

## ROLE OF ZINC AND COPPER RATIO ON GROWTH IN PIGLETS

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### ABSTRACT

The effect of zinc and copper ratio on body weight gain was studied on 24 healthy crossbred (Hampshire × Assam local) male piglets with similar body weight at 2 months of age which were randomly divided into four groups, viz., Control T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> comprising of 6 piglets in each group. The ratio of zinc and copper supplementation was done to different groups as for T<sub>1</sub> – 125:12.5 ppm; T<sub>2</sub> – 150:15 ppm and T<sub>3</sub> – 175 : 17.5 ppm. The piglets were kept under intensive system of rearing following all the managerial practices in the farm belonging to AICRP on Pig, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22. Body weight of each animal of respective groups was measured and blood samples were collected at fifteen days interval beginning from 2 months upto 6 months of age. Serum was separated and stored at -20°C for hormonal estimation. The body weight in all four groups during the trial period clearly revealed that there was gradual increase in the body weight of pigs which was highest (52.70 ± 0.69 kg) in T<sub>3</sub> and lowest (42.90 ± 0.32 kg) in control group. The serum zinc concentration in all four groups during the trial period revealed apparent increase with the highest (0.30 ± 0.03 ppm) in T<sub>3</sub> and lowest (0.26 ± 0.03 ppm) in control group. The serum copper concentration was highest 0.25 ± 0.01 ppm in T<sub>3</sub> and lowest (0.21 ± 0.01 ppm) in control group. During the experimental period, there observed a linear increasing trend of serum copper concentration in general irrespective of groups. Supplementation of zinc and copper at 175 ppm: 17.5 ppm per day was found to be beneficial with highest growth.

**Key words** : Body weight gain, copper, zinc and piglets.

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Zinc is one of the important trace minerals which has profound action in the piggery production programme because it controls about 1000 enzymes in the body<sup>6</sup>. Supplementation of various level of zinc resulted in better growth, average daily body weight gain and better feed conversion ratio<sup>2</sup>. The appropriate ratio of zinc and copper is essential because increase levels of dietary zinc have an antagonistic affect on the

bioavailability of copper. Available literature suggested the ratio of zinc and copper as 10:1 for growing pigs. The present study was undertaken to investigate the body weight gain of growing male piglets following supplementation of three different ratios of zinc and copper.

### MATERIALS AND METHODS

Twenty four healthy crossbred (Hampshire × Assam local) male piglets with similar body weight at 2 months of age were randomly divided into four groups, viz., Control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> comprising of 6 piglets in each group. The rate of supplementation was done to different groups as T<sub>1</sub> – 125 ppm Zinc : 12.5 ppm Cu; T<sub>2</sub> – 150 ppm Zn: 15 ppm Cu and T<sub>3</sub> – 175 ppm Zn: 17.5 ppm Cu. Body weight of each animal of respective groups was measured at fifteen day intervals beginning from 2 months upto 6 months of age. The experimental animals were kept under intensive system of rearing following all the managerial practices in the farm belonging to AICRP on Pig, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22.

Blood serum was separated and stored at -20°C for hormonal estimation. Serum zinc and copper were processed as per the method described by Fick<sup>3</sup> and estimated in Atomic Absorption Spectrophotometer (AAS), GBC 932AA. All the data generated were analyzed statistically by the programme SAS (Statistical Analysis Software) Enterprise guide 4.2.

### RESULTS AND DISCUSSION

The initial body weight (Mean ± SE) at 2 months of age in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups were recorded as 13.58 ± 0.20, 13.67 ± 0.57, 14.33 ± 0.61 and 13.58 ± 0.20 kg respectively. The final body weight at 6 month of age were recorded as 42.90 ± 0.32, 43.72 ± 0.44, 45.78 ± 0.45 and 52.70 ± 0.69 kg for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups,

respectively. Statistical analysis revealed significant difference (P<0.05) on weight gain between different experimental groups. Higher body weight gain was evident in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups that received dietary zinc supplementation when compared to control group. Result suggested that zinc help in assimilation of feed substances in the body as it is associated with the regulation of appetite, by maintaining the function of taste buds<sup>1</sup> and regulating carbohydrate and proteolytic enzymes<sup>4</sup>. The lowest BWG in control group might be due to lower feed intake and anorexia; due to sub-optimal zinc bioavailability. The present findings are in close agreement with the earlier findings<sup>2</sup> in pigs.

The average zinc concentration in all four groups during the trial period revealed apparent increase which was highest (0.30 ± 0.03 ppm) in T<sub>3</sub> and lowest (0.26 ± 0.03 ppm) in control group.

The present experiment indicated that higher level of zinc supplementation did not proportionately elevate the serum zinc concentration in the experimental animals T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups and in control groups. This might be due to saturation of zinc transport system which was responsible for absorption and also storage and assimilation of zinc in the biological system<sup>7</sup>.

The average copper concentration was highest (0.25 ± 0.01 ppm) in T<sub>3</sub> and lowest (0.21 ± 0.01 ppm) in control group. During the experimental period, there observed a linear increasing trend of serum copper concentration irrespective of groups.

In the present experiment, at 6 month of age zinc and copper supplementation with higher dose recorded apparent increase in serum copper concentration, it may be due to supplementation of copper along with zinc. It was found that supplementation of zinc at higher dose elevate the serum copper concentration<sup>5</sup>.

## CONCLUSION

Results of the present study indicated beneficial effect of zinc and copper supplementation at the ratio of 125:12.5; 150:15 and 175:17.5 ppm on body weight in growing piglets of which 175:17.5 ppm showed the better results in comparison to the control animals.

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