The Role of Lemon Grass (*Cymbopogon citratus*) in Improving Carcass Quality and Final Body Weight

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Abstract. Lemon grass (*Cymbopogon citratus*) has been valued for its aromatic and medicinal properties. This study explores its role in improving carcass quality and final body weight in broilers. The increasing global demand for high-quality meat products necessitates sustainable animal production systems. Traditional methods often use synthetic additives and antibiotics, raising concerns about food safety and environmental impact. Thus, natural alternatives like lemon grass, rich in essential oils, flavonoids, and phenolic compounds, are gaining attention. This experiment, conducted at Politeknik Negeri Lampung using four threatments and five replications and for further test using Duncan. The highest body weight and carcass percentage were observed in broilers with 1.5% lemon grass extract in drinking water. This study confirms lemon grass's potential as a natural feed additive, promoting sustainable and efficient livestock farming practices while improving meat production quality. Further research is recommended to optimize inclusion rates and understand long-term effects.

Keywords: *broiler, lemongrass, carcass*

INTRODUCTION

Lemon grass (*Cymbopogon citratus*), a perennial plant native to tropical regions, has long been valued for its aromatic properties and medicinal benefits. Recently, its potential applications in animal husbandry have garnered significant attention. This research paper aims to explore the role of lemon grass in improving carcass quality and final body weight in livestock, particularly focusing on its effects when included in broiler drinking water. The study seeks to provide a comprehensive understanding of how lemon grass can enhance meat production, thereby contributing to more sustainable and efficient livestock farming practices. The global demand for high-quality meat products has been steadily increasing, driven by population growth and rising incomes. Consequently, the livestock industry faces the challenge of meeting this demand while ensuring the sustainability and health of animal production systems. Shrimp peptide extract has been shown to enhance final body weight to improve broiler performance [7]. The addition of garlic powder (*Allium sativum*) in broiler rations significantly improved final body weight [6]. Traditional methods of enhancing meat quality and growth rates often involve the use of synthetic additives and antibiotics, which have raised concerns regarding food safety, antibiotic resistance, and environmental impact. As a result, there is a growing interest in natural alternatives that can promote animal health and productivity without adverse effects. Lemon grass, known for its rich content of essential oils, flavonoids, and phenolic compounds, has emerged as a promising natural feed additive. Studies have shown that these bioactive compounds possess antimicrobial, antioxidant, and anti-inflammatory properties, which can positively influence animal health and growth performance. The experiment conducted at the poultry farm showed significant improvements in broiler performance with lemongrass supplementation [1]. The inclusion of lemon grass in animal diets has been reported to improve feed intake,

nutrient utilization, and overall growth rates, leading to better carcass quality and higher final body weights.

Several mechanisms have been proposed to explain the beneficial effects of lemon grass on livestock. Firstly, its antimicrobial properties help in maintaining gut health by reducing pathogenic bacteria, thereby enhancing nutrient absorption and feed efficiency. Secondly, the antioxidant activity of lemon grass protects cells from oxidative stress, which is crucial for maintaining optimal metabolic functions and growth. Additionally, the anti-inflammatory effects of lemon grass can mitigate stress responses in animals, promoting better health and growth conditions. Empirical evidence supporting the use of lemon grass in livestock diets is growing. For instance, studies on poultry have demonstrated that lemon grass supplementation can lead to significant improvements in body weight gain, feed conversion ratio, and meat quality parameters such as tenderness and juiciness. Similar positive outcomes have been observed in other livestock species, including swine and ruminants, highlighting the versatility and efficacy of lemon grass as a feed additive. The study by [8]compared the effects of probiotic powder, liquid, and combination on broiler carcass quality and percentage. The experiment conducted at the poultry farm examined the effect of adding different levels of lemongrass leaves (*Cymbopogon citratus*) to the diet and its extract to drinking water on the productive performance of broiler chickens [4]. The pre-slaughter management is a key factor in reducing carcass and meat quality due to stress conditions [5]. Despite the promising results, further research is needed to fully understand the optimal inclusion rates, modes of action, and long-term effects of lemon grass supplementation in different animal species. This research paper aims to address these gaps by providing a detailed analysis of existing studies and conducting new experiments to evaluate the impact of lemon grass on carcass quality and final body weight in livestock. The findings of this study are expected to contribute to the development of more sustainable and health-conscious livestock production practices, ultimately benefiting both producers and consumers. By investigating the role of lemon grass in improving carcass quality and final body weight, this research seeks to offer valuable insights into natural feed additives that can enhance the efficiency and sustainability of meat production.

METHODS

Experimental Design

This study was conducted in Politeknik Negeri Lampung, to evaluate the role of lemon grass (Cymbopogon citratus) in drinking water on improving carcass quality and final body weight of broiler chicks. A total of 100 day-old broiler chicks were used in this experiment. The chicks were randomly assigned to four treatment groups with five replications per group, and each replication consisted of five chicks. The experimental design followed a completely randomized design (CRD) to ensure unbiased results.

Treatments

The four treatment groups were as follows:

Control Group (T0)	: Broiler chicks received plain drinking water without any additives.
Lemon Grass Concentration (T1)	: Broiler chicks received drinking water supplemented with 0.5% lemon grass extract.
Lemon Grass Concentration (T2)	: Broiler chicks received drinking water supplemented with 1.0% lemon grass extract.
Lemon Grass Concentration (T3)	: Broiler chicks received drinking water supplemented with 1.5% lemon grass extract.

Preparation of Lemon Grass Extract

Fresh lemon grass (Cymbopogon citratus) was obtained from a local market. The leaves were washed thoroughly, air-dried, and then using destilation method to separate extract and oil.

Housing and Management

The broiler chicks were housed in a well-ventilated poultry house with a controlled environment. Each replication group was kept in separate pens with adequate space, feeders, and drinkers. The chicks were provided with a commercial broiler starter diet for the first three weeks, followed by a broiler finisher diet until the end of the experiment. Feed and water were provided ad libitum throughout the study period. Standard management practices, including vaccination and biosecurity measures, were strictly followed.

Data Collection

Growth Performance

The final body weight was measured at the end of the experiment to assess the growth performance of the chicks.

Carcass Quality

At the end of the experiment, five chicks from each treatment group were randomly selected and slaughtered for carcass quality evaluation. The parameters measured dressing percentage. Dressing Percentage : The ratio of the dressed weight to the live weight of the chicks.

Statistical Analysis

The data collected were subjected to statistical analysis using analysis of variance (ANOVA) to determine the significance of differences among the treatment groups. The means were compared using Duncan's multiple range test at a significance level of $P < 0.05$. All statistical analyses were performed using SPSS software (version 25.0).

RESULTS AND DISCUSSION

Table 1. Average value of final body weight and carcass percentage in broiler with *Cymbopogon citratus* extract

Parameter	P0	P1	P2	P3
Final BW (gr)	876.00±33.61[a]	949.00±32.09[ab]	952.00±28.63[ab]	1013.80±18.08[bc]
Carcass percentage (%)	77.14±0.89[a]	78.90±0.69[ab]	78.97±0.61[ab]	80.26±0.34[bc]

[abc] means in the same row are not different at P<0.05

Final Body Weight

The highest final body weight was observed in the P3 group (1013.80±18.08), which is significantly higher than the other groups. The statistical analysis showed that adding different levels of lemon leaves to its extract to drinking water significantly improved broiler final body weight.This suggests that the treatment applied in P3 had a positive effect on the final body weight of the broilers. Research from [3], lemongrass extract significantly impacted broiler growth performance, lemongrass extract showed the highest BW increase by 9.51%. Lemongrass contains phytochemicals with various pharmacological actions, optimizing bird performance and gut health. This study investigates lemongrass extract on broiler body weight performance due to its high nutritional value. Moreover the study from [2] examined the impact of adding lemongrass leaves and extract to broiler significant improvements in body weight.

Carcass Percentage

The highest carcass percentage was also observed in the P3 group (80.26±0.34), which is significantly higher than the other groups. This indicates that the treatment in P3 not only improved the final body weight but also enhanced the carcass quality. While dietary herbal inclusions like citrus oils can improve broiler performance and carcass traits, their effects on gut health remain underexplored. Research from [1] investigated the effect of lemongrass leaves and extract on broiler chickens, showing significant improvements in carcass quality. Adding extract lemongrass importance to pre-slaughter. Moreover research from [1] pre-slaughter management affects carcass quality and broiler meat due to stress, this study evaluated lemongrass infusions in pre-slaughter broiler diets, examining carcass and meat quality.

CONCLUSIONS

The Duncan's Multiple Range Test results show that the treatment applied in P3 significantly improved both the final body weight and carcass percentage of the broilers compared to the other treatments. This suggests that the specific intervention used in P3 is effective in enhancing broiler performance. Further research could explore the mechanisms behind these improvements and validate the findings in different settings.

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