

# Effect of copper supplementation on growth performance in broiler birds



## Science

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### ABSTRACT

The study was undertaken to evaluate the effect of different concentrations of copper sulphate on the performance and carcass trait of broiler birds. The results revealed that the highest weight gain and lowest FCR was observed in T1 group. The dressing percentage was increasing with the supplementation of 200 to 400 ppm of copper. The best recommended level of copper sulphate in feed was 200 ppm.

### Introduction

Copper is routinely used as a micronutrient and is necessary for the development of connective tissue, nerve coverings, and bone. Copper also participates in the iron and energy metabolism and acts as a reductant in the enzymes superoxide dismutase, cytochrome oxidase, lysyl oxidase, dopamine hydroxylase, and several other oxidases that reduce molecular oxygen (Cousins, 1985). Besides the physiological function

Copper also act as antimicrobial, antiviral, anti-inflammatory and antitumor agents (Iakovidis *et al.*, 2011). In aspergillosis outbreaks, 1:2000 aqueous solution of copper sulphate in drinking water preventing the spread of the disease (Dyar *et al.* 1984).

Recently there is a worldwide trend to limit AGP use in food animals (Turnidge, 2004). At this context copper is useful as growth promoter. Copper had role in immune stimulation, reducing stress and lowering disease challenges. Therefore it was a practice to supplement an addition of 125 to 250 ppm of copper sulphate to poultry feed (Cohen, 2002).

This study aims to understand the effect of different concentrations of copper sulphate on growth performance and dressing percentage of broiler chicken.

### Materials and methods

Fifty healthy day old broiler chicks (Vencobb 500) were procured from licensed wholesale retailer (Venkateshwara Hatcheries Pvt. LTD, Kallekulangara, Palakkad, Kerala). All the chicks were tagged on the day of arrival using wing tags. These birds were divided into five groups of 10 birds in each group.

The pen was cleaned, washed and fumigated with formaldehyde solution prior to the arrival of chicks and commencement of the biological experiment. All the chicks were provided with standard brooding and housing managements. The vaccination was carried out as per the schedule. The birds were fed pre-starter from day old to 10th day, starter ration from 11- 21st day and finisher ration from 22nd day upto sacrifice.

Along with the standard ration different concentrations of powdered Copper sulphate pentahydrate (CuSO<sub>4</sub>.5H<sub>2</sub>O Merck specialties Private Limited, Worli, Mumbai) was added to the basal diet as 200 ppm in T1, 400 ppm in T2, 600 ppm in T3 and 800 ppm in T4 groups. The control group (C) was maintained on basal diet. The body weights of the birds were recorded at the day of arrival of chicks and the day of slaughter by using electronic accuracy. The birds were provided with ad libitum feed during

the experimental period and at the end of each day, the left over feed was weighed back and net treatment wise feed consumption arrived, to calculate the feed conversion ratio for growth performance period (0-6 weeks). The live weight and dressing percentage was recorded on 37th day.

### Results and Discussions

All the treatment groups were statically significant (p<0.05) from the control group with respect to body weight. Copper supplementation reduced the body weight gain in all the groups compared to control group of birds (Table. 1).

**Table 1: growth performance of birds supplemented with different concentrations of copper sulphate**

Group	Weight gain (kg)	Feed intake (kg)	FCR
C	1.90 ± 0.153 <sup>b</sup>	3.571 ± 0.025 <sup>b</sup>	1.90740 ± 0.050246 <sup>ab</sup>
T1	2.28 ± 0.108 <sup>a</sup>	3.546 ± 0.045 <sup>b</sup>	1.55930 ± 0.070694 <sup>a</sup>
T2	1.87 ± 0.240 <sup>b</sup>	3.495 ± 0.008 <sup>b</sup>	1.89362 ± 0.061706 <sup>ab</sup>
T3	1.47 ± 0.231 <sup>c</sup>	3.374 ± 0.031 <sup>a</sup>	2.34333 ± 0.110201 <sup>bc</sup>
T4	1.22 ± 0.012 <sup>c</sup>	3.32400 ± 0.002 <sup>a</sup>	2.71770 ± 0.027131 <sup>c</sup>

Means bearing different superscripts in a column differ significantly

The C, T1 and T2 groups did not differ significantly. But the increased concentration of copper in the diet at the level of 600 mg/ kg and 800 mg/ kg to T3 and T4 group showed a significant difference (p<0.05) from other groups (Table.1). The lowest FCR was observed with the supplementation of 200 ppm of copper. An increase in relative dressed weights compared to control group (Table 2).

**Table 2. Relative dressed weight of broiler birds on the day of slaughter.**

Group	Relative dressed weight
C	0.5983 ± 0.0109 <sup>a</sup>
T1	0.6503 ± 0.0049 <sup>c</sup>
T2	0.6566 ± 0.0074 <sup>c</sup>
T3	0.6127 ± 0.0166 <sup>ab</sup>
T4	0.6320 ± 0.0042 <sup>bc</sup>

Means bearing different superscripts in a column differ significantly

### Discussions

The growth performance of the birds was found to be reducing with increased copper supplementation. Optimal weight gain was observed with addition of 200 ppm copper sulphate. Miles *et al.* (1997) observed a reduction in growth performance with the dietary supplementation of copper sulphate from 200 to 600 ppm. There was a significant reduction in the feed intake with the groups fed copper at 600 to 800 ppm of copper. The reduction in feed intake could be due to the gastrointestinal disturbance caused by copper as hemorrhagic enteritis (Shivanandappa *et al.*, 1983). Feed conversion ratio is the amount of feed required to produce 1 kg of body weight (Miles *et al.*, 1997). The lowest FCR obtained was with the supplementation of 200 ppm. The positive effect of copper at the level of 200 ppm could be attributed to the reduction of pathogenic microorganisms of digestive tract (Xia *et al.*, 2004). Faundez *et al.* (2004) demonstrated the antimicrobial activity of copper against highly prevalent enteropathogenic organisms, *salmonella spp* and *campylobacter spp*. This metal also improved the activity of digestive enzymes such as protease, amylase and lipase, which ensured better digestion and utilization of the feed (Xia *et al.*, 2004). An increase in the dressed weight was noticed with the supplementation of copper from 200 to 800 ppm. Baber *et al.* (1960) suggested that reduction in the liver and gut weight might be the cause of increased dressing percentage.

### Conclusion

The best recommended level of copper in broiler feeds was found to be 200 ppm as copper sulphate along with the basal ration. Comparing to the basal diet the feed supplemented with 200 ppm of copper sulphate showed better growth performance.

## REFERENCE

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