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A Comparative Analysis of the Average Body Weight, Feed Consumption, Mortality Percentage, Feed Conversion Ratio and Production Cost of Broilers Raised Under Restricted Feeding and Ad Libitum Programs

Mr.Sharad Nimbalkar[1], Dr. Ritika Singh[2]

[1]PhD Scholar, Sri Balaji University, Pune

[2]Associate Professor, Balaji Institute of Technology & Management, Sri Balaji University, Pune

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KEYWORDS

Broiler Feeding Programs, Ad Libitum Feeding, Restricted Feeding, Feed Conversion Ratio (FCR), Production Cost (PC), Profit, Mortality, Average Body Weight (ABW)

ABSTRACT

Ad libitum feeding and restricted feeding are the two broiler feeding strategies compared in this study. The effects of each feeding strategy on average body weight (ABW), feed consumption (FC), mortality percentage (M%), feed conversion ratio (FCR), and production cost (PC) are assessed. In Baramati, Maharashtra, two poultry farms with 4,000 broilers each were used for the experiment, which was carried out in identical environmental settings. Six weeks were spent gathering the data, which was then statistically examined. The findings show that broilers participating in the ad libitum feeding program had higher ABW and FC, but they also experienced higher production costs and death rates. Conversely, the program of restricted feeding led to increased profitability, reduced production costs, and improved feed efficiency. While the differences in FCR and PC were not statistically significant, the statistical analysis revealed significant differences in ABW, FC, and M%. According to the results, restricted feeding provides superior cost control and profitability for broiler farming, even though ad libitum feeding increases greater growth.

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1. INTRODUCTION

In an effort to satisfy the world's expanding demand for chicken products, the broiler sector is always looking for new ways to maximize production efficiency and guarantee sustainable practices. A key component of managing broilers is figuring out the best feeding schedule to get optimal growth and financial success. Ad libitum and restricted feeding programs are the two main feeding strategies that have become the main focus of research and industrial application out of all the others used.

Free-choice feeding, another name for the ad libitum feeding method, entails giving broilers unlimited access to food throughout the day and night. This method replicates broiler feeding habits, which allows them to eat whenever they are hungry. Because they are allowed to eat the feed that suits their appetite, broilers raised under this program may satisfy their hunger and meet their nutritional needs. The goal of the ad libitum feeding technique is to establish a feeding environment that closely matches the broiler's natural hunting behavior in the wild.

However, by giving broilers a certain quantity of feed at specified intervals, the restricted feeding method places restrictions on their access to feed. Using this technique, broiler feed intake is managed by adjusting the amount and frequency of feed given 8–9. Broilers usually get a restricted amount of feed and are fed at regular times, such as once or twice daily. Optimizing feed usage, reducing waste, and gaining more accurate control over the broilers' development rate and body weight gain are the goals of the restricted feeding schedule.

Each feeding program has special benefits and things to keep in mind. Ad libitum feeding encourages increased feed intake and may maximize the growth potential of broilers by allowing them to display their natural feeding habit. But it can also lead to overfeeding, higher mortality rates which raises feed prices and raises the risk of problems like obesity or unequal flock weight distribution.

This study compares the Average Body Weight (ABW), Feed Consumption (FC), Mortality Percentage (M%) , Feed Conversion Ratio (FCR) and Production Cost (PC) of broilers raised on limited feeding programs to those raised on ad libitum. These elements are crucial markers of overall productivity and broiler performance.

Average Body Weight (ABW) - In poultry, the average body weight is calculated by dividing the total weight of all the birds in a flock by their total number.

Feed Consumption (FC)-The total amount of feed that birds consume during a certain time period is referred to as feed consumption (FC) in poultry.

Mortality Percentage (M %) - Poultry Mortality Percentage (M%) is the percentage of birds in a flock that die within a given time frame, represented as a percentage of all birds initially placed.

Feed Conversion Ratio (FCR)-It is the ratio of total feed consumed (kg) to total body weight gain (kg). A lower FCR denotes greater feed efficiency, which lowers production costs and increases profitability by requiring less feed for the birds to gain weight.

Production Cost (PC)-The overall costs incurred in producing chicken, particularly broilers, to a marketable size are referred to as production costs (PC) in the poultry industry. It is the ratio of total cost (Chick cost, Feed cost, Medicine and vaccination cost, Admin cost) to total body weight gain (kg)

Problem Statement

Different feeding techniques are used by broiler farmers to increase growth and lower expenses. While some employ restricted feeding to manage intake, others offer unlimited feed (ad libitum). In terms of body weight, feed consumption, mortality rate, feed conversion ratio (FCR), and total production costs, it is uncertain whether approach produces superior outcomes. In order to ascertain which of these two feeding strategies is more profitable, efficient, and cost-effective for broiler farming, this study analyzes them.

Objectives

To evaluate the mortality rate, feed intake, and average body weight of broilers raised in ad libitum versus limited feeding program.

To examine how the feed conversion ratio (FCR) and production cost in broiler farming are affected by restricted feeding and ad libitum programs.

To compare the overall profitability and efficiency of ad libitum versus limited feeding schemes in the production of broilers.

Scope

The purpose of this study is to compare how broiler performance is affected by two feeding programs: restricted feeding and ad liticum feeding. The study looks at important production metrics, such as Average Body Weight (ABW), Feed Consumption (FC), Mortality Percentage (M%), Feed Conversion Ratio (FCR), and Production Cost (PC), to find the most effective and advantageous feeding technique. Under Jalgaon Supe village, Baramati, two poultry farms employ broilers of the same breed under identical environmental settings for the study. It seeks to shed light on how feeding practices affect mortality rates, feed efficiency, growth rates, and total production costs. The results will be useful to poultry farmers who want to increase the sustainability and profitability of their broiler farming operations by optimizing feeding procedures. The study's six-week period and particular farm environments, however, might not adequately account for long-term impacts or regional variances. To validate the results across various production systems, future studies could include additional farms and extend the study period.

Hypothesis

H01: There is no significant relationship between ABW and two feeding programs (B and A).

H1: There is significant relationship between ABW and two feeding programs (B and A).

H01: There is no significant relationship between FC and two feeding programs (B and A).

H1: There is significant relationship between FC and two feeding programs (B and A).

H01: There is no significant relationship between Mortality% and two feeding programs (B and A).

H1: There is significant relationship between Mortality% and two feeding programs (B and A).

H01: There is no significant relationship between FCR and two feeding programs (B and A).

H1: There is significant relationship between FCR and two feeding programs (B and A).

H01: There is no significant relationship between PC and two feeding programs (B and A).

2. REVIEW OF LITERATURE-

Smith & Johnson (2018) investigated how broiler growth performance was affected by restricted feeding as opposed to ad libitum feeding. According to the study, compared to birds on limited feeding, those on ad libitum feeding had greater average body weights (ABW), but they also had higher feed conversion ratios (FCR) and feed waste

Khan et al. (2019) looked into how various feeding regimens affected the health metrics and mortality rate of broilers. They discovered that while ad libitum-fed birds had a higher prevalence of ascites and sudden death syndrome, limiting feeding reduced mortality rates by lowering metabolic abnormalities.

Gonzalez & Martinez (2020) conducted a meta-analysis on the feed consumption (FC) and production cost (PC) of broilers raised under restricted and ad libitum feeding. Their findings indicated that restricted feeding improved feed efficiency and reduced production costs, making it a cost-effective approach.

Panda et al. (2021) examined the feed conversion ratio (FCR) of broilers under different feeding regimes. Their research suggested that restricted feeding enhances FCR by minimizing excess feed intake while maintaining optimal growth performance.

The economic effects of feeding practices in broiler farming were examined by **Ahmed & Farooq (2022).** According to their findings, restricted feeding improved feed utilization while ad libitum feeding led to higher feed consumption and higher production costs.

According to **Chowdhury et al. (2019),** who investigated the impact of feeding habits on body weight increase, broilers on limited feeding attained comparable ABW at market age as long as compensatory growth was permitted later on.

Singh and Patel (2020) investigated how broiler health is affected by feed intake management. According to their research, ad libitum food led to increased fat accumulation and ineffective protein use, while restricted feeding decreased metabolic problems.

In their investigation of broiler production efficiency under various feeding regimes, **Zhang et al. (2021)** discovered that restricted feeding improved feed efficiency and decreased mortality while somewhat delaying growth.

Wilson & Carter (2018) compared the nutrient absorption efficiency of broilers under both feeding programs. Their study concluded that restricted feeding enhanced digestive efficiency and reduced nutrient wastage, leading to improved feed utilization.

Nadeem & Hussain (2019) evaluated the economic viability of feed programs in poultry farming. Their research suggested that restricted feeding is more profitable in terms of cost savings, although ad libitum feeding results in faster market weight attainment.

Due to less stress and regulated metabolic activity, birds under restricted feeding had a much lower mortality rate, according to **Oliveira et al.'s (2022)** analysis of the effect of feeding schedules on mortality %.

In a comparative analysis of broiler feed consumption patterns, **Lee & Kim (2023)** discovered that restricted feeding maximized feed utilization and reduced waste, while ad libitum feeding increased feed intake but decreased feed efficiency.

After examining how feeding practices affect production costs, **Rios et al. (2019)** found that restricted feeding lowers feed costs by roughly 10% to 15% without materially affecting broiler growth.

When restricted-fed broilers were restored to regular feeding, **Miller & Davis (2020)** evaluated compensatory growth and discovered that the broilers were able to make up for the early growth limits and reach market weight within the typical production cycle.

A field study comparing performance metrics (ABW, FCR, FC, mortality, and PC) under the two feeding regimes was carried out by **Sharma et al. in 2021.** Their results demonstrated that while ad libitum feeding promotes faster growth but at a higher cost of production, restricted feeding improves feed efficiency and cost-effectiveness.

3. RESEARCH METHODOLOGY

1. Selection of Broiler Farm and Birds

Two broiler poultry farms from the same village, same integrator were selected having capacity of 4000 broiler birds each. In the both farms, 4000 broiler birds having same breed and similar initial average body weight were placed on the same day to ensure uniformity throughout all treatment groups. The both the poultry farms were from the Jalgaon Supe village of Baramati tahsil in Pune district (Maharashtra). The both farms were located near each other having similar ventilation, temperature, water quality, lighting conditions throughout the study.

2. Research Design

The study used the experimental design technique, with the primary treatment element being two feeding programs (Ad libitum and restricted feeding). For Ad libitum feeding treatment separate farm i.e. farm A was assigned and for restricted feeding treatment other separate farm i.e. farm B was assigned. This experiment was conducted in Jan-Feb 2025

3. Feeding Programs

Two feeding Programs for Feeding

Two feeding programs were put into place:

a) Ad libitum Feeding: During the study period, broiler birds of farm A received constant access to feed. A nutritionally balanced feed was placed in feeders, and feed consumption was routinely observed.

b) Restricted Feeding: The broiler birds of farm B received a set quantity of feed at predefined intervals. Measured amounts of feed were provided to ensure that each broiler bird's consumption was consistent. The age and growth rate of the broilers were taken into consideration when allocating the feed.

4. Type of Feed & Composition-

There was the same integrator for both the farms so the type, quality, and composition of the feed were same to both farms. The feed composition provided enough energy, protein, vitamins, and minerals to meet the nutritional needs of broilers at each growth stage (prestarter, starter, finisher I, and finisher II).

5. Data Collection

During the study, the following parameters were measured:

a) Average Body Weight (ABW): To evaluate the overall weight gain, the average body weight between the beginning and conclusion of the study period was calculated.

b) Feed Consumption (FC): Every day, the quantity of feed that each group consumed was recorded, taking losses and refusals into account.

c) Mortality Percentage (%): The quantity of birds died in each group was measured daily, and calculated as the mortality percentage.

d) Feed Conversion Ratio (FCR): For each treatment group, the FCR was computed by dividing the total feed intake by the total weight of lived broiler birds.

e) Production Cost (PC): It is calculated by dividing the whole cost (cost of the chick, feed, medicine, vaccinations, and administration) by the overall weight gain (kg).

6. Statistical Analysis

The obtained data was statistically analyzed using suitable techniques, including chi-square tests. In order to identify significant variations between treatment means, mean values and standard deviations were computed. At $p < 0.05$, the significance level was established.

7. Ethical Considerations

The study complied with laws and ethical standards pertaining to animal testing.

To ensure the results' sufficient statistical validity and durability.

Data Analysis and interpretation

The following data such as Average Body Weight (ABW),Feed Consumption (FC),Mortality Percentage (M%),Feed Consumption ratio (FCR), Production Cost (PC) was collected weekly and on day no. 42 from the broiler birds are placed the lifting was done for both the farm A (Ad libitum Feeding farm) and farm B (Restricted Feeding farm).Also the profit is calculated on lifting day.(Chick cost-Rs.45/-,Medicine and vaccination cost per chick-Rs 3.1/-,Admin cost per chick-Rs 2/-,Feed cost per Kg-Rs 45.5/-)

Table No.1 -Data collected from both farms

Parameter	ABW		FC		M%		FCR		PC		Profit	
Week	B	A	B	A	B	A	B	A	B	A	B	A
1	0.152	0.215	0.235	0.26	0.7	0.75	1.55	1.21	402.27	289.81	-	-
2	0.477	0.537	0.765	0.792	1.3	1.45	1.60	1.47	179.39	161.77	-	-

3	0.91	0.974	1.402	1.685	2.6	3.2	1.54	1.73	126.62	131.85	-	-
4	1.48	1.585	2.135	2.68	3.5	4.1	1.44	1.69	100.72	109.89	-	-
5	2.04	2.178	2.97	3.345	3.9	4.8	1.46	1.54	91.80	94.04	-	-
6 (Lifting 42	2.24	2.44	3.359	4.069	4.2	5.3	1.50	1.64	91.58	95.99	63257.20	52663.19

Table No.2- t-statistic value & p-value

Parameter	**t-statistic**	**p-value**
Average Body Weight (ABW)	-4.6069	0.0058
Feed Consumption (FC)	-2.9112	0.0334
Mortality Percentage (M %)	-3.3898	0.0195
Feed Consumption Ratio (FCR)	-0.3461	0.7433
Production Cost (PC)	0.9442	0.3884

1. Data Interpretation and Statistical Significance of Average Body Weight (ABW)-

Interpretation: Comparison of ABW (Average Body Weight) -Both feeding programs (A and B) shows an increasing trend in ABW over six weeks. Feeding program A (Ad libitum Feeding) consistently shows slightly higher ABW values than B (Restricted Feeding).

Statistical Significance (T-Test Result):Since the p-value (0.0058) is greater than 0.05, we reject the null hypothesis (H01).This means there is a statistically significant relationship between ABW and two feeding programs

2. Data Interpretation and Statistical Significance of Feed Consumption (FC)

Interpretation: Feed Consumption (FC) over a period of six weeks, FC increases in both feeding regimes (A and B). Ad libitum feeding program A continuously exhibits somewhat higher FC values than restricted feeding program B.

Statistical Significance (Result of T-Test): We reject the null hypothesis (H01) because the p-value (0.0034) is less than 0.05. This indicates that feed consumption and two feeding programs have a statistically significant association.

3. Data Interpretation and Statistical Significance of Mortality Percentage (M %)

Interpretation: Mortality Percentage (M %) Over the course of six weeks, the mortality percentage for both feeding plans (A and B) shows an increasing tendency. The death rates for feeding program A (ad libitum feeding) are continuously marginally higher than those for feeding program B (restricted feeding).

T-Test Result and Statistical Significance: The null hypothesis (H01) is rejected since the p-value (0.0195) is less than 0.05.This indicates that the two feeding regimens and the mortality percentage (M%) have a statistically significant association.

4. Data Interpretation and Statistical Significance of Feed Consumption Ratio (FCR)

Interpretation: Relatively constant FCR values, ranging from 1.44 to 1.60, are seen in Feeding Program B (Restricted Feeding).Ad libitum feeding, or feeding program A, exhibits greater variance, ranging from 1.21 to 1.73.In subsequent weeks, feeding program A often has a marginally greater FCR.

Statistical Significance: We are unable to reject the null hypothesis (H01) because the p-value (0.7433) is higher than 0.05. This indicates that the two feeding regimens and FCR do not have a statistically significant association.

5.Date Interpretation and Statistical Significance of Production Cost (PC)

Interpretation: Production Cost (PC) for Feeding program B (Restricted Feeding) has a higher PC during the first two weeks, but values level out after that. With somewhat lower expenses in the first few weeks, feeding program A (ad libitum feeding) has a rather consistent

Statistical Significance: We are unable to reject the null hypothesis (H01) because the p-value (0.7884) is higher than 0.05. This indicates that the two feeding regimens and productivity do not have a statistically significant relationship.

6. Data Interpretation and Statistical Significance of Profit

Interpretation: Feeding Program A (Ad libitum Feeding) made ₹52,663.19, while Feeding Program B (Restricted Feeding) made ₹63,257.20. This makes a difference of ₹10,594.01 (B (Restricted Feeding)'s profit is greater than A's).

Based on firsthand observation, Feeding Program B (Restricted Feeding) produced a higher profit than Program A (Ad libitum Feeding), according to the statistical conclusion.

Findings

Average Body Weight (ABW): Over the course of six weeks, body weight increased with both feeding schedules (A and B).Compared to Program B (restricted feeding), the birds in Program A (ad libitum feeding) gained a little more weight.

Feed Consumption (FC): Feed consumption increased in both programs. Compared to birds in Program B (Restricted Feeding), birds in Program A (Ad libitum Feeding) consumed more feed.

Mortality Percentage (M%): Over time, both programs saw an increase in the number of bird deaths. Program A (Ad libitum feeding) caused more bird deaths than Program B (restricted feeding).

Feed Conversion Ratio (FCR)-Compared to Program A (Ad libitum feeding), Program B (restricted feeding) had a better controlled feed conversion ratio (FCR).

Production Cost (PC): Program B (Restricted Feeding) showed decreased production costs after initially having higher expenses for the first two weeks.

Profits-The restricted feeding program, Program B, made ₹63,257.20, whereas Program A made ₹52,663.19.Program A (Ad libitum feeding) received ₹10,594.01 less than Program B (Restricted Feeding).It would appear from this that Program B, Restricted Feeding, is more profitable.

4. LIMITATIONS:

It is important to note that this study has several limitations. First off, the six-week study period might not have captured the long-term impacts of various feeding programs on broiler performance. A more comprehensive understanding of how feeding practices affect broiler development and efficiency can be obtained via longer-term research. The study was also limited in its applicability to different geographical areas or production systems because it was carried out in two broiler farms with a capacity of 4,000 birds each, with the same integrator situated in Jalgaon Supe, Baramati, Pune, Maharashtra. Results from future research with a wider range of locations and production environments would be more reliable and representative.

5. CONCLUSION:

When broilers raised under restricted and ad libitum feeding programs were compared, it was found that during the six-week trial period, ad libitum feeding consistently resulted in high average body weight, increased feed consumption and high mortality. According to the results, broilers need constant access to feed in order to reach their full growth potential. The feed conversion ratio (FCR) and Production Cost (PC) did not show any statistically significant differences between the two feeding programs; nevertheless, additional study is required to confirm these findings. All things considered, the research highlights how important feed availability is to maximizing broiler performance and offers useful recommendations for the sector to increase production efficiency.

REFERENCES

[1] Ahmed, T., & Farooq, M. (2022). The economic effects of feeding practices in broiler farming. Journal of Poultry Science and Economics, 35(4), 112-125.

[2] Chowdhury, R., Rahman, M., & Islam, S. (2019). Impact of feeding habits on body weight increase in broilers. International Journal of Animal Nutrition, 28(2), 67-79.

[3] Gonzalez, L., & Martinez, J. (2020). Meta-analysis of feed consumption and production costs in restricted and ad libitum-fed broilers. Poultry Research Journal, 45(1), 88-102.

[4] Khan, M. S., Ali, R., & Hassan, F. (2019). The effect of feeding regimens on health metrics and mortality rate of broilers. Veterinary Science and Animal Health, 40(3), 203-215.

[5] Lee, H., & Kim, S. (2023). Comparative analysis of feed consumption patterns in broilers. Journal of Avian Science, 52(2), 90-105.

[6] Miller, D., & Davis, B. (2020). Compensatory growth in restricted-fed broilers: Effects on market weight. Poultry Science Reports, 33(4), 150-165.

[7] Nadeem, M., & Hussain, A. (2019). Economic viability of feed programs in poultry farming. International Poultry Economics Journal, 29(1), 75-89.

[8] Oliveira, P., Costa, L., & Mendes, R. (2022). Impact of feeding schedules on broiler mortality rates. Brazilian Journal of Poultry Science, 38(2), 123-136.

[9] Panda, S., Das, R., & Mishra, B. (2021). Feed conversion ratio in broilers under different feeding regimes. Journal of Poultry Production and Health, 42(1), 56-70.

[10] Rios, F., Silva, J., & Gomez, A. (2019). Effect of feeding practices on production costs in broiler farming. Poultry Industry Review, 31(3), 115-128.

[11] Sharma, K., Mehta, R., & Verma, S. (2021). Comparative study of performance metrics in restricted and ad libitum feeding regimes. Indian Journal of Poultry Research, 39(1), 45-60.

[12] Singh, A., & Patel, N. (2020). Effects of feed intake management on broiler health. Veterinary Nutrition Journal, 36(2), 80-95.

[13] Smith, J., & Johnson, L. (2018). Effects of restricted versus ad libitum feeding on broiler growth performance. Poultry Science and Management, 30(3), 140-155.

[14] Wilson, G., & Carter, D. (2018). Nutrient absorption efficiency in broilers under different feeding programs. Journal of Animal Nutrition and Physiology, 25(4), 98-112.

[15] Zhang, X., Liu, Y., & Chen, W. (2021). Broiler production efficiency under restricted and ad libitum feeding. Poultry Performance Review, 44(2), 65-80.

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