle, sheep and goats in the tropics. <https://hdl.handle.net/10568/50594>.
- [3] Greathead, H. (2003). Plants and plant extracts for improving animal productivity. *Proceedings of the nutrition Society*. 62 (2): p. 279-290.
- [4] Waller, P. (1987). Anthelmintic resistance and the future for roundworm control. *Veterinary Parasitology*. 25 (2): p. 177-191.
- [5] Jackson, F. and R. Coop. (2000). The development of anthelmintic resistance in sheep nematodes. *Parasitology*. 120 (7): p. 95-107.
- [6] Chandrawathani, P. (2002). Evaluation of the neem tree (*Azadirachta indica*) as a herbal anthelmintic for nematode parasite control in small ruminants in Malaysia. *Tropical Biomedicine*. 19 (1&2): p. 41-48.
- [7] Chaudhary, S. (2017). Progress on *Azadirachta indica* based biopesticides in replacing synthetic toxic pesticides. *Frontiers in plant science*. 8: p. 610.
- [8] Tripathi, K. (2003). *Essentials of medical pharmacology*. New Delhi: Jaypee Brothers. Medical publishers (P) LTD. 5: p. 235-249.
- [9] Mandal, S. (2011). Effect of *Azadirachta indica* A. Juss (Meliaceae) seed oil and extract against *Culex quinquefasciatus* Say (Diptera: Culicidae) larval susceptibility of Indian subcontinent. *Macedonian Journal of Medical Sciences*. 4 (1): p. 5-11.
- [10] Danøe, R. and Bogh, H. (1999). Usage of herbal medicine against helminths in livestock. An old tradition gets its renaissance. *World Animal Review*. 93 (2): p. 60-65.
- [11] Iqbal, Z. (2004) Anthelmintic activity of *Artemisia brevifolia* in sheep. *Journal of Ethnopharmacology*. 93 (2-3): p. 265-268.
- [12] Biu, A., S. Yusufu, and J. Rabo, (2009). Phytochemical screening of *Azadirachta indica* (Neem)(Meliaceae) in Maiduguri, Nigeria. *Bioscience research communications*. 21 (6): p. 281-283.
- [13] Pandey, A. and P. Pare, (2018). A review: Antimicrobial activity of *Azadirachta indica* (Neem). *International Journal of Pharmacy & Life Sciences*. 9 (3).
- [14] Paolini, V., I. Fouraste, and H. Hoste, (2004). In vitro effects of three woody plant and sainfoin extracts on 3rd-stage larvae and adult worms of three gastrointestinal nematodes. *Parasitology*. 129 (1): p. 69-77.
- [15] Gakuya, D. (2011). Ethnoveterinary Medicine: The prospects of integrating medicinal plant products in Veterinary Medicine in Kenya. *Kenya Veterinarian*. 35 (2): p. 67-76.
- [16] Jamra, N. (2015). Anthelmintic efficacy of crude neem (*Azadirachta indica*) leaf powder against bovine strongylosis. *Journal of parasitic diseases*. 39 (4): p. 786-788.
- [17] Mute, V. M. (2009). Anthelmintic effect of Tamarind *indica* linn leaves juice extract on *Pheretima posthuma*. *International journal of pharma research and development*. 7 (1): p. 1-6.
- [18] Veerakumari, L. and P. Priya, (2006). In vitro effect of azadirachtin on the motility and acetylcholinesterase activity of *Cotylophoron cotylophorum* (Fischöeder, 1901). *Journal of Veterinary Parasitology*. 20 (1): p. 1-5.
- [19] Eminov, R. and E. RS, (1982) Effect of certain pasture plants on gastrointestinal nematodes of sheep.
- [20] Fajimi, A. and A. Taiwo, (2005). Herbal remedies in animal parasitic diseases in Nigeria: a review. *African journal of biotechnology*. 4 (4): p. 303-307.
- [21] Das, S., M. Dey, and A. Ghosh, (2011). Determination of anthelmintic activity of the leaf and bark extract of *Tamarindus indica* Linn. *Indian journal of pharmaceutical sciences*. 73 (1): p. 104.
- [22] Jamra, N., Das, G., Singh, P. and Haque, M. (2015). Anthelmintic efficacy of crude neem (*Azadirachta indica*) leaf powder against bovine strongylosis. *J Parasit Dis.*, 39 (4): 786-788.
- [23] Coles, G. C., Bauer, C., Borgsteede, F. H. M., Geerts, S., Walker, P. J. (1992). World Association for the Advancement of Veterinary Parasitology (WAAVP) methods for the detection of anthelmintic resistance. *Vet Parasitol.*; 44: 35-44. doi: 10.1016/0304-4017(92)90141-U.