EFFECT OF ZINC SUPPLEMENTATION ON GROWTH RATE OF ASSAM LOCAL MALE KIDS*

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ABSTRACT

An experiment was conducted on thirty six Assam local male kids of three months of age and between 3 to 4 kg of body weight. The animals were divided into group I (control group, \(n=12\)) in which kids were grown without zinc supplementation, group II (Inorganic group, \(n=12\)) in which kids were grown with inorganic zinc supplementation, zinc sulphate and group III (Organic group, \(n=12\)) in which kids were grown with organic zinc supplementation, zinc propionate. All the experimental goats received concentrate mixture @ 50 g/day/goat up to 5 months and then @ 100 g/day/goat up to 7 months of age in addition to their free range grazing. The present study revealed gradual increase of body weight with advancing age in all the groups kids as measured at fortnightly interval from 5 to 7 months of age. The body weight of the organic zinc-supplemented kids were highest as compared to inorganic zinc-fed group. Lowest growth rate observed in kids of control group. The ranged values (Mean ± S.E.) were recorded as 5.08±0.07 to 7.93±0.07 kg in control, 5.31±0.10 to 8.33±0.04 kg in inorganic and 5.25±0.09 to 9.75±0.14 kg in organic zinc-fed groups of kids. From the study, it can be concluded that the organic zinc source proved better choice than inorganic one as feed supplement considering bioavailability and effectiveness.

Key words: Zinc supplementation, Growth, Goat

INTRODUCTION

Zinc is a micro-mineral involved in various processes of animal metabolism. Since it was originally demonstrated by Todd et al. in 1934 that zinc was necessary for growth of animal organism it began to gain special attention. Garcia and Calderon (1975) observed a significant correlation of age at puberty with body weight and daily gain in body weight from birth to puberty following zinc supplementation. Several studies were conducted to observe the effect of zinc on increase of body growth in sheep (Rojas et al., 1995), piglets (Shanklin et al., 1968; Hill et al., 2001; Pyne et al., 2006) and puppies (Ao et al., 2007). Effect of organic and inorganic zinc supplementation on the growth of goat is very scanty. Therefore, the study was undertaken to see the effect of supplementation of organic or inorganic zinc on growth of Assam local kids of age between 4 to 7 months of age.

MATERIALS AND METHODS

The experiment was conducted in the department of veterinary physiology, college of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati. A total of thirty six Assam local male kids of three months of age and between 3 to 4 kg of body weight was included in this experiment. The experimental goats received concentrate mixture @50g/day/goat up to 5 months and then @100gm/day/goat up to 7 months in addition to their free range grazing. Group I (control) animals \((n=12)\) received no zinc supplementation while the Group II \((n=12)\) and III animals \((n=12)\) received inorganic and organic form of zinc supplements, respectively along with concentrate mixture. The aforesaid concentrate mixture contained 2 per cent mineral mixture – the AAVETMIN without zinc which was supplied by AICRP project entitled “Improvement of Feed...
TABLE 1: Body weight (Kg, Mean±S.E.) in male goat kids following zinc supplementation.

<table>
<thead>
<tr>
<th>Group</th>
<th>4</th>
<th>4.5</th>
<th>5</th>
<th>5.5</th>
<th>6</th>
<th>6.5</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>5.08±0.07</td>
<td>5.20±0.13</td>
<td>5.72±0.02</td>
<td>6.37±0.02</td>
<td>6.80±0.03</td>
<td>7.35±0.03</td>
<td>7.93±0.03</td>
</tr>
<tr>
<td>Inorganic</td>
<td>5.31±0.10</td>
<td>5.86±0.03</td>
<td>6.43±0.02</td>
<td>6.99±0.02</td>
<td>7.55±0.05</td>
<td>8.20±0.06</td>
<td>8.33±0.04</td>
</tr>
<tr>
<td>Organic</td>
<td>5.25±0.09</td>
<td>5.82±0.04</td>
<td>6.40±0.05</td>
<td>7.24±0.02</td>
<td>8.06±0.05</td>
<td>8.87±0.04</td>
<td>9.75±0.14</td>
</tr>
</tbody>
</table>

Resources and Nutrient Utilization in Raising Animal Production. The kids belonging to Group II and III received 120mg of inorganic zinc supplement (Zinc Sulphate) and 40mg of organic zinc supplement (zinc propionate), per kid per day, respectively. Body weight of each animal of respective groups was measured at 15 days interval beginning from 4 to 7 months of age. For all the observed data in the present experiment, the standard statistical procedures recommended by Snedecor and Cochran (1994) have been followed. The data were presented by showing mean and standard error. The significant differences of values for different parameters studied were assessed by the critical difference test. All the above calculations were carried out using SPSS software version 11.5.

RESULTS AND DISCUSSION

Table 1 represents body weight of kids in different treatment groups at different ages. The values showed definite trend of increase of body weight within the different groups at various ages as measured at fortnightly interval from 4 to 7 months of age. The body weight increased from 5.08 ± 0.07, 5.31 ± 0.10 and 5.25 ± 0.09 kg to 7.93 ± 0.03, 8.33 ± 0.04 and 9.75 ± 0.14 kg in group I, II and III, respectively during the study period. The Critical Difference Test showed significantly higher (P<0.05) body weight of kids fed zinc-supplemented kids than that of control group (Table 1). It might be due to zinc is also associated with the increase of appetite by maintaining the function of taste buds (Berger, 2002) and it reportedly had stimulatory effect on carbohydrate and proteolytic enzymes (Hedemann et al., 2003; Hedemann et al., 2006). In growing lamb, loss of appetite is the first sign of zinc deficiency which led to poor growth and development. However, the present study hinted that the zinc-supplementation promoted the processes of tissue repairing and growth in the small intestine and stimulated the synthesis of digestive enzymes, resulting in a better digestion and absorption of nutrients, thus potentially improved growth performances. Perusal to Table 1, the kids receiving organic zinc from 5.5 months onwards up to 7 months of age had significantly higher (P<0.05) body weight than the inorganic zinc-supplemented group. It might be due to the fact that the organic zinc contributed greater bioavailability in the body system than the inorganic zinc sources (Hahn and Baker, 1993). Ao et al. (2007) reported that the organic sources of zinc like Bioplex zinc linearly increased feed intake and weight gain. Further, the Bioplex zinc had the ability to overcome the negative effect of calcium on zinc absorption (Brinkhaus et al., 1998). Other studies also showed that the bioavailability from the zinc-chelates was higher as organic source than that from the traditional inorganic zinc supplement (Wedekind et al., 1994; Rojas et al., 1995; Ward et al., 1996), particularly in the period of rapid growth (Rupic et al., 1997). Although the mode of action was unclear, researchers suggested that supplementing organic forms of zinc could improve animal-production responses (growth, milk production and reproduction) as compared to those observed in ruminants that were supplemented with only inorganic zinc (Spears, 1996). However, Cao et al. (2000) reported that except for zinc propionate A, organic zinc supplementation had bioavailability values similar to that of zinc sulphate for chicks and lambs.

CONCLUSION

The present experiment was conducted on thirty six Assam local male kids of three months of age and between 3 to 4 kg of body weight to study the effect of organic and inorganic forms of oral zinc supplementation. It was found that the rate of growth in organic zinc supplemented group of kids was the maximum followed by the inorganic zinc supplemented group as compared to the control one. Hence, it is concluded that the growth in male Assam local kids can be enhanced through oral zinc supplementation and the organic form of zinc is a better growth promoter than the inorganic form.
REFERENCES