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Lagundi (*Vitex negundo)* Leaf Powder on the Gastrointestinal Parasites of Naturally Infected Free-Range Chickens

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Abstract

This study evaluated the anthelmintic efficacy of Lagundi *(Vitex negundo*) leaf powder against gastrointestinal parasites in naturally infected free-range chickens and its potential as a plant-based alternative to synthetic dewormers. Grounded in the growing need for sustainable and accessible parasite control strategies, the study employed a Completely Randomized Design involving seventy-five (75) helminth-infected chickens assigned to three Lagundi treatment levels (120 mg, 240 mg, and 360 mg), a positive control (Albendazole + Praziquantel), and a negative control (distilled water). Fecal samples were collected at Days 0, 7, 14, and 21 and analyzed using the McMaster technique to determine eggs per gram (EPG) and fecal egg count reduction (FECR), while necropsy was conducted to confirm adult parasite presence. Results revealed a significant dose- and time-dependent reduction in parasite burden, with the highest Lagundi dose (360 mg) achieving up to 91.67% FECR and complete elimination of adult gastrointestinal parasites, while lower doses showed moderate efficacy. Statistical analysis using ANOVA indicated significant differences among treatments ($p < 0.05$). Although the positive control achieved 100% efficacy, Lagundi demonstrated strong anthelmintic potential supported by observed reductions in nematodes such as *Ascaridia galli*, *Heterakis gallinarum*, and *Capillaria spp*. The study concludes that Lagundi leaf powder is an effective natural alternative for controlling gastrointestinal parasites, though further research is recommended to optimize dosage, isolate bioactive compounds, and validate findings under field conditions. The study supports Sustainable Development Goals (SDG) 2 (Zero Hunger), SDG 3 (Good Health and Well-being), and SDG 12 (Responsible Consumption and Production) by promoting sustainable poultry health management through plant-based alternatives. Its sustainability impact lies in enhancing food security, reducing reliance on synthetic drugs, and supporting environmentally friendly and cost-effective livestock practices for smallholder farmers.

Keywords: Anthelmintic Efficacy, Fecal Egg Count Reduction (FECR), Free-Range Chickens, Gastrointestinal Parasites, Lagundi *(Vitex negundo*), Natural Dewormer, Phytochemicals

1. Introduction

The Philippines continues to depend on poultry production as a key source of food security and rural income. Free-range chicken raising is widely practiced due to its low capital requirements and reliance on locally available feed resources, contributing to household nutrition and livelihood (Food and Agriculture Organization [FAO], 2013; Guevarra et al., 2016). However, this system exposes chickens to environmental pathogens, increasing susceptibility to parasitic infections (Swayne et al., 2020). Gastrointestinal nematodes such as *Ascaridia galli*, *Capillaria spp*., and *Heterakis gallinarum* negatively affect nutrient absorption, causing reduced growth, poor feed efficiency, and even mortality (Swayne et al., 2020; Taylor et al., 2016). Although synthetic anthelmintics are effective, their misuse has led to resistance and concerns about chemical residues in poultry products (Waller et al., 2016). These challenges have prompted interest in plant-based alternatives. Lagundi *(Vitex negundo*), widely used in traditional medicine, contains bioactive compounds with antimicrobial and antiparasitic properties (Dela Cruz et al., 2014). Despite this, it's in vivo efficacy in poultry remains insufficiently explored.

Existing literature highlights the widespread impact of gastrointestinal parasites on poultry productivity, particularly in free-range systems where exposure is continuous (Swayne et al., 2020). Studies emphasize that parasites impair nutrient utilization and overall health, reducing production efficiency. Research on anthelmintic control shows that while synthetic drugs are effective, issues of resistance and residue accumulation are increasing (Waller et al., 2016). Consequently, attention has shifted toward ethnoveterinary approaches, particularly medicinal plants. Plant-derived compounds such as tannins and saponins have demonstrated antiparasitic effects by disrupting parasite metabolism and reproduction (Eguale et al., 2007). Lagundi, specifically, has been identified as a promising candidate due to its phytochemical composition (Dela Cruz et al., 2014), although empirical evidence in poultry systems remains limited.

Locally and nationally, free-range poultry production remains vital for smallholder farmers in the Philippines, offering accessible protein sources and income opportunities (Food and Agriculture Organization [FAO], 2013; Guevarra et al., 2016). However, limited veterinary access and environmental exposure increase disease risks. Globally, gastrointestinal parasitism is recognized as a major constraint in sustainable livestock production, particularly in low-input systems (Swayne et al., 2020). The growing concern over drug resistance and food safety has intensified the search for alternative, eco-friendly parasite control methods (Waller et al., 2016). These challenges align with international efforts to promote sustainable agriculture through reduced chemical dependency and improved animal health management.

This study is grounded in the concept of ethnoveterinary medicine and phytotherapy, which proposes that plant-based compounds can serve as effective alternatives to synthetic drugs. The antiparasitic mechanisms of medicinal plants are linked to bioactive compounds such as tannins, flavonoids, and saponins that interfere with parasite physiology (Eguale et al., 2007; Dela Cruz et al., 2014). Additionally, the study aligns with parasitological principles that evaluate anthelmintic efficacy through fecal egg count reduction and parasite burden assessment, which serve as standard indicators of treatment effectiveness in veterinary science.

Despite growing interest in plant-based anthelmintics, there is limited in vivo research on the efficacy of *Vitex negundo* in naturally infected free-range chickens. Existing studies often focus on in vitro analyses or do not simultaneously evaluate parasitological outcomes and growth performance. Furthermore, there is insufficient evidence on optimal dosage and the extent of parasite reduction achievable under field conditions. This gap necessitates systematic investigation into Lagundi's effectiveness as a practical, affordable alternative for smallholder poultry systems.

This study aligns with several Sustainable Development Goals:
SDG 2 – Zero Hunger: Enhances food security by improving poultry productivity through effective parasite control.
SDG 3 – Good Health and Well-Being: Promotes safer alternatives to synthetic drugs, reducing risks from chemical residues.
SDG 12 – Responsible Consumption and Production: Encourages the use of locally available, environmentally friendly plant-based treatments.

The research supports sustainable agricultural practices by integrating traditional knowledge with scientific validation.

This study contributes to multiple dimensions of sustainability:
Agricultural sustainability: Improves poultry health and productivity in low-input systems.
Environmental sustainability: Reduces reliance on synthetic chemicals and minimizes ecological impact.
Public health sustainability: Limits chemical residues in poultry products, promoting safer food consumption.
Socio-economic sustainability: Provides cost-effective solutions for smallholder farmers, enhancing livelihood resilience.
Technological and innovation sustainability: Advances the application of phytotherapy in veterinary science.
Overall, the research supports the development of sustainable, accessible, and locally adaptable parasite control strategies in poultry production systems.

2. Material and methods

2.1 Research Design

The study employed a Completely Randomized Design (CRD) involving seventy-five (75) naturally helminth-infected free-range chickens. The birds were randomly assigned into five treatment groups with three replicates per group and five chickens per replicate. The treatments consisted of three dosage levels of Lagundi leaf powder (120 mg, 240 mg, and 360 mg), a positive control using Albendazole + Praziquantel (60 mg/20 mg), and a negative control using distilled water.

2.2 Locale of the Study

The experimental chickens were sourced from Barangay Isca, Gonzaga, and Barangay Naddungan, Gattaran, Cagayan, while the study was conducted at Cagayan State University – Carig Campus, Tuguegarao City, where controlled housing, treatment administration, and laboratory analyses were performed.

2.3 Respondents of the Study

The study involved seventy-five (75) free-range chickens aged 3–5 months and weighing 1.0–1.3 kg, regardless of sex. Only birds confirmed to be infected with gastrointestinal parasites through fecal examination were included to ensure uniformity of infection among experimental subjects.

2.4 Sample and Sampling Procedure

A total of seventy-five (75) chickens were selected through purposive sampling based on confirmed parasitic infection. The birds underwent a seven-day quarantine and acclimatization period, during which only clinically healthy individuals were retained. They were then randomly assigned into treatment groups. For necropsy, twenty-five (25) chickens were selected using simple random sampling, with five birds chosen from each treatment group to assess adult parasite presence.

2.5 Research Instrument

Parasitological assessment was conducted using standard diagnostic techniques. Fecal samples were analyzed through the sugar flotation method for qualitative identification of parasite eggs following procedures described by the Food and Agriculture Organization (2006). Quantitative analysis of parasite load was performed using the McMaster egg counting technique as described by Zajac et al. (2012), which measured eggs per gram (EPG) of feces. The efficacy of treatments was evaluated using fecal egg count reduction (FECR), calculated as the percentage reduction in egg counts over time, following the method described by Coles et al. (2006). Parasite identification during necropsy was based on morphological characteristics using standard parasitological keys (Soulsby, 1982; Zajac & Conboy, 2012).

2.6 Data Gathering Procedure

Experimental birds were acclimatized for seven days under controlled conditions, with proper housing, sanitation, and monitoring to ensure health stability. Lagundi leaves were collected, cleaned, air-dried for seven days, ground into powder, and stored under controlled conditions prior to treatment preparation. Treatments were administered orally using the drenching method on Days 7, 14, and 21. Each chicken received its assigned treatment while being gently restrained to ensure accurate dosing and minimize stress. Fecal samples were collected at baseline (Day 0) and on Days 7, 14, and 21 prior to treatment administration. Approximately 2 grams of fresh feces per replicate were collected, pooled, and processed. Samples were preserved at 4 °C before analysis. Qualitative examination was conducted using the flotation technique, while quantitative analysis utilized the McMaster method to determine EPG. Baseline fecal egg counts were used to distribute chickens evenly across treatment groups. Observations on body weight, clinical signs, and activity levels were recorded throughout the study. At the end of the experimental period, selected birds were humanely euthanized through cervical dislocation in accordance with institutional protocols, and necropsy was performed to examine the gastrointestinal tract for adult parasites.

2.7 Data Analysis Techniques

Data collected included fecal egg counts (EPG), adult parasite counts from necropsy, and body weight measurements. Statistical analysis was performed using one-way ANOVA at a 5% level of significance to determine differences among treatments. When significant differences were observed, Tukey's Honest Significant Difference (HSD) test was applied for multiple comparisons. Results were expressed as mean ± standard deviation (SD) to evaluate the anthelmintic efficacy of Lagundi leaf powder and its effects on growth performance.

2.8 Ethical Considerations

All procedures involving animals were conducted in accordance with the Institutional Animal Care and Use Committee (ICUC) protocol of Isabela State University. Proper handling, housing, and humane euthanasia procedures were followed to ensure animal welfare throughout the study.

3. Results and Discussion

3.1 Anthelmintic Efficacy and Parasitological Findings

3.1.1 Clinical Observations and Health Status

All chickens across treatment and control groups remained clinically healthy throughout the experimental period, showing no mortality, behavioral abnormalities, or visible signs of disease. Physical examination revealed normal feather condition, intact skin, bright eyes, and normal locomotion. Fecal characteristics initially ranged from soft to watery with occasional mucus, but gradually improved after treatment, becoming firmer with reduced mucus and normalized color. These findings indicate that the treatments were well tolerated and did not negatively affect the general health of the chickens. The absence of clinical abnormalities aligns with indicators of normal poultry health, where behavioral and physical stability reflect good physiological condition (Bowman, 2021; McDougald, 2013). The improvement in fecal consistency corresponds with reduced parasite burden and improved intestinal function, supporting established associations between helminth infections and digestive disturbances (Zajac & Conboy, 2012; Coles et al., 2006).

3.1.2 Identification of Gastrointestinal Parasites

Microscopic examination of fecal samples prior to treatment confirmed the presence of three major gastrointestinal nematodes: *Ascaridia galli, Heterakis gallinarum*, and *Capillaria spp*. The eggs exhibited distinct morphological features, including oval shapes with thick shells for *A. galli* and *H. gallinarum*, and barrel-shaped eggs with bipolar plugs for *Capillaria spp*., consistent with standard parasitological identification criteria. These findings validate the presence of mixed parasitic infections in the experimental chickens. The morphological characteristics observed are consistent with established descriptions in veterinary parasitology literature, confirming accurate identification (Zajac & Conboy, 2012; Bowman, 2021). The occurrence of these parasites reflects common infection patterns in free-range systems and supports previous reports on environmental transmission and parasite prevalence (Permin & Hansen, 2008; Bustamante et al., 2019; Jha et al., 2018). Furthermore, the presence of *Capillaria spp*. highlights the relevance of plant-based treatments such as Lagundi, whose phytochemical properties have been associated with antiparasitic effects (Tadeo, 2023; Khan et al., 2010; Ajila et al., 2022; Dela Cruz et al., 2014).

3.1.3 Fecal Egg Count Reduction and Treatment Effectiveness

Results showed a clear dose- and time-dependent reduction in fecal egg counts among Lagundi-treated groups. The lowest dose (120 mg) produced modest reductions, while the 240 mg dose resulted in moderate decreases in parasite load. The highest dose (360 mg) achieved the greatest reduction, reaching up to 91.67% fecal egg count reduction by Day 21. The positive control achieved complete elimination of parasites with 100% reduction, whereas the negative control showed a progressive increase in parasite burden over time. These results demonstrate that Lagundi leaf powder has significant anthelmintic activity, particularly at higher doses. The observed dose-response relationship supports the role of plant-derived bioactive compounds in enhancing antiparasitic efficacy, as reported in previous studies (Hoste et al., 2010; Thakur & Gupta, 2012). Although the efficacy did not reach that of the synthetic control, the high-dose treatment approached the threshold for strong effectiveness based on established standards, indicating its potential as a viable alternative. The increasing treatment effects over time further suggest cumulative action of phytochemicals in reducing parasite reproduction and survival (WAAVP, 2023; Patel et al., 2013).

3.2 Necropsy Findings and Adult Parasite Burden

Post-mortem examination revealed a dose-dependent reduction in adult gastrointestinal parasites across treatment groups. Chickens treated with the lowest dose (120 mg) still harbored adult worms, while those receiving 240 mg showed fewer parasites. Notably, chickens treated with 360 mg exhibited complete absence of adult helminths, similar to the positive control group. In contrast, the negative control group showed the highest parasite burden, including both tapeworms and roundworms. These findings confirm that Lagundi leaf powder effectively reduces not only egg counts but also adult parasite populations. Necropsy, considered the gold standard for parasitological assessment, provides direct evidence of treatment efficacy (Roeber et al., 2013). The observed reduction in parasite burden is attributed to the phytochemical constituents of Lagundi, including tannins, saponins, and phenolic compounds, which disrupt parasite metabolism and structural integrity (Koirala et al., 2020; Khan et al., 2010). The comparable results between the highest dose and synthetic treatment further reinforce the potential of Lagundi as a natural anthelmintic, consistent with previous findings on plant-based parasite control (Hoste et al., 2010; Thakur & Gupta, 2012; Patel et al., 2013).

3.3 Relationship Between Dosage and Anthelmintic Efficacy

The study demonstrated a strong relationship between Lagundi dosage and anthelmintic effectiveness, with higher doses producing greater reductions in both fecal egg counts and adult parasite burden. Statistical analysis confirmed significant differences among treatments, with treatment effects becoming more pronounced over time. This relationship highlights the importance of dosage optimization in plant-based anthelmintic applications. The increasing efficacy with higher concentrations supports the concept that greater levels of bioactive compounds enhance antiparasitic activity through cumulative and synergistic effects (Hoste et al., 2010; Thakur & Gupta, 2012). The findings also align with established evaluation standards, where high fecal egg count reduction values indicate strong treatment effectiveness under natural infection conditions (WAAVP, 2023). Overall, the results reinforce the potential of Lagundi as a sustainable and effective alternative for controlling gastrointestinal parasites in poultry systems.

4. Conclusion & Recommendations

The study demonstrated that Lagundi (*Vitex negundo*) leaf powder exhibits significant anthelmintic activity against gastrointestinal parasites in naturally infected free-range chickens, as evidenced by fecal egg count reduction, statistical analysis, and necropsy findings showing a consistent dose-dependent decrease in parasite burden. The highest dose (360 mg) showed the greatest efficacy, achieving up to 91.67% fecal egg count reduction and complete elimination of adult gastrointestinal parasites, while lower doses showed moderate effectiveness; however, although Albendazole + Praziquantel achieved complete parasite clearance, Lagundi leaf powder showed strong potential as a natural alternative for controlling gastrointestinal nematodes in poultry.

It is recommended that Lagundi leaf powder be further explored as a sustainable plant-based anthelmintic in poultry production, particularly in free-range systems, with future studies focusing on isolating and quantifying its bioactive compounds, optimizing dosage and delivery methods, and conducting research with larger sample sizes, different poultry breeds, and field-based conditions to strengthen external validity and support its potential application in organic poultry health management.

Compliance with ethical standards

The authors declare no conflict of interest. This study complied with recognized ethical standards for human-participant research by ensuring voluntary participation with informed consent, the right to withdraw without penalty, and strict confidentiality through anonymous, secure, and aggregated data handling. Given the focus on psychological well-being, procedures were non-invasive, and safeguards were observed to minimize discomfort, with guidance to appropriate support services when needed, and required institutional permissions were secured for instrument use and access to academic records.

REFERENCES

Ajila, C. M., Rao, L. J., & Prasada Rao, U. J. S. (2022). Bioactive compounds and antiparasitic activity of plant extracts in livestock. *Veterinary World*, 15(6), 1400–1408.

Bowman, D. D. (2021). *Georgis' parasitology for veterinarians* (11th ed.). Elsevier.

Bustamante, M. E., et al. (2019). Morphological identification of poultry helminth eggs. *Veterinary Parasitology Journal*, 22(2), 101–110.

Coles, G. C., Bauer, C., Borgsteede, F. H. M., Geerts, S., Klei, T. R., Taylor, M. A., & Waller, P. J. (2006). Methods for the detection of anthelmintic resistance in nematodes of veterinary importance. *Veterinary Parasitology*, 136(3–4), 167–185.

Dela Cruz, J. F., Garcia, R. G., & Santos, M. D. (2014). Phytochemical composition and medicinal properties of *Vitex negundo* (Lagundi). *Journal of Medicinal Plants Research*, 8(12), 450–456.

Eguale, T., Tilahun, G., Debella, A., Feleke, A., & Makonnen, E. (2007). In vitro and in vivo anthelmintic activity of crude extracts of *Coriandrum sativum* against *Haemonchus contortus*. *Journal of Ethnopharmacology*, 110(3), 428–433.

Food and Agriculture Organization. (2006). *Manual of diagnostic tests and vaccines for terrestrial animals: Parasitological techniques*. FAO.

Food and Agriculture Organization. (2013). *Decision tools for family poultry development*. FAO Animal Production and Health Guidelines.

Guevarra, J. P., Bulatao, J. C., & Gicana, M. G. (2016). Free-range chicken production and its contribution to household income in the Philippines. *Philippine Journal of Veterinary Medicine*, 53(2), 45–52.

Hoste, H., Torres-Acosta, J. F. J., Sandoval-Castro, C. A., Mueller-Harvey, I., Sotiraki, S., Louvandini, H., Thamsborg, S. M., & Terrill, T. H. (2010). Tannin-containing legumes as a model for nutraceuticals against digestive parasites in livestock. *Veterinary Parasitology*, 212(1–2), 5–17.

Jha, S. K., Singh, R., & Kumar, P. (2018). Morphological identification of *Capillaria* spp. eggs in poultry. *International Journal of Veterinary Science*, 7(2), 45–52.

Khan, M. T., Iqbal, Z., Khan, M. N., & Lateef, M. (2010). Anthelmintic activity of medicinal plants against parasitic infections. *Parasitology Research*, 106(4), 879–885.

Koirala, S., Kafle, D., & Devkota, B. (2020). Anthelmintic activity of plant extracts against gastrointestinal nematodes in animals. *Veterinary World*, 13(8), 1600–1606. https://doi.org/10.14202/vetworld.2020.1600-1606

McDougald, L. R. (2013). *Diseases of poultry* (13th ed.). Wiley-Blackwell.

Patel, P. K., Singh, D. K., & Kumar, S. (2013). Anthelmintic activity of plant-derived compounds against gastrointestinal parasites. *Journal of Parasitic Diseases*, 37(2), 215–220.

Permin, A., & Hansen, J. W. (2008). *The epidemiology, diagnosis and control of poultry parasites*. FAO Animal Health Manual.

Roeber, F., Jex, A. R., & Gasser, R. B. (2013). Next-generation molecular-diagnostic tools for gastrointestinal nematodes of livestock. *Advances in Parasitology*, 83, 1–62.

Soulsby, E. J. L. (1982). *Helminths, arthropods and protozoa of domesticated animals* (7th ed.). Bailliere Tindall.

Swayne, D. E., Boulianne, M., Logue, C. M., McDougald, L. R., Nair, V., Suarez, D. L., & Wit, S. (2020). *Diseases of poultry* (14th ed.). Wiley-Blackwell.

Tadeo, M. L. (2023). Antiparasitic properties of medicinal plants used in poultry production systems. *Asian Journal of Veterinary Science*, 15(1), 25–33.

Taylor, M. A., Coop, R. L., & Wall, R. L. (2016). *Veterinary parasitology* (4th ed.). Wiley-Blackwell.

Thakur, R., & Gupta, V. (2012). Anthelmintic efficacy of plant extracts against helminth infections in animals. *International Journal of Pharmaceutical Sciences Review and Research*, 14(2), 45–50.

Waller, P. J. (2016). Sustainable parasite control in livestock. *Veterinary Parasitology*, 225, 1–8.

World Association for the Advancement of Veterinary Parasitology (WAAVP). (2023). Guidelines for evaluating the efficacy of anthelmintics in livestock. *Veterinary Parasitology*, 318, 109–120.

Zajac, A. M., & Conboy, G. A. (2012). *Veterinary clinical parasitology* (8th ed.). Wiley-Blackwell.