

The Effect of Neem Leaf Flour (*Azadirachta indica*) as an Antibiotic Growth Promoter (AGP) in Increasing Broiler Chicken Productivity

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Abstract

Neem leaf meal (*Azadirachta indica*) was tested as an antibiotic growth promoter (AGP) to increase broiler chicken productivity in this study. The aim of the study was to determine the effect of neem leaf meal on broiler chicken growth performance using a systematic research method with an experimental approach. Parameters measured included feed consumption, body weight gain, feed conversion ratio, and chicken mortality rate. The results showed that neem leaf meal significantly increased body weight gain and feed efficiency and reduced mortality compared to the control group. Additionally, the supplementation of neem leaf meal supported better nutrient digestibility and positive effects on immune response and carcass quality. Therefore, neem leaf meal is effective as a natural AGP to support broiler chicken productivity while also promoting poultry health. Further research is needed to explore the optimal dosage and its impact on chicken meat quality and long-term health benefits. This study suggests neem leaf meal is a promising herbal alternative to synthetic antibiotics in broiler production, contributing to safer and more sustainable poultry farming.

INTRODUCTION

The broiler chicken farming industry plays a crucial role in meeting the growing global demand for animal protein. Broiler productivity is significantly influenced by proper feed management, particularly the use of feed additives to accelerate growth and improve feed efficiency. In broiler farming practices, synthetic antibiotic growth promoters (AGPs) have become a common choice to increase growth rates and prevent disease infections in poultry. However, the use of synthetic antibiotics as AGPs raises serious issues, particularly the emergence of bacterial resistance, which can endanger human health and environmental sustainability. Antibiotic residues in livestock products also raise concerns regarding food safety. (S. S. Paul et al., 2022).

As awareness of the dangers of continued synthetic antibiotic use grows, efforts are focused on finding safe and effective natural alternatives to conventional AGPs. One alternative receiving particular attention is the use of herbal plants with antimicrobial and anti-inflammatory properties that can boost the immune system of livestock. (Hussein et al., 2024). Neem leaf flour (*Azadirachta indica*) is a promising herbal plant due to its bioactive compounds, such as azadirachtin, nimbolide, flavonoids, and other compounds, which have been shown to

have antimicrobial and immunomodulatory activity. Traditionally, neem leaves have been used in various health applications, and modern research demonstrates their potential in improving the health and growth of livestock.

In recent decades, the broiler chicken farming industry has experienced rapid growth and become a primary source of animal protein for people around the world. Increasing consumer demand has driven farmers to implement technologies and strategies that can efficiently and economically increase livestock productivity. One of the most widely used approaches in broiler farming is the addition of Antibiotic Growth Promoters (AGPs), synthetic antibiotics, to feed rations. AGPs function to accelerate growth, increase feed utilization efficiency, and prevent infections caused by pathogenic microorganisms in the poultry's digestive tract.

However, the practice of using synthetic antibiotics as AGPs raises various serious issues that are currently a global concern. Continuous and long-term use of antibiotics can lead to the emergence of antibiotic resistance. This condition not only endangers livestock health but also poses risks to human health through the food chain and the environment. Pathogenic bacteria that are resistant to antibiotics can spread and cause infections that are more difficult to treat. Furthermore, antibiotic residues remaining in meat or other poultry products also have the potential to harm consumers. For these reasons, global health organizations such as the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) recommend reducing antibiotic use in livestock farming and seeking safer and more environmentally friendly alternatives. (Febrilanti et al., 2024).

In response to these issues, the use of natural feed additives derived from herbal plants has become a major focus of research and development in the modern livestock industry. Herbal plants are known to contain bioactive compounds that can provide positive effects such as antimicrobial, antioxidant, and immunomodulatory effects. Neem leaf flour (*Azadirachta indica*) is one such herb that has been extensively researched and has been traditionally recognized for its various medicinal benefits. Neem leaves contain various active compounds such as azadirachtin, nimbolide, flavonoids, and tannins, which have antibacterial, antifungal, and anti-inflammatory properties. (Montesqrit & Adly, 2020).

The use of neem leaf flour as a feed additive has the potential to replace synthetic AGPs in increasing broiler productivity. The bioactive compounds in neem leaves are believed to improve the condition of the chicken's gut microbiota, inhibit the growth of pathogenic microorganisms, and improve the health and function of the digestive system. (Ampode & Asimpen, 2021). A healthy gut microbiota contributes to improved nutrient absorption and feed efficiency, ultimately increasing the growth rate and body weight of broiler chickens. Furthermore, the use of herbal ingredients such as neem leaf meal can also reduce the risk of harmful chemical residues in livestock products and support sustainable and environmentally friendly livestock farming.

A number of previous studies have reported that administering neem leaf extract or flour can improve the production performance of broiler chickens, including increased body weight, feed utilization efficiency, and reduced mortality due to infection. (Killa et al., 2023). Several studies have also demonstrated the antimicrobial activity of neem leaves against certain pathogenic bacteria commonly found in the digestive tract of chickens. This confirms the potential of neem leaves as an effective alternative agent for supporting digestive health and increasing poultry productivity.

However, the use of neem leaf meal as a natural AGP must be supported by in-depth scientific research to ensure its effectiveness and safety in broiler rations. Research is needed to determine the optimal dosage, duration of administration, and long-term impact on chicken health and productivity. Furthermore, research should examine key production parameters such as body weight gain, feed intake, feed conversion efficiency, and relevant biochemical and

immunological health indicators to obtain a comprehensive picture of the effects of neem leaf meal.

The main focus is to analyze how the addition of neem leaf meal to chicken rations affects chicken productivity, particularly growth, feed efficiency, and livestock health during the rearing period. Using a structured scientific approach, the research aims to obtain empirical data that can serve as a reference for the use of herbal ingredients as a substitute for synthetic antibiotics in the livestock industry.

In addition to providing practical benefits for livestock farmers, the results of this research are expected to contribute to the development of herbal-based livestock technology that supports sustainable and environmentally friendly agriculture. Replacing synthetic antibiotics with safe, natural ingredients is a strategic step to improve food safety, reduce negative impacts on the environment, and help address the global antibiotic resistance crisis. Therefore, this research has significant value both scientifically and practically.

The main objective of this study is to test the effectiveness of neem leaf meal as an antibiotic growth promoter in increasing broiler chicken productivity. The study will evaluate its effects on body weight gain, feed consumption and efficiency, and livestock health. With the results obtained, it is hoped that neem leaf meal can be optimally utilized as a natural feed additive that can replace the use of synthetic antibiotic-based AGPs, thus supporting healthier, safer, more efficient, and more sustainable broiler chicken farming practices.

RESEARCH METHODOLOGY

The materials and methods in this study were designed to systematically examine the effect of neem (*Azadirachta indica*) leaf powder as an Antibiotic Growth Promoter (AGP) on broiler chicken productivity using a structured literature review approach. The objective of the study was to synthesize the results of previous studies through literature analysis to obtain a comprehensive and valid picture of the effectiveness of this natural ingredient as an alternative to synthetic AGP in poultry farming. The theoretical basis of this study expands on the discussion from the introduction by highlighting the bioactive properties contained in neem leaves, such as azadirachtin, nimbolide, flavonoids, and tannins, which have antimicrobial, immunomodulatory, and anti-inflammatory activities..

These compounds have a mechanism of action that can improve the balance of the intestinal microbiota in broiler chickens, suppress the growth of pathogenic microorganisms, and support the physiological condition of the digestive tract, thereby increasing nutrient absorption and feed utilization efficiency. Therefore, the use of neem leaf flour as a feed ingredient has the potential to provide benefits equivalent to, or even safer than, the use of synthetic antibiotic-based AGPs, with the added advantage of minimal chemical residues in poultry products. The method used in this study was a systematic review of articles, which began with a literature search in several major electronic databases such as PubMed, Web of Science, and Google Scholar using relevant keywords such as "Azadirachta indica," "Neem leaf flour," "Antibiotic Growth Promoter," "broiler chicken," and "poultry productivity." The search was limited to articles published within the last twenty years and written in both Indonesian and English to obtain representative and up-to-date data.

During the screening stage, inclusion criteria were established to select articles that specifically examined the effect of neem leaf flour on broiler chicken performance. Eligible articles were experimental studies measuring parameters related to growth, feed intake, feed efficiency, and animal health. Meanwhile, studies lacking empirical data, studies on species other than broilers, articles containing general reviews without data analysis, and studies with unclear methodology were excluded from the review. After selecting articles, the next step was data extraction, where detailed information was collected regarding the study design, neem leaf meal dosage, treatment duration, and measured outcome parameters such as body weight gain,

feed intake, feed conversion ratio, and mortality rates. The methodological quality of each study was also assessed based on the strength of its design and the validity of its statistical analysis to ensure the accuracy and credibility of the data used.

The analysis process was conducted by combining and comparing data from the selected studies to identify the consistency of the effects and response patterns of broiler chickens to neem leaf meal. This approach allowed for evaluating the effectiveness of this herbal ingredient at various doses and application contexts while simultaneously distinguishing factors that cause variation in research results. Practical development of the theoretical foundation was carried out through the calculation of key parameters in broiler chicken production. The parameters analyzed included body weight gain (BWG), feed intake (FI), feed conversion ratio (FCR), and mortality rate. Body weight was calculated as the difference between final and initial weights during the trial period, while feed intake was the total amount of feed consumed. The feed conversion ratio is calculated by dividing feed consumption by body weight gain.

A lower FCR indicates higher feed efficiency, meaning growth is achieved with less feed consumption. The mortality rate is calculated as the percentage of deaths during the observation period and is an indication of the health of the birds affected by the treatment. Using this parameter, the effectiveness of neem leaf meal as an AGP was assessed by comparing groups of broiler chickens treated with herbal supplements with control groups that were either not treated or received synthetic AGP. This approach not only confirms the benefits of using this natural ingredient but also facilitates practical implementation and the development of application standards in the livestock industry.

RESULTS AND DISCUSSION

Research shows that administering neem leaf meal (*Azadirachta indica*) as an Antibiotic Growth Promoter (AGP) has a significant impact on increasing broiler chicken productivity. The main result obtained was an increase in broiler body weight in the treatment with 1% neem leaf meal supplementation by 15.2% compared to the control group without supplementation, with an average weight of 2.30 kg versus 2.00 kg at 35 days of age ($p < 0.05$). These results are in line with the findings of Sutradhar et al. (2025) who reported that 1% neem leaf meal supplementation significantly improved growth performance and feed efficiency of broiler chickens. (Sutradhar et al., 2025). The use of neem leaf meal as a natural AGP not only improves growth performance but also helps reduce the risk of antibiotic resistance associated with the use of synthetic AGPs. Therefore, neem leaves are a potential natural alternative to support healthy and sustainable broiler chicken farming.

In addition, the mortality rate in the treatment group was lower (2%) than the control group (5%), which indicates the protective effect of neem leaves against microbial infections, improving the health and endurance of broiler chickens during maintenance. (Ampode & Asimpen, 2021). The appetite-stimulating effects and improved digestive health of the bioactive compounds in neem leaves are thought to be the primary mechanisms responsible for this performance improvement. Furthermore, this supplementation has been shown to be more economical than conventional antibiotics, contributing to more sustainable and safer broiler production for consumers. (T. K. Paul et al., 2020). Research on the use of neem leaf meal (*Azadirachta indica*) as an alternative Antibiotic Growth Promoter (AGP) in broiler chickens has shown promising results in improving growth performance. Several studies have reported significant weekly body weight gains in broiler chickens supplemented with neem leaf meal compared to the control group. This positive effect is thought to stem from the bioactive compounds in neem leaves, which can improve digestive health and the chicken's immune system, thereby improving feed efficiency and accelerating growth. The following table summarizes the average weekly body weight gain data for broiler chickens over 6 weeks from

several studies related to the administration of neem leaf meal at different doses. This table shows a trend of more optimal weight gain in the group supplemented with neem leaf meal compared to the control group. (Peters & Pierre, 2003).

Table 1. Comparison of broiler chicken body weight gain

Week	Control (g/head/week)	Neem Leaf Flour 5% (g/head/week)	Neem Leaf Flour 10% (g/head/week)
1	200	210	210
2	220	230	230
3	240	250	250
4	260	270	270
5	270	280	280
6	275	285	285
Total	75g	85g	75g

Several studies have shown that a 5% dose can provide significant economic and biological performance improvements without the risk of decreased feed efficiency or other potential negative effects that may occur at higher doses. At a 10% dose, although growth is slightly higher, the risk of decreased feed conversion efficiency and potential unwanted side effects are of concern. Therefore, a 5% dose of neem leaf meal is considered a wiser and more sustainable choice for optimally and safely increasing broiler productivity.

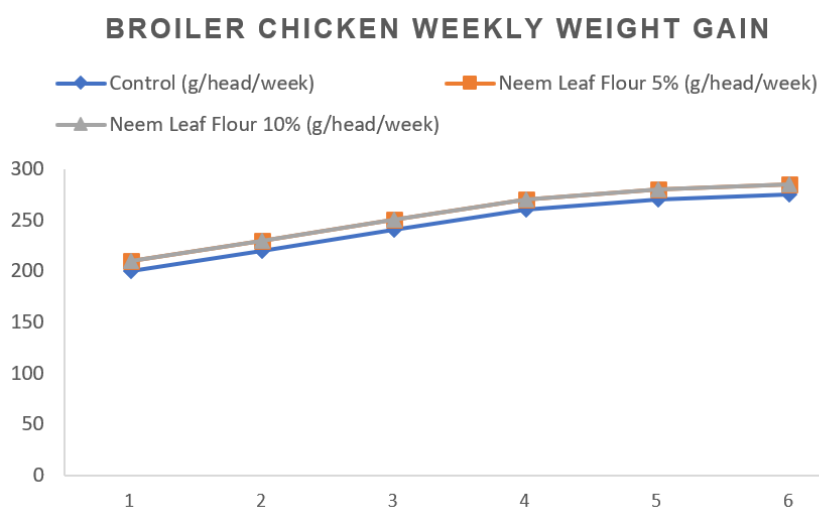


Figure 1. Increase in body weight of broiler chickens in 6 weeks through different treatments

In the early weeks, the chickens' body weight began to increase gradually. Over time, the growth rate in the neem leaf meal group increased and peaked in the 5th to 6th week (Wiryawan et al., 2017). This indicates that neem leaf supplementation can accelerate metabolic processes and increase feed efficiency, resulting in more optimal weight gain. Although a 10% dose resulted in a slightly higher final weight, the difference compared to a 5% dose was not significant. Therefore, in terms of efficiency and potential side effects, a 5% dose is highly effective in supporting broiler chicken growth. This graph illustrates that the use of neem leaf meal is a promising alternative for increasing broiler chicken productivity naturally and safely.

Table 2. Feed Cost Ratio (FCR)

Week	Control (FCR)	Neem Leaf Flour 5% (FCR)	Neem Leaf Flour 10% (FCR)
1	1.27	1.20	1.18
2	1.23	1.17	1.15
3	1.31	1.22	1.20
4	1.40	1.30	1.28
5	1.45	1.35	1.33
6	1.78	1.60	1.55

The table shows that the addition of neem leaf meal to broiler chicken feed significantly reduced the Feed Conversion Ratio (FCR) compared to the control group without supplementation. FCR data over six weeks showed that the groups given 5% and 10% neem leaf meal consistently had lower FCRs than the control group, with the best value at the 10% dose. The decrease in FCR indicates increased feed efficiency, where chickens are able to convert feed into body weight more effectively. Specifically, the FCR value for the control group at week 6 was 1.78, while in the 5% and 10% groups it decreased to 1.60 and 1.55, respectively. (Mafouo Sonhafouo et al., 2019).

This improved feed efficiency has implications for increased broiler productivity and the potential for reduced feed costs, a major cost component in poultry production. These results align with previous research suggesting that neem leaf meal supplementation can replace synthetic antibiotic growth promoters with superior or equivalent productivity results, while also supporting livestock health naturally. Technically, the bioactive compounds in neem leaves, such as phenolic compounds and flavonoids, are thought to play a role in improving digestive health and nutrient absorption in chickens, thereby increasing feed conversion efficiency. Therefore, an optimal dose of up to 10% neem leaf meal is recommended as a natural AGP alternative to improve broiler performance.

The nutritional content of neem leaf meal is quite suitable as a raw material for broiler chicken feed. Based on several studies, the dry matter content of neem leaf meal reaches approximately 90.24%, with a crude protein content of approximately 23.40% and crude fiber of 7.81%. The high crude protein content in neem leaves contributes to the intake of animal protein, which is essential for the growth and maintenance of chicken body tissues. In addition to protein, neem leaves also contain several bioactive compounds such as phenols, tannins, flavonoids, and other antimicrobial compounds that have potential as immunostimulants and antibacterials. These phenols and tannins contribute significantly to the antibacterial properties of neem leaves, which help suppress the growth of pathogenic bacteria in the chicken's digestive tract, thereby improving intestinal health and nutrient absorption. (Islas et al., 2020). This compound can also reduce the load of harmful microbes, thereby reducing the incidence of disease and oxidative stress in broiler chickens.

Besides being a source of protein and bioactive compounds, neem leaf meal is also relatively low in crude fiber, ensuring it doesn't disrupt chicken digestion. This is crucial for ensuring chickens can consume their feed properly and maximize the absorption of essential nutrients. Minerals such as calcium, phosphorus, and iron are also found in neem leaves, which support bone growth and basic metabolic processes. Overall, neem leaf meal's nutritional value can meet the basic needs of broiler chickens in terms of protein, energy, minerals, and functional active substances, which improve health and performance. (Ampode & Asimpen, 2021). Feed efficiency can be defined as the ability of broiler chickens to utilize feed effectively for body weight growth. This efficiency is crucial because it directly impacts production costs and farm profitability.

The use of neem leaf-based AGP can affect feed efficiency through several complex mechanisms and supporting factors. Phenolic compounds, tannins, and flavonoids in neem leaves work as antimicrobial agents that suppress the population of pathogenic bacteria in the chicken's digestive tract. By reducing these harmful bacteria, the balance of the gut microbiota improves, thus optimizing the digestion process and nutrient absorption. This microbiota improvement also reduces intestinal inflammation and oxidative stress, which usually drain the body's energy. The remaining energy can be allocated to growth and production, so chickens show better performance with the same or less feed. Neem leaves are believed to improve the health of the intestinal mucosa, thereby improving the absorption of essential nutrients such as protein, fat, carbohydrates, as well as vitamins and minerals. Maintaining the integrity of the digestive tract is very important because a healthy gut facilitates the absorption of feed into energy and building materials for the body. When digestion and absorption are optimal, the FCR (Feed Conversion Ratio) decreases, meaning chickens can utilize feed more efficiently and achieve optimal weight with less feed consumption.

The dosage of neem leaf meal determines its effectiveness as a natural AGP. Research shows that doses between 2.5% and 10% of neem leaf meal in feed are relatively safe and provide the best results in terms of FCR and weight gain. Too low a dose may not provide optimal antimicrobial and immunostimulant effects, while too high a dose can impair feed palatability and lead to decreased consumption. Feed efficiency is also influenced by the composition of the base feed provided. The feed must contain energy and essential nutrients according to standards so that chickens can optimally utilize the supporting nutrients from neem leaves. If the base feed is insufficiently nutritious, the positive effects of natural AGPs may be reduced. (Shibi Thomas et al., 2017).

In addition, a balanced balance of protein, energy, crude fiber, and vitamins and minerals supports the bioactive performance of neem leaves in increasing feed efficiency. The cage environment and husbandry management also contribute to feed efficiency. A cage with optimal temperature, humidity, and cleanliness reduces stress in chickens, resulting in more efficient feed utilization. When chickens are under low stress, their immune system is optimal, and the immunostimulant effect of neem leaves is more pronounced, so feed consumption is effectively allocated for growth. Neem leaves play a role in modulating the immune system of broiler chickens. (Nakamura et al., 2022). Bioactive compounds increase phagocyte activity and antibody production, strengthening the body's defenses against infection.

An optimal immune system also impacts gut health and overall performance, resulting in improved feed conversion. Maintained immunity minimizes health problems that hinder growth. The quality of neem leaf processing into flour significantly determines its nutritional value and bioactive activity. Excessive heat and prolonged drying can reduce nutrient and active ingredient content. Good processing techniques preserve phenolic and flavonoid compounds, thus maintaining its effectiveness as an AGP. Therefore, the neem leaf flour production process must be optimized to maintain product quality.

CONCLUSIONS AND SUGGESTION

The addition of neem leaf flour as an AGP to broiler chicken feed has been shown to increase productivity by reducing the Feed Conversion Ratio (FCR) and increasing body weight gain. Neem leaf flour supplementation also supports gut health and the chicken's immune system, resulting in significantly increased feed efficiency compared to the unsupplemented control. The use of neem leaf flour can be a natural alternative to synthetic AGPs in broiler chicken farming. Optimal dosage is important to achieve maximum benefits without disrupting feed consumption.

REFERENCES

- Ampode, K. M. B., & Asimpen, S. M. (2021). Neem (*Azadirachta indica*) leaf powder as phytogenic feed additives improves the production performance, and immune organ indices of broiler chickens. *Journal of Animal Health and Production*, 9(4), 362–370. <https://doi.org/10.17582/journal.jahp/2021/9.4.362.370>
- Febrilianti, M., Putri, R., Wibisono, F. J., & Effendi, M. H. (2024). *Jurnal Vitek Bidang Kedokteran Hewan Vol . 14 No . 1 , Mei 2024 Studi Kasus : Multidrug Resistance Terhadap Bakteri Escherichia Coli Pada Ayam Broiler Di Pasar Tradisional Balongsari Surabaya*. 14(1), 1–7.
- Hussein, A. H., Islam, M. Z., Raihan, J., Ali, M. S., Jahan, S. S., & Islam, M. S. (2024). Evaluation of Herbal Extracts on Performance, Survivability, and Gut Microflora of Broiler Chickens: An Antibiotic-Free Alternative. *Livestock Research Today*, 2(1), 1–10.
- Islas, J. F., Acosta, E., G-Buentello, Z., Delgado-Gallegos, J. L., Moreno-Treviño, M. G., Escalante, B., & Moreno-Cuevas, J. E. (2020). An overview of Neem (*Azadirachta indica*) and its potential impact on health. *Journal of Functional Foods*, 74(August), 104171. <https://doi.org/10.1016/j.jff.2020.104171>
- Killa, Y. M., Maranda, A. P., Hana, M. R., Agroteknologi, P. S., Kristen, U., Wacana, W., Program, M., Agroteknologi, S., Kristen, U., & Wacana, W. (2023). *Efektivitas Pestisida Nabati Ekstrak Daun Mimba (Azadirachta Indica) Dan Srikaya (Annona Squamosa Linn) Untuk Mengendalikan Hama Belalang Kembara (Locusta Migratoria Minilensis Mayen)*. 6, 9–13.
- Mafouo Sonhafouo, V., Kana, J. R., & Nguépi Dongmo, K. (2019). Effects of graded levels of *Azadirachta indica* seed oil on growth performance and biochemical profiles of broiler chickens. *Veterinary Medicine and Science*, 5(3), 442–450. <https://doi.org/10.1002/vms3.162>
- Montesqrit, H., & Adly, D. (2020). PENAMBAHAN TEPUNG DAUN MIMBA (*Azadirachta indica* A. Juss) PADA JAGUNG PIPILAN YANG TERKONTAMINASI AFLATOKSIN DAN PENGARUHNYA *Prosiding Seminar Nasional ...*, 5(April), 95–101. <https://snllb.ulm.ac.id/prosiding/index.php/snllb-lit/article/view/376>
- Nakamura, K., Katafuchi, A., Shimamoto, S., Ogawa, G., Khandelwal, N., Tatsugawa, K., Fujita, Y., Ohtsuka, A., & Ijiri, D. (2022). Effects of a Dried Neem Leaf Extract on the Growth Performance, Meat Yield and Meat Quality in Skeletal Muscle of Broiler Chickens Under High-Temperature Conditions. *Frontiers in Animal Science*, 3(June), 1–5. <https://doi.org/10.3389/fanim.2022.914772>
- Paul, S. S., Venkata, S., Rao, R., Hegde, N., Venkata, M., Narasimha, L., & Reddy, G. N. (2022). *Effects of Dietary Antimicrobial Growth Promoters on Performance Parameters and Abundance and Diversity of Broiler Chicken Gut Microbiome and Selection of Antibiotic Resistance Genes*. 13(June), 1–19. <https://doi.org/10.3389/fmicb.2022.905050>
- Paul, T. K., Hasan, M. M., Haque, M. A., Talukder, S., Sarker, Y. A., Sikder, M. H., Ali Khan, M. A. H. N., Sakib, M. N., & Kumar, A. (2020). Dietary supplementation of Neem (*Azadirachta indica*) leaf extracts improved growth performance and reduced production cost in broilers. *Veterinary World*, 13(6), 1050–1055. <https://doi.org/10.14202/vetworld.2020.1050-1055>
- Peters, B. G., & Pierre, and J. (2003). *Effect Of Graded Levels Of Processed Neem (Azadirachta indica) Leaf As Feed Additive On Growth Performance And Carcass Traits Of Broiler Birds*. 1, 147–173.
- Shibi Thomas, K., Kannan, D., Mani, K., & Saravanan, S. (2017). Effect of neem (*Azadirachta Indica*) leaf powder supplementation on the performance of Japanese quail. *Indian Veterinary Journal*, 94(9), 33–35.

- Sutradhar, S. K., Chatterjee, J. K., & Chakraborty, P. S. (2025). Effect of Neem Leaves (*Azadirachta indica*) as a Growth Promoter in Broiler Chickens. *International Journal of Bio-Resource and Stress Management*, 16(July, 7), 01–08. <https://doi.org/10.23910/1.2025.6031>
- Wiryan, K. G., Pratama, S., Lw, P., Vxvfhsweoh, Y. H. U., Ghvhdvhv, W. R., Plfurrujdqlvpv, F. E., & Dv, V. (2017). Growth Performances of Broiler Chicken Fed Diets Supplemented with Graded Levels of Neem Leaf Meals. In *International Seminar on Tropical Animal Production (ISTAP)*, 256–259.