Effect of Nano Zinc Supplementation on Production Performance, Immune Response and Carcass Characteristics in Japanese Quail Broiler

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ABSTRACT

Background: Nano-technology is currently an emerging field and giving promising results with cost economics in the poultry nutrition sector. A study was conducted to investigate the effects of nano Zn supplementation on production performance, immune response and carcass characteristics applementation.

Methods: Synthesis of zinc oxide nano-particles was carried out by chemical method and characterized by standard techniques. Day old Japanese quail chicks (n=240) were randomly allotted in four treatment groups for feeding trial and fed with basal diet and source of zinc *viz.* for T_1 inorganic Zinc Oxide, for T_2 , T_3 and T_4 nano Zinc Oxide was used at 75%, 50% and 25% levels of BIS recommendation for Zinc. Production parameters, immune response, carcass characteristics and cost economics were studied.

Result: Based on the data analysed T_3 and T_4 showed significantly (P<0.05) improved performance in production parameters like body weight gainand cumulative feed conversion ratio than T_1 and T_4 . HI, titer value and carcass characteristics data also showed similar trend.

Key words: Japanese quail, Nano zinc oxide, Production performance.

INTRODUCTION

Japanese quail are characterized by many favorabletraits such as a fast growth rate, quick sexual maturity, shortgeneration interval, small body size and significant egg production ratio compared to other farm birds (Narinc *etal.* 2014; Molino *et al.* 2015).

Zinc is an essential trace mineral for Japanese quail since it is required for normal growth, bone development, feathering (Sahin *et al.* 2009). A high concentration of Zn can affect the balance of other trace elements such as Ca, Cu and Fe in the body (Sundaresan *et al.* 2008). Zinc supplementation exhibits a positiveeffect on growth performance of Japanese quail (Sahin *et al.* 2005; Rouhalamani *et al.* 2014).

Zinc oxidenanoparticles (ZnONPs), as an alternative to theconventional zinc sources, represent a good alternativein livestock feeding. The usage of ZnONPs has gainedattention due to the larger surface area, higher surfaceactivity and catalytic efficiency and stronger adsorbing quality compared with the conventional use of Zn (Javad et al. 2013). Zhao et al. (2014) reported that supplementation of nano-zinc in broilers at 20, 60 and 100 ppm significantly improved the feed conversionand growth rate compared with the control group (60 mg/kg ZnO). With the emergence of nanotechnology, zinc can be added as a feed supplement in many forms to improve the efficiency of trace minerals in poultry and livestock (Attia et al. 2013); Geetha et al. 2020). Hence, this study was designed in an attemptto examine the effects of ofnano Zn on production performance, immune response and carcass characteristics and cost economics in Japanese quail broiler.

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MATERIALS AND METHODS

This experiment was designed and carried out at the Department of Animal Nutrition, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University, Tirunelveli, Tamil Nadu, India during the September- October of 2020. To assess the effect of Nano zinc on production performance, immune response and carcass characteristics the experiments were fabricated as follows.

Synthesis and characterization of zinc oxide nanoparticles that were used in this experiment

The zinc oxide nanoparticles (ZnO-NPs) were synthesized by chemical method described by Geetha *et al.*, (2020). Zinc