



Original Research

Field Study on Growth Performance of Pre-Weaned Stall Fed Local Kids Supplemented with Organic Zinc

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Abstract

Small ruminants especially goat plays an important economic and sustainable income to the Indian farming community especially small, marginal and landless labourers in the country. Wants of human been raising to meet the food requirements of the increasing population. But in the other side the nutritional status of these animals plays a vital role in their production performances. Among the essential micronutrients zinc influences metabolism, immune system and overall health condition, deficiency of which can result in growth retardation, and other health related problems leading to huge economic losses. Hence, the current study was carried out to assess the effect of organic Zn supplementation on growth rate of pre-weaned stall fed local kids. Twelve twin local kids of one week age were divided in to two equal groups of six in each group (control and treatment) with the average body weights of 2.20 ± 0.01 kg (control) and 2.16 ± 0.03 kg (treatment). The control group animals were allowed to suckle mother during first three weeks of study. Then along with suckling, they were provided with tree leaves (Neem and Sesbania), horse gram and chopped fodder maize till the completion of study. Whereas, the animals in treatment group were also offered same diet as that of control group, additionally these group was supplemented with organic Zn (Zn acetate) @ 1 mg/kg body weight. Weekly body weight of both groups was recorded for 10 weeks and the data so collected was analyzed statistically. The results showed that the Average Daily Gain (ADG) (g) of kids supplemented with organic Zn was higher (89.73 ± 0.57) than the control (44.38 ± 1.23). This shows that the supplementation of zinc in the form of zinc acetate has a significant influence on growth and development of kids; hence study recommends the supplementation of zinc for young small ruminants mainly kids.

Key words: Growth Rate, Kids, Micronutrient, Organic Zn, Stall Fed

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Introduction

Goat farming is one of most important subsidiary occupations of the majority of farmers in India. Browsing land being the major constraint for free range goat farming to inflation in land rates and encroachment of pasture lands, farmers are forced to undertake stall feeding of goats. Efficient feeding management of goats under such conditions would certainly yield difference in production potential and thereby enhancing farm productivity and profitability. Due to increase in the cost of feed and fodder, improvement in efficiency of utilization of available nutrients would significantly add to the profitability of farming. Zinc being one of the most important micronutrient, which is involved in functioning of enzyme systems in livestock. Furthermore, zinc is essential for nucleic acid metabolism, protein synthesis and carbohydrate metabolism, therefore, zinc deficiency might greatly reduce synthesis of DNA, RNA and Protein hence leading to impairment in cellular division, growth and repair (Lee and Mc Dowell, 2014). Zinc also plays major role in appetite control (Suttle, 2010) and immunity (Pavalata *et al.*, 2011) against diseases especially coccidiosis in kids, hence organic Zn can be recommended as prophylaxis for coccidian (Petra *et al.*, 2011). In view of this, the present study was conducted to elaborate the influence of oral supplementation of organic Zn on the growth performance of pre-weaned stall fed local kids.

Materials and Methods

Twelve pre-weaned local twin kids of one week age were randomly selected from stall fed farm. The initial average body weight (Kg) of control and treatment (with Zn acetate supplementation) group was 2.20 ± 0.01 and 2.16 ± 0.03 respectively. The present 10 week feeding trial was carried out at Suvarna Goat farms, Agrhara Hosa Colony, Kanakapura, Taluk, Ramnagar district. Control group kids were allowed to suckle mother's milk up to the age of one month and after one month of age they were offered tree leaves at *ad libitum* (Neem and Agase), horse gram and chopped maize fodder along with mother's milk up to the end 10 week trial. In addition to this for the kids of treatment group, oral Zn acetate at 1mg/kg body weight supplemented as per ICAR (2013). The dose of Zn acetate was adjusted according to week wise body weight. The week wise body weight recorded using digital balance (Essae Company) for both control and treatment groups, from that ADG were calculated. Along with this general health of kids were regularly monitored. Data were analyzed as per statistical methods described by Snedecor and Cochran (1994).

Result and Discussion

The initial body weights (Kg) of control and treatment groups' were 2.20 ± 0.01 and 2.16 ± 0.03 , whereas the final body weights (Kg) were 4.89 ± 0.18 and 7.82 ± 0.02 respectively. The corresponding average daily gain (g/d) for control and treatment groups was 44.38 ± 1.23 and 89.73 ± 0.57 respectively during the study period. The weekly body weights (kg) and average daily gain (g) is represented in Table 1 and 2.

Table 1: Weekly body weights (kg) of kids

Weeks	Control	Treatment
2	2.49±0.02	2.73±0.09
3	2.76±0.09	3.47±0.03
4	3.08±0.12	4.12±0.02
5	3.41±0.15	4.73±0.02
6	3.72±0.17	5.35±0.02
7	3.96±0.16	5.95±0.02
8	4.26±0.17	6.59±0.01
9	4.56±0.17	7.20±0.01
10	4.89±0.18	7.82±0.02
Mean	3.53^a	5.01^b

^{ab}Means bearing different superscripts differ significantly ($P<0.05$)

Table 2: Average daily gain in body weights (g/d) of kids

Week	Control	Treatment
2	42.38 ± 4.05	94.06 ± 0.80
3	47.11 ± 5.27	93.51 ± 0.92
4	45.38 ± 4.90	92.22 ± 1.68
5	47.17 ± 4.70	87.74 ± 0.83
6	44.45 ± 3.69	88.02 ± 0.78
7	40.80 ± 5.21	85.72 ± 2.34
8	42.14 ± 1.76	91.31 ± 2.20
9	43.43 ± 1.36	87.21 ± 0.24
10	46.41 ± 2.77	89.10 ± 0.77
Average	44.38 ± 1.23^a	89.73 ± 0.57^b

^{ab}Means bearing different superscripts differ significantly ($P<0.05$)

The growth pattern showed definite trend of increase in the body weight between the groups at different intervals. The critical difference treatment showed significantly higher ($P<0.05$) body weight gain of kids supplemented with organic zinc than in control group. The increase in the body weight and average daily gain (ADG) in treatment group might be due to organic zinc supplementation. Generally, zinc is associated with growth and by appetite improvement in animals (Neville, 2010) and due to these kids started nibbling grass and leaves earlier than control. In the present study the kids with organic zinc supplementation from first week onwards till 10th week of study showed a significant high body weight gain ($P<0.05$) than that of control group.

Several studies conducted in other species also showed the positive responses as revealed by Devi *et al.* (2012), Pechova *et al.* (2009) and Hemanth *et al.* (2015) reported that the organic Zn had the ability to overcome the negative effect of calcium and phosphorus on zinc absorption and Stefania *et al.* 2011, reported that the bio availability of zinc in organic form is higher than in inorganic form, furthermore Maan *et al.* (2014) and Hala *et al.* (2014) reported that the supplementation of zinc plays a major role in the growth

performances of kids with significant difference. Similar findings were also reported by Satyanarayana *et al.* (2017) in buffalo heifers and Nagalaksmi and Himabindu (2013) in growing lambs.

In addition it was also observed that the kids receiving organic zinc showed lustrous hair coat, no incidence of gastrointestinal (GI) disturbances and other related health problems. Whereas control group kids had dull hair coat and frequently suffered from GI disturbances. Supplementation of organic Zn had an influence on immunity against diseases, correlates with the results of Pavalata *et al.* (2011) and Simona *et al.* (2011). Its effect on skin health and hair coat was demonstrated by Ray *et al.* (1997) and Randhawa *et al.* (2008) as noted in present study.

Conclusion

From the present trial it can be concluded that the body weight and growth rate of non-descriptive kids improved by oral organic zinc supplementation. In addition to this there was no occurrence of gastrointestinal disturbances and other related health problems in zinc supplemented kids. Further studies need to be undertaken in kids with varying levels of zinc dose and source and in a larger treatment groups.

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