

Manganese requirements of broiler breeder hens

Introduction

Manganese is an essential nutrient for poultry. Limited research has been conducted with manganese in broiler breeder hens. This study was done at Aviário de Ensino e Pesquisa, located in south of Brazil. The main goal of the present study is to provide Mn requirements, such that daily Mn supply to broiler breeder hens do not limit competitive production, but also are not excessive, such that an increase in the cost of production parallels unnecessary Mn excretion, turning it into environmental pollutant.

Material and Methods

One hundred and twenty Cobb 500 hens, 22 wks of age, were individually allocated in cages. After fed a Mn deficient diet (22.2 ppm), hens were randomly placed in treatments having 6 increments of 30 ppm Mn. Supplementation was with lab grade Mn sulfate ($\text{MnSO}_4 \cdot \text{H}_2\text{O}$). Feeds were corn-soybean meal plus oat hulls. Treatments were fed during 4 periods of 28 d. Breeder hens were given a common pre-experimental adaptation feed followed by a Mn depletion one. Starting at 36 wks, the hens were individually weighed and assigned to the experimental treatments following a complete randomized block experimental design. Variables studied were egg production, egg quality and incubation. Additionally, analysis of eggshell ultrastructure were done using scanning electron microscopy. Data were submitted to ANOVA. Estimates of maximum response to total dietary Mn were done using quadratic polynomial (QP) and broken line quadratic (BLQ).

Results

Just some of the results are going to showed, since there are more than 30 variables studied. Maximum responses for settable egg production were 122.1 and 63.6 ppm Mn. We can see in the graphic that the settable eggs increase as the Mn in the diet increases. The same occurred to contaminated eggs and others. In the ultrastructure of eggshell palisade and mammillary layer was thinner and poor in the eggshell from hens fed with a Mn-deficient diet.

Conclusions

Average requirements for egg production and hatchability were 93.5 ppm (13.6 mg/hen/d), and 97.6 ppm (14.2 mg/hen/d), respectively, whereas averaged values for egg quality responses were 117.5 ppm (17.1 mg/hen/d). The average of all requirement estimates using both models (QP and BLQ) was 111.5 ppm total dietary Mn (16.3 mg/hen/d).