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Digestible threonine:digestible lysine ratio in diets for brown laying hens from 42 to 54 weeks of age

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The threonine is the third limiting amino acid for poultry in diets based on corn and soybean meal, preceded by the sulfur amino acids and lysine. It is important in the proteins formation, in the maintenance of body protein turnover and is part of the mucin composition. However, few studies have been conducted with the objective to determine the requirement of digestible threonine and especially its ideal ratio with the digestible lysine in diets for brown laying hens. The objective with this study was to estimate the ideal digestible threonine:digestible lysine ratio in diets for brown laying hens of 42 to 54 weeks of age. We used 270 Dekalb Brown hens at 42 weeks of age distributed in a completely randomized design with five treatments, nine replicates and six birds per experimental unit. To ensure that all consumed lysine was metabolized by birds and to prevent the excess of this nutrient, the digestible lysine level in the diets was sub-optimal (0.660%). The digestible threonine levels in the experimental diets were 0.436, 0.462, 0.489, 0.515 and 0.541%, providing digestible threonine:digestible lysine ratios of 66, 70, 74, 78 and 82%, respectively. Diets were formulated to satisfy the nutritional requirements of birds in accordance with the recommendations of Rostagno et al. (2011), except for threonine and lysine. The digestible threonine:digestible lysine ratios in the diets were obtained by supplementation of L-threonine (98%) replacing starch. The ideal digestible threonine:digestible lysine ratio was estimated through the studied of performance and egg quality characteristics using analysis of variance, regression analysis and Linear Response Plateau (LRP). Was also calculated 95% of the quadratic and quadratic with plateau for the variables that showed a significant quadratic effect. For this study we used the program SAEG (Sistema para Análises Estatísticas e Genéticas). Quadratic effect was observed in response to digestible threonine:digestible lysine ratios for egg production, egg mass, feed conversion per egg dozen and feed conversion per egg mass. For each one of these parameters, the average of the digestible threonine:digestible lysine ratio estimated by different statistical models applied were 72.46, 72.72, 72.74 and 72.97%, respectively. The digestible threonine:digestible lysine ratios estimated in this study were lower than those observed by Bregendahl et al. (2008) (77.0%) and Rocha et al. (2009) (78.0%). However these values were similar to those ratios estimated by Cupertino (2006), Sá et al. (2007) and Schmidt et al. (2010). Feed intake, egg weight, internal egg quality and weight gain were not affected by digestible threonine:digestible lysine ratios. The ideal digestible threonine:digestible lysine ratio in diets for brown laying hens of 42 to 54 weeks of age recommended is 72%.

Keywords: amino acid, bird, egg, ideal protein