

Literature Review: The Effects of Various Herbal-Based Phytobiotics on Body Weight Gain and Feed Conversion Ratio in Broiler

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Abstract

This literature review examines the effects of various herbal-based phytobiotics on body weight gain (BWG) and feed conversion ratio (FCR) in broiler chickens. In line with Indonesia's Free Nutritious Meal (MBG) program launched in 2025, which demands a significant increase in broiler production to meet protein requirements, herbal phytobiotics emerge as promising natural feed additives to enhance poultry performance while reducing dependence on antibiotic growth promoters. Data synthesized from relevant scientific articles published in the last decade reveal that certain phytobiotics, such as bitter melon (*Momordica charantia*), red ginger (*Zingiber officinale* var. *rubrum*), turmeric (*Curcuma longa*), and areca nut powder (*Areca catechu*), significantly improve BWG and FCR compared to conventional diets. These effects are attributed to their bioactive compounds with antimicrobial, anti-inflammatory, and antioxidant properties that support gut health, nutrient absorption, and overall growth efficiency. However, variations in effectiveness were observed depending on the type of phytobiotic and dosage applied, indicating the need for further optimization of feed formulations. Overall, herbal-based phytobiotics show considerable potential as natural, sustainable alternatives to antibiotics in broiler nutrition, supporting both productivity and the development of environmentally friendly poultry farming in response to national food security goals.

INTRODUCTION

In 2025, the Indonesian government launched the Free Nutritious Meals (MBG) program as a strategic effort to improve the nutritional quality of the community. In this program, broiler chicken meat is the main component of the nutritious diet, providing a source of animal protein. The projected need for broiler chickens to meet this program is estimated to reach around 70,000 tons of meat per year, and domestic production must be able to meet this amount to maintain national food security (Kementan, 2024). Along with the implementation of the MBG program, innovation in the feed sector is crucial to support increased broiler production. In broiler production systems, several constraints such as poor feed efficiency, intestinal health disorders, and the restriction of antibiotic growth promoters often reduce production performance. Recent studies suggest that herbal-based phytobiotics may serve as effective natural feed additives capable of improving digestive function, modulating gut microbiota, and enhancing growth performance in broiler chickens (Obianwuna et al., 2024; Dastgerdi & Mahdi, 2022). One innovation that has received attention is the use of herbal-based phytobiotics as natural feed additives. Phytobiotics have been shown to increase body

weight gain and reduce the feed conversion ratio in broiler chickens, thereby increasing livestock productivity economically and efficiently. This also supports reducing dependence on antibiotics, which carry the risk of residues and bacterial resistance (Obianwuna et al., 2024)

Various herbal sources containing bioactive compounds have been used as phytobiotics in broiler chicken feed, such as red ginger, turmeric, Javanese ginger, and garlic. These phytobiotic compounds have antimicrobial, anti-inflammatory, and antioxidant properties that can improve chicken digestive health and maintain microbiota balance. A healthy gut contributes to increased nutrient absorption, which impacts optimal growth and reduces FCR (Siswantoro et al., 2021). In addition to improving production performance, phytobiotics also play a role in increasing broiler chickens' immunity to pathogens and environmental stress. With good immunity, mortality rates decrease and carcass quality improves. This is significant for farmers in maintaining production continuity and sustainably increasing business results (Aljumaah et al., 2020).

The use of herbal-based phytobiotics as a feed innovation is also in line with the global trend towards environmentally friendly and sustainable livestock farming. Phytobiotics derived from natural ingredients can reduce the negative impacts of synthetic chemical use in livestock production. In addition to providing production benefits, this approach also supports consumer health and meets market requirements that increasingly demand products with high food safety standards (Wardah & Sihmawati, 2020). This literature review aims to examine the effects of various herbal-based phytobiotics on body weight gain and feed conversion ratio in broiler chickens. This research is expected to provide a comprehensive overview that can serve as a basis for developing natural alternative feeds to support increased broiler chicken production to meet the needs of the Free Nutritional Meal program and maintain the sustainability of the national livestock industry.

RESEARCH METHODOLOGY

This study employed a literature review approach by collecting, reviewing, and synthesizing data from relevant scientific publications related to the use of herbal-based phytobiotics in broiler chickens. The literature search was conducted using several scientific databases, including ScienceDirect and Google Scholar. Articles published within the last ten years (2015–2025) were identified using keywords such as phytobiotics, herbal feed additives, broiler chickens, body weight gain, and feed conversion ratio.

A total of 45 articles were initially identified through the database search. After screening based on relevance to the research topic, availability of experimental data, and methodological quality, 18 articles were selected for further analysis. These selected studies were then systematically reviewed to obtain a comprehensive understanding of the effects of herbal phytobiotics on broiler growth performance, particularly body weight gain (BWG) and feed conversion ratio (FCR), which served as the basis for drawing conclusions and recommendations for the development of natural feed additives in broiler production systems.

RESULTS AND DISCUSSION

The data presented in Table 1 indicate variations in the effects of different types of herbal phytobiotics on body weight gain (BWG) and feed conversion ratio (FCR) in broiler chickens based on findings reported in previous studies. The bitter melon-based phytobiotic as a basal with a concentration of 0.75% gave the highest BW value of 2195.2 grams per head with an FCR of 1.46, indicating the great potential of this plant in supporting optimal growth in broiler chickens (Gultom et al., 2022). This is thought to be related to the content of bioactive compounds such as flavonoids and tannins in bitter melon, which increase digestive activity and nutrient absorption. Furthermore, Red Ginger powder, given a basal dose of 2%, also showed a significant increase in BWG, reaching 1957 grams per head with an FCR of 1.22

(Utami et al., 2023). Red ginger contains anti-inflammatory and antioxidant compounds that help maintain a healthy digestive tract, thereby improving feed efficiency and chicken growth performance.

Table 1. Effect of Herbal Phytobiotics on Body Weight Gain and Feed Conversion Ratio of Broiler

Phytobiotic Type	Basal Diet Composition	Inclusion Level (%)	Body Weight Gain (G/Bird)	Feed Conversion Ratio (FCR)	Source
Brotowali (<i>Tinospora crispa</i>) Stem Powder	Concentrate, rice bran, ground corn	1.0	799.43	3.36	(Armayanti et al., 2024)
Areca Nut (<i>Areca catechu</i>) Powder	Commercial feed	1.5	1470.00	1.29	(Nilawati & Gustian, 2023)
Red Ginger (<i>Zingiber officinale</i> var. <i>rubrum</i>) Powder	Basal diet	2.0	1957.00	1.22	(Utami et al., 2023)
Bitter Melon (<i>Momordica charantia</i>) Leaf Powder	Basal diet	0.75	2195.2	1.46	(Gultom et al., 2022)
Atshiba Leaf Powder	BR1 and BR2 feeds	1.5	1635.60	1.46	(Oktaviana & Windhari, 2019)
Turmeric (<i>Curcuma longa</i>) Powder	Commercial feed	1.5	1091.87	1.08	(Sadi et al., 2024)
Ketapang (<i>Terminalia catappa</i>) Leaf Extract	CP 11 and CP 12	2.5	635.32	1.65	(Harahap et al., 2023)
Temulawak (<i>Curcuma xanthorrhiza</i>) Rhizome Extract	CP 11 and CP 12	2.5	647.88	1.67	(Harahap et al., 2023)
Noni (<i>Morinda citrifolia</i>) Leaf Extract	Corn, rice bran, concentrate, coconut oil	0.1	1408.58	1.91	(Sukoco, 2018)

Commercial areca nut powder at 1.5% yielded a BWG of 1470 grams and a low FCR of 1.29, which also demonstrated the effectiveness of this phytobiotic in improving feed efficiency. Nilawati and Gustian (2023) reported that areca nut powder has antimicrobial activity that helps control pathogenic bacteria in the intestine, which has a positive impact on livestock growth and feed conversion. Turmeric phytobiotic at 1.5% yielded a BWG of 1091.87 grams with a highly efficient FCR of 1.08, which is the lowest FCR value among other phytobiotics in the table (Sadi et al., 2024). Turmeric contains curcumin, which is known as a powerful antioxidant and can improve digestive system function and accelerate energy metabolism, thereby reducing feed use more effectively (Sadi et al., 2024).

Noni leaf extract mixed with corn, rice bran, concentrate, and coconut oil showed a relatively high PBB of 1408.58 grams but with a higher FCR of 1.91. This indicates that although growth was stimulated, feed utilization efficiency was not optimal, possibly due to different energy metabolism or the need for more tailored feed formulation (Sukoco, 2018). The effect of phytobiotics on FCR also appeared to differ among the types of herbs used. For example, ketapang leaf extract and temulawak rhizome extract, both at 2.5% concentration, provided an FCR above 1.6 with a lower BWG than ginger and bitter melon (Harahap et al., 2023). This condition shows the importance of the correct dosage and composition of feed to

maximize production efficiency and performance, while also emphasizing that not all phytobiotics have the same effect under similar rearing conditions.

CONCLUSIONS AND SUGGESTION

Based on the literature review, it can be concluded that the use of herbal-based phytobiotics in broiler chickens has been proven to improve production performance through higher body weight gain and a more efficient feed conversion ratio, although effectiveness varies between herbal types and doses administered. Plants such as bitter melon, red ginger, turmeric, and areca nut powder showed the most prominent results in terms of both growth and feed efficiency, while several other herbal extracts still require formulation optimization. Overall, herbal phytobiotics have great potential as an alternative natural additive to antibiotics, supporting broiler productivity, and aligning with the direction of sustainable livestock development and the national program for improving community nutrition.

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