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Resumen

The aims of the study were to develop and evaluate a model for predicting the optimum requirements of essential amino acids and performance in laying hens in terms of ideal and balanced protein. Feed consumption was estimated using a factorial equation developed from theory and the ideal protein requirement was calculated from the weighted average of amino acids as a percentage of the protein for maintenance, body weight gain, and egg production. The level of the sulfur amino acids of the diet was generated from the ratio deposited amino acids/consumed amino acids, from which four balanced protein levels (90, 100, 110, and 120%) in the diets were proposed. A total of 192 laying hens were randomly distributed to four dietary treatments in a completely randomized block design with four replicates containing 12 birds each. The results show that egg production, feed consumption, feed conversion, weight, and egg mass were significantly influenced by the level of balanced protein in the diet and the best performance was obtained with the level of 110%. Regression analysis revealed that the requirement of balanced protein for the biological maximum was 109.4% and for the economic optimum of egg mass was 104%. Two equations to predict egg mass and feed consumption were generated from the literature. Predicted values were evaluated against those observed in the present experiment. The error of model was of 4.71% for egg mass and 2.44% for feed consumption, which indicate that the simulation model of the effect of balanced protein on performance is adequate and can be useful to estimate the optimum requirement of essential amino acids.

Palabras clave : model; requirement; prediction; ideal protein; balanced protein; laying hens; egg mass.

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