**Precision Nutrition for Laying Hens**

 **Application**: Although several advances have been made in the commercial laying sector, there are still nutritional techniques that need to be revalidated to improve production performance, together with better nutrient utilization and lower production costs.

**Introduction**: The commercial laying sector has stood out for its high production rates, and this scenario is the result of technological innovations, automation, and changes in the areas of genetics, nutrition, health, and ambience. One of the main factors in achieving maximum production is the supply of a balanced diet. However, for balanced rations to be properly formulated, it is necessary to know the nutritional requirements of the animals, the content and availability of nutrients, and to consider the cost of the ingredients, as they account for around 60 to 70 percent. In this sense, precision nutrition has become a fundamental strategy for improving sustainable improvements in the production process. The concept of precision nutrition is not new, but it can be defined as an approach that involves altering dietary constituents to favor body composition, health, and environment. The success of its implementation depends on ingredient characterization, determination of nutritional requirements, and careful management to ensure that the two previous requirements are met so that feed management is flexible throughout the production cycle to meet the bird's daily needs (Moss, et al. 2021). The aim of the study was to evaluate the concept of precision nutrition on the performance of poultry.

**Materials and Methods**: A total of 288 Hisex Brown layers, from 90 to 96 weeks of age, were used in a completely randomized design (DIC), in a 2x2 factorial (2 dietary compositions of maize and soybean meal: tabulated or analyzed by NIRS and 2 diets formulations according to the recommendation of Rostagno et al. (2011) or the strain) with nine replicates of eight birds per pen. Hens were allocated in cages and were given water and feed ad libitum, and the light schedule was 16 hours per day. Diets were maize and soybean meal-based, following the nutrient levels used by the industry according to recommendations of Rostagno et al. (2011). Two evaluation periods were considered, both with two cycles of 21 days each (from 90 to 93 and from 94 to 96 weeks of age). At the end of each cycle, performance was evaluated: egg production, feed consumption, egg mass, and feed conversions per dozen eggs produced and per egg mass. Egg quality was assessed on the last two days of each cycle (i.e. days 20 and 21), when the eggs produced were collected, identified, and analyzed using the Digital Egg Tester (DET6000). Shell strength (Kgf), egg weight (g), albumen height (mm), Haugh unit (HU), yolk color, and shell thickness (mm) were analyzed. All mortalities were recorded daily. Performance and egg quality data were analyzed using the Statistical Analysis System (SAS, 2015), using the ANOVA procedure, and the homogeneity of the data and normality of the residuals were checked. Data that did not meet the assumptions were transformed or excluded and finally subjected to analysis of variance and Tukey's test at 5% significance.

       **Results**: There was no significant interaction between the factors studied for the performance traits analyzed. Feed consumption was significantly influenced by the individual factors, but there was an improvement in egg production and mass, feed conversion per dozen, and egg mass for birds fed diets formulated according to Rostagno when maize and soybean meal were analyzed by NIRS (p<0.05). Feed conversion per dozen and egg mass were proportional indices of feed consumption, egg mass, and egg production. By analyzing the ingredients of the feed beforehand, it is possible to meet the birds' needs more accurately than by using the nutrient values given in the various tables of recommendations. This is because a fixed composition value doesn't always correspond to what the cereals provide. Also, the inputs are subject to the effects of climatic, soil type, cultivation, and storage, among others, which influence their nutritional composition. Regarding egg quality, there was no interaction between the factors studied nor isolated for albumen height, Haugh unit, and shell strength (p>0.05). However, there was a significant interaction between the factors studied for the yolk color and shell thickness. For yolk color, it was observed that when using the Rostagno dietary recommendation, the tabulated value had a higher color than the analyzed one, contrary to the recommendation proposed by the strain. Maize is an ingredient rich in carotenoids, which are the pigments responsible for the color of egg yolks. Therefore, the higher the maize content the better the egg yolk color. Regarding shell thickness, it was observed that when the Rostagno diet was used, the tabulated value resulted in better shell thickness. Similarly, to maize, there was a greater incorporation of calcitic limestone in the diet formulated based on the nutritional composition of the tabulated ingredients. It is well known that calcitic limestone is one of the most used sources of calcium in layer diets and is more responsible for shell formation. The use of the concept of precision nutrition, through meeting the nutritional needs established by Rostagno, reduces the cost of production and improves the profitability of egg production.

**Conclusions**: Diets formulated by analyzing the ingredients according to Rostagno's recommendations improved the performance. The analyzed composition of the ingredients used to formulate the feed allows the bird's needs to be met more efficiently, improving nutrient utilization.

**References**:

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Rostagno, H. S.et al., (2011). Poultry and Swine Brazilian Tables,

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