Research Article

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Effect of Replacing Soybean Meal Protein with Different Levels of Urea on Some Productive and Physiological Traits in Laying Hens

Alfred S. Karomy[1]*, Huda Falih Saad[2], Sabah Kadhum Al-Hummod[3], Ahmed Kareem jree[4], Alice Louis Yousif[5]

[1,2,3,4] College of Agriculture, Department of Animal Production, University of Basrah, Iraq.
[5]Department of Natural products Researches, Center of Technical Research, Northern Technical University, Mosul, Iraq

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ABSTRACT

This study investigated the effect of replacing part of the dietary protein with different levels of urea on the productive performance, egg traits, blood parameters, and gut microbiota in laying hens. A total of 144 Isa Brown hens were divided into four groups: a control group receiving a standard diet (T1), and three experimental groups receiving the same diet supplemented with T2 (0.4%), T3 (0.8%) or T4 (1.2%) urea. The results showed that the addition of 0.4% urea improved feed conversion ratio, body weight gain, and overall productivity. However, higher levels of urea (0.8% and 1.2%) negatively affected performance, which may be attributed to potential nitrogen toxicity. Urea supplementation did not significantly affect most external egg quality parameters such as egg weight and shell thickness, but it influenced internal quality by increasing albumen percentage and reducing yolk proportion at higher doses. Blood analysis showed that moderate urea increased albumin and globulin concentrations, suggesting improved protein metabolism. Microbiological analysis confirmed an increase in the proportion of Lactobacillus individuals at 0.4% urea, which was more abundant with higher proportions of E. coli. Such results indicate the need for close regulation of dietary urea to optimize its beneficial effects without impairing hen health and performance.

Introduction

Poultry are one of the fastest-growing most efficient sectors of global agriculture and plays a significant role in both food security and protein provision. Improving the productive and physiological performance of laying hens largely depends on ideal nutritional strategies (feed ingredients along with alternative protein sources, feed additives) including supplements fed in commercial diets for layers to potentially meet their requirements (Heo et al., 2023; Komlósi, 2022).

Because urea can promote microbial protein synthesis, it is a non-protein nitrogen (NPN) molecule that has been widely employed in ruminant nutrition. However, because

*corresponding authoremail : alfred.solaka@uobasrah.edu.iq