

**EFFECT OF DIETARY ORGANIC ZINC
ON COMMERCIAL BROILER PERFORMANCE
AND ABSORPTION KINETICS**

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CERTIFICATE

This is to certify that the thesis entitled **"EFFECT OF DIETARY ORGANIC ZINC ON COMMERCIAL BROILER PERFORMANCE AND ABSORPTION KINETICS"** submitted in partial fulfilment of the requirements for the award of the degree of **MASTER OF VETERINARY SCIENCE in POULTRY SCIENCE** to the **TAMIL NADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY, CHENNAI- 600 051**, is a record of bonafide research work carried out by **A. VARUN**, under my guidance and that no part of this thesis has been submitted for the award of any other degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journal or magazine.

Date : 18-08-2016

Place: Chennai - 7.



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EXTERNAL EXAMINER

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ABSTRACT

Title : **EFFECT OF DIETARY ORGANIC ZINC ON COMMERCIAL BROILER PERFORMANCE AND ABSORPTION KINETICS**

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An experiment was conducted to investigate the effectiveness of different sources of zinc (Zn) as a feed supplement on the commercial broiler performance, concentration of the Zn in the tibia and serum and metallothionein mRNA expression on different organs. A total of 300 one-day-old commercial broiler chicks (Cobb 400) were fed with corn-soybean meal based basal diet (unsupplemented control) or the basal diet supplemented either with 40 or 80 mg of Zn/kg of feed from each sources, such as Zn oxide, Zn sulfate, Zn-methionine and Zn-protinate except that the nano-Zn which was supplemented only at 20 mg/kg for a period of 42 d. When compared with control, broilers supplemented with various sources of Zn had higher ($P<0.05$) body weight and feed

consumption. Meanwhile, the birds supplemented with organic sources of Zn at 40 mg/kg and nano-Zn at 20 mg/kg had a significantly higher ($P<0.05$) concentration of Zn in their serum and tibia when compared to the treatment groups supplemented with inorganic sources of Zn. The carcass characteristics in terms of post-starvation live weight, blood loss, eviscerated yield, ready-to-cook yield, organ weights and cut-up parts yields remained comparable in all dietary treatments. The osteomorphometry (length and diameter of tibia) and osteomineralization (weight of tibia) had been observed to be not influenced by various treatments compared with control. While considering the pancreas, liver and intestine metallothioneine (MT) mRNA expression, the organic and nano-Zn supplemented groups had a significantly higher ($P<0.01$) MT mRNA expression and more relative bioavailability compared with inorganic sources of Zn. Based on the concentration of Zn in the tibia and serum and metallothioneine mRNA expression, more relative bioavailability was observed in the groups supplemented with organic and nano-Zn, which might be explained by higher absorption of organic and nano-Zn due to the reduced interaction with other dietary components in gastro-intestinal tract. Hence, it may be concluded that the sources like Zn-methionine, Zn-protinate and nano-Zn will be equally bio-available with that of Zn sulphate based on the phenotypic performance of broilers and Zn concentration in the serum and tibia. However, Zn-methionine and Zn-protinate were more effective in enhancing feed intake and the nano-Zn could elicit a significantly higher metallothioneine mRNA expression of all organs studied in this experiment.

Key words : Broilers, supplements, Zn oxide, Zn sulphate, Zn-methionine, Zn-protinate, nano-Zn, carcass characteristics, osteomorphometry, Osteomineralization, metallothioneine