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The Influence of Probiotic Administration on the Performance of Laying Hens

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Abstract : This study aims to evaluate the effects of probiotic administration on the performance of laying hens. The research method involves two groups of laying hens kept under the same conditions, with one group receiving probiotic supplementation and the control group receiving standard feed. Parameters observed include egg production rate, egg weight, mortality rate, and overall health. Statistical analysis (t-test, $p < 0.05$) indicates significant differences between groups. The results suggest probiotics enhance productivity and health, with economic benefits for farmers.

Keywords: laying hens, livestock health, performance, probiotics

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INTRODUCTION

Laying hens play a crucial role in the poultry industry, with high egg production being the primary objective. However, challenges in maintaining the health and productivity of laying hens persist, including digestive health disorders that can affect egg production performance. One intriguing approach to improving the digestive health and productivity of laying hens is the administration of probiotics.

Probiotics are increasingly being used in the poultry industry as an alternative to antibiotics to enhance the health and productivity of laying hens. These beneficial microorganisms can improve gut health, egg production, and overall performance in laying hens. Probiotic supplementation has been shown to enhance laying performance, increase egg weight, and improve egg quality, including albumen height and Haugh unit scores (Xiang *et al*., 2019; Lu *et al*., 2021; Wang *et al*., 2024). In this context, this study aims to investigate the influence of probiotic administration on the performance of laying hens, including egg production, digestive health, and other productivity parameters. The results of this research are expected to provide new insights into laying hen management.

MATERIALS AND METHODS

This study employs an experimental design with two treatment groups: a group given feed supplemented with probiotics and a control group given feed without probiotic supplementation. The research sample consists of 100 laying hens divided into two groups, each comprising 50 hens. The laying hens used are 20-week-old hens ready to lay eggs.

Treatments:

1. Treatment Group (Probiotics):
   - Hens in this group are fed standard feed with an additional 1 gram of probiotics per kilogram of feed.
2. Control Group:
   - Hens in this group are fed standard feed without probiotic supplementation.

Observation Parameters:

1. Egg Production Rate:
   - The number of eggs produced each day by each group.

2. Egg Weight:
   - The average weight of eggs produced in each group, measured weekly.

3. Mortality Rate:
   - The number of hens that died during the research period.

4. General Health:
   - The health condition of the hens is assessed based on physical appearance, behavior, and veterinary health examinations.

Data Analysis: The obtained data will be analyzed using the t-test statistical analysis to compare the differences between the treatment and control groups. Significance is determined at $p < 0.05$. This research method will provide in-depth insights into the effects of probiotic administration on the performance of laying hens and can serve as a basis for considering the use of probiotics in enhancing egg production and the health of laying hens.

Subchapters

Egg Production Increase: The research results indicate that the group of laying hens provided with feed supplemented with probiotics showed a significant increase in egg production compared to the control group. Probiotics seem to aid in improving digestive efficiency and nutrient absorption, contributing to the increase in egg production.

Egg Weight: The egg weight in the probiotic-supplemented group was also higher compared to the control group. This is likely due to the improved quality of feed and better nutrient absorption due to the presence of probiotics.

Mortality Rate: The mortality rate in the probiotic group was lower compared to the control group. This suggests that probiotics may play a role in enhancing immunity and overall chicken health, thereby reducing mortality rates.

General Health: Chickens provided with probiotics exhibited better overall health conditions. They were more active, had shinier feathers, and showed fewer signs of disease compared to the control group.

Economic Benefits: With increased egg production and weight, as well as a decrease in mortality rates, the use of probiotics can provide significant economic benefits to laying hen farmers. Improved feed efficiency can also reduce operational costs.

RESULT AND DISCUSSION

Table 1 Result laying hen given probiotic in egg production, egg weight, mortality and general health

Parameter	Without Probiotic	With Probiotic
Egg Production (eggs)	950	1100
Egg Weight (g/egg)	60	65
Mortality (%)	5	1
General Health	Fair	Good

From these results, it's evident that the group of laying hens provided with feed supplemented with probiotics showed a significant ($P<0.05$) increase in egg production compared to the control group. The average egg weight was also higher in the probiotic group. Additionally, the probiotic group exhibited a lower mortality rate and better overall health compared to the control group. This indicates that the use of probiotics can provide significant benefits in improving the performance and health of laying hens. Probiotics improve intestinal morphology by increasing villus height and the villus height to crypt depth ratio, which enhances nutrient absorption and gut health. They also modify the gut microbiota, increasing beneficial bacteria like Lactobacillus and reducing harmful bacteria such as Escherichia coli (Jha *et al*., 2020; Xu *et al*., 2023) .

The results revealed a significant increase in egg production and egg weight in the probiotic-supplemented group compared to the control group. Additionally, the probiotic group exhibited lower mortality rates and better overall health indicators, such as activity level and feather condition. Probiotics stimulate the immune system, reducing inflammatory responses and enhancing antibody production, which contributes to better health and resilience against diseases (Alaqil *et al*., 2020; Dehsahraee *et al*., 2024)

The findings of this study support the hypothesis that probiotic supplementation positively influences the performance of laying hens. The observed improvements in egg production, egg weight, mortality rates, and overall health suggest that probiotics enhance digestive efficiency, nutrient absorption, and immunity in laying hens. These results have implications for laying hen management practices, highlighting the potential benefits of incorporating probiotics into feed formulations to optimize productivity and welfare.

Results: Statistical analysis indicated significant differences between the probiotic group and the control group in terms of egg production, egg weight, and mortality rate. The probiotic group yielded more eggs with higher weights and had a lower mortality rate. The overall health of the chickens was also better in the probiotic group.

CONCLUSIONS

Probiotic supplementation significantly improves laying hens' performance, reduces mortality, and enhances overall health. Further research is recommended to determine optimal probiotic strains and dosages..

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