GROWTH AND ECONOMIC PERFORMANCE OF IMPROVED INDIGENOUS CHICKEN FED ON DIETS CONTAINING BLACK SOLDIER FLY (*Hermatia Illucens*) LARVAE MEAL IN KENYA

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A150/0L/CTY/26714/2015

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Animal Nutrition and Management in the School of Agriculture and Environmental Sciences, Kenyatta University

March 2023

DECLARATION

Student's Declaration

I Mwangi Kevin Waithaka declare that this thesis is my original work and has not been presented for the award of a degree in any other university or any other award.

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Signature _____ Date 3rd March 2023

Supervisor's Declaration

We confirm that the work reported in this thesis was carried out by the candidate under our supervision and has been submitted with our approval as university supervisors.

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ABSTRACT

Poultry feed cost constitutes about 70% of total poultry production costs. This is mainly due to the high cost of protein feed resources, especially protein concentrates, and their limited availability. Studies elsewhere have identified Black soldier fly (*Hermetia illucens*) larvae (BSFL) meal as an alternative protein source in animal feeds. This study aimed to provide information on the nutritive value of locally prepared BSFL meal and determine the growth and economic performance of improved indigenous chicken fed on diets containing graded levels of the meal. A total of 315, day old KALRO improved chicks were procured and used for the study. Five experimental diets were formulated for the chick and grower phases containing BSFL levels of 0% (C0), 5% (C5), 10% (C10), 15% (C15), and 20% (C20), respectively, to replace conventional protein sources (fishmeal and soybean meal). The diets were formulated to contain at least 2800 Kcal/ Kg ME and 18% CP for the chick diets and 2550 Kcal/Kg ME and 15% for the growers' diets. The five dietary treatments were randomly allocated to the experimental units in a completely randomized design, and the birds were fed the diets from 7 to 56 days for the chick phase and from 57 to 126 days for the grower phase. The BSFL meal and feed samples were analysed for proximate composition, and data on body weight and feed intake was collected weekly. An economic analysis was done to determine the cost implication of using the BSFL meal in the feeding trial. The results showed that BSFL meal used in the diets had a high CP level at 43.9% and ether extract at 29.4%. There was a significant difference (P=0.0001) in the feed intake, final body weight, and daily weight gain of the chicks at the end of the chick phase. However, in the grower phase, the treatments significantly affected feed intake, not the final body weight, daily weight gain, and feed conversion ratio. The birds in the dietary treatment C0 had the highest final body weight (1673.6±90.70g), and C20 had the lowest final body weight (1383.0±86.04g). Dietary treatment C10, whose BSFL meal inclusion was 10%, had the highest final body weight (1564.7±90.70g) among the diets with BSFL meal. Dietary treatments with high inclusion levels of BSFL meal (C15 and C20) resulted in low feed intake and final body weight after the feeding trials. The cost of feed consumed was also significantly different for the entire period, and it gradually reduced with the increase of BSFL meal in the diets. The dietary treatment C0 had the highest cost of feed consumed, followed by C5, C10, C15, and C20, respectively. The treatments also significantly affected the total cost of production, which reduced gradually, with the highest being C0 and the lowest being C20. Nonetheless, the control diet C0 recorded the highest gross profit margin (276.3±42.15 Ksh) in the feeding trials, while C10 recorded the highest gross profit margin (254.3±42.15) among diets with BSFL meal. According to these findings, BSFL meal can replace conventional protein sources in improved indigenous chicken diets at certain inclusion levels without affecting their growth and economic performance. This study recommends a 10% BSFL meal inclusion level in improved indigenous chicken diets for optimal growth and economic performance.