

The Addition of Wasted Powdered Milk in Rooster Feed on Feed Conversion Ratio (FCR) and Income Over Feed Cost (IOFC), Carcass Weight, and Abdominal Fat

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History Article:

- Submit: August 2025
- Publish: April 2026

Keyword:

Rooster, Wasted Powdered Milk, FCR, IOFC, Carcass Weight, Abdominal Fat, Business Plan

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Abstract

Feed costs are a significant challenge in poultry farming, particularly in the production of roosters, where they account for more than 60% of total production costs. To mitigate these expenses, it is essential to explore alternative, affordable feed ingredients that still support optimal poultry performance. Wasted powdered milk, despite being unfit for human consumption, is rich in protein, energy, vitamins, and minerals, making it a promising feed ingredient. This study evaluates the effects of adding wasted powdered milk to rooster feed on Feed Conversion Ratio (FCR), Income Over Feed Cost (IOFC), carcass weight, and abdominal fat. In addition, a financial analysis was conducted to assess the economic viability of incorporating this by-product into poultry diets. The experiment involved 90 roosters, divided into three treatment groups: P0 (0%), P1 (2%), and P2 (4%) wasted powdered milk. The results demonstrated that the 4% supplementation (P2) achieved the best outcomes, with a lower FCR of 2.11 kg/bird, the highest IOFC of IDR 13,308 per bird, and a significant increase in carcass weight (536.7 g/bird). Although a slight increase in abdominal fat was observed, there was no significant difference between treatments ($p > 0.05$). A financial analysis for a production scale of 5,000 birds indicated that the use of wasted powdered milk in rooster feed is economically feasible, with R/C Ratios ranging from 1.10 to 1.13, an ROI of 10.85–23.3%, and an investment payback period of 7–9 production cycles. This study recommends the inclusion of 4% wasted powdered milk as an effective method to improve feed efficiency, carcass quality, and profitability in poultry farming, while also promoting the sustainable use of dairy by-products.

INTRODUCTION

The poultry industry, particularly in the production of broilers and roosters, faces ongoing challenges in improving production efficiency. Feed costs represent over 60% of total production costs, making it crucial to explore alternative feed ingredients that are both cost-effective and nutritionally adequate. One such alternative is wasted powdered milk, which is often discarded by the dairy industry due to its inability to meet commercial standards for human consumption. Despite this, wasted powdered milk is a rich source of essential nutrients, including protein, fat, carbohydrates, and minerals, making it a viable candidate for poultry feed supplementation.

This by-product is comparable in nutritional value to traditional feed ingredients like soybean and corn, but it comes at a lower cost, presenting a potentially economical solution for poultry farmers. Studies by Kusuma et al. (2024) and Blongkod et al. (2024) have investigated the effects of supplementing rooster feed with various levels of wasted powdered milk, evaluating key performance indicators such as FCR, IOFC, carcass weight, and abdominal fat. These studies highlight the significant nutritional and economic benefits of incorporating wasted powdered milk into poultry diets.

RESEARCH METHODOLOGY

Research Design

This study employed a Completely Randomized Design (CRD) to assess the effects of supplementing rooster feed with wasted powdered milk. The experiment was conducted in two parts: one focused on evaluating FCR and income over feed cost (IOFC), while the other examined carcass weight and abdominal fat content. Each treatment group was repeated six times, with five birds per replicate, resulting in a total of 90 birds.

Treatments

Three levels of rejected milk powder supplementation were used:

- a. P0: No milk powder supplementation (control).
- b. P1: 2% rejected milk powder supplementation.
- c. P2: 4% rejected milk powder supplementation.

The wasted powdered milk was incorporated into the feed during the entire study period. The feed used was a commercial formulation for roosters, with the addition of wasted powdered milk according to the specified treatment levels.

RESULTS AND DISCUSSION

Feed Conversion Ratio (FCR) and Income Over Feed Cost (IOFC)

The addition of wasted powdered milk resulted in significant improvements in FCR. The 4% supplementation group (P2) achieved the lowest FCR at 2.11 kg/bird, indicating better feed conversion efficiency. This improvement is primarily attributed to the high metabolic energy content in the wasted powdered milk, which effectively met the energy needs of the birds, particularly during the finishing phase. The improved feed conversion means that less feed is required for the same weight gain, leading to more efficient poultry production. Treatment **P2 (4%)** resulted in the best FCR, with a value of **2.11 kg/bird**, meaning that chickens in this group required less feed to gain one kilogram of body weight compared to other treatments. In contrast, the **P0 (control)** group had the highest FCR at **2.59 kg/bird**.

This result supports earlier findings that suggest the higher metabolic energy content in rejected milk powder can meet the energy needs of chickens, especially during the finishing phase, which requires additional energy for growth. The milk powder's fat and protein content help improve feed efficiency (Hidayat et al., 2020). Additionally, the unique aroma of milk powder likely stimulates the chickens' appetite, thus increasing feed intake and promoting better growth, as noted by Anastasia (2018).

The P2 group also showed the highest IOFC, reaching IDR 13,308 per bird. This substantial increase in IOFC highlights the cost-saving potential of using wasted powdered milk in poultry feed. By improving feed efficiency and reducing the overall feed cost per unit of weight gain, the supplementation of wasted powdered milk boosts profitability for poultry farmers. This suggests that the use of wasted powdered milk is not only nutritionally beneficial but also economically advantageous, helping reduce feed costs and increase the overall profitability of the farm.

Carcass Weight and Abdominal Fat

The results showed a significant improvement in carcass weight in the P2 group, with an average weight of 536.7 grams per bird, representing a 25.5% increase over the control group. However, abdominal fat content showed no significant difference between the treatments ($p > 0.05$), suggesting that rejected milk powder supplementation did not increase fat accumulation.

Treatment	FCR (kg/bird)	IOFC (IDR/bird)	Carcass Weight (g)	Abdominal Fat (g)
P0 (Control)	2.59	9,697.8	427.5	14.2
P1 (2%)	2.36	11,569.3	475.8	15.3
P2 (4%)	2.11	13,308.1	536.7	16.0

Figure 1: Feed Conversion Ratio (FCR) for Different Treatments

Graph showing the comparison of FCR values across treatments

CONCLUSIONS AND SUGGESTIONS

The addition of 4% wasted powdered milk in rooster feed significantly improved Feed Conversion Ratio (FCR), carcass weight, and Income Over Feed Cost (IOFC). The 4% supplementation resulted in the lowest FCR (2.11 kg/bird) and the highest IOFC (IDR 13,308 per bird), demonstrating significant improvements in feed efficiency and profitability. Additionally, the 4% supplementation led to a 25.5% increase in carcass weight compared to the control group, while abdominal fat content did not show significant differences. This study recommends the inclusion of 4% wasted powdered milk as an effective feed supplement to enhance feed efficiency, carcass quality, and profitability in rooster farming. The use of wasted powdered milk also promotes more sustainable farming practices by utilizing dairy industry by-products. Further research is needed to explore the long-term effects and the potential for using other dairy by-products in poultry feed.

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