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Research Article

Effect of Zinc Oxide and Zinc Methionine Supplementation on Skin Coat Condition in Piglets

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Abstract

Pig production occupies an important place in modern agriculture. Piglets are far less demanding on nutrients as compared to poultry. The experiment was conducted to know the effect of feeding organic and inorganic sources of additional zinc on growth incidences of gut microbial status in piglets. Sixty graded (Large White Yorkshire) suckling piglets were randomly divided into three treatment group of twenty piglets each on the basis of litter size, parity and live birth weight. Treatment I (T_1) served as control and these piglets were fed with deionized water daily . Treatment II (T_2) and Treatment III (T_3) were fed Zinc Oxide (ZnO) and Zinc Methionine (ZnM) daily (50 ppm) as oral suspension. The hair coat condition was scored based on the general appearance of the hair coat condition during experimental period, rated either 0 (normal) or 1 (poor). "Normal" refers to a hair coat in which hairs are evenly distributed, fine, appropriately oriented on the body. "Poor" refers to a hair coat in which bald patches are present or hairs are unevenly distributed, coarse, woolly, crimped or lying in a disoriented fashion, or appearing dull. The observa- tions during the experiment revealed that the hair coat was similar among all piglets regardless of the treatment groups during the entire period of the study. Statistical analysis revealed there was no significant difference between control (T_1), zinc oxide (T_2) and zinc methionine (T_3) groups respectively. This might be due to lower levels of zinc oxide and zinc methionine used during the experiment..

Keywords: Piglets ; Supplementation; Zinc Oxide; Zinc Methionine

Introduction

Pig production occupies an important place in modern agriculture. Piglets are far less demanding on nutrients as compared to poultry. The production cost of pork is comparatively not very high. However economical pig production is ahead of the hour for those involved in pig production activities. Among all the livestock production programmes, pig production is the most potential source of profit earning because of its prolificacy, fast growth rate, efficiency in feed conversion etc. Several *in vitro* studies have shown that zinc (Zn) has broad-spectrum antiviral activity against a variety of viruses, such as human immunodeficiency virus, trans-

missible gastroenteritis virus (TGEV), equine arteritis virus, and severe acute respiratory syndrome coronavirus [1,7,11]. Many potential mechanisms have been suggested to explain the potential beneficial effect of Zn against virus infections. Supplementation of Zinc plays a vital role in human nutrition as well as in livestock feeding. [9,10]. For example, Zn mediates antiviral effects through the inhibition of nidovirus RNA-dependent RNA polymerases or other proteins essential for the different phases of the viral life cycle [2]. Signs of zinc deficiency include thickening, hardening and fissuring of the skin (parakeratosis), with lesions being more pronounced on the extremities in piglets [12,13]. The body weight and growth rate of non-descriptive kids was 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 [4,6,7].

In one of the experiments conducted [3], coat condition was taken as the health descriptor in piglets and score was recorded by an experienced evaluator across one or two parities (total > 3,000 records). Hair coat condition was scored based on appearance, rated either 0 (normal) or 1 (poor). "Normal" refers to a hair coat in which hairs are evenly distributed, fine, appropriately oriented on the body, and carrying sheen. "Poor" refers to a hair coat in which bald patches are present or hairs are unevenly distributed, coarse, woolly, crimped or lying in a disoriented fashion, or appearing dull. Organic forms of zinc may exhibit greater bioavailability than commonly used inorganic forms of zinc and also have decreasing environmental concerns. Therefore, the present study was undertaken with an objective to study the effect of supplementation of zinc at low levels on incidences of nonspecific scours in pigs.

Materials and Methods

The experiment was conducted at piggery Farm, Department of Instructional Livestock Farm Complex, Veterinary College, Bangalore. The experiment was conducted to know the effect of feeding organic and inorganic sources of additional zinc on growth performance of young piglets. Sixty graded (Large White Yorkshire) suckling piglets with a mean average weight of 1.313 kg were used in eight weeks growth trial. The piglets were randomly divided into three treatment group of twenty piglets each on the basis of litter size, parity and live birth weight, so that each group had comparative average initial weight (Table 1).

Treatment 1 (control)			Treatment 2 (ZnO)			Treatment 3 (ZnM)		
Piglets number	Body weight (kg)	Sow No	Piglets number	Body weight (kg)	Sow No	Piglets number	Body weight (kg)	Sow No
185	1.55	31	187	1.3	31	217	1.59	31
223	1.19	141	218	1.73	31	392	0.675	141
221	1.14	141	190	1.075	141	189	1.15	141
178	1.915	225	224	1.19	141	200	1.97	225
179	1.68	225	191	1.045	141	201	1.61	225
182	1.85	466	180	1.45	225	204	1.3	466
183	1.69	466	202	1.76	225	206	1.81	466
195	1.585	227	207	1.87	466	196	1.505	227
199	0.833	225	235	1.565	466	226	1.345	227
209	1.47	149	197	1.65	227	214	1.865	57
212	1.5	149	213	1.575	57	176	1.745	432
197	1.93	432	215	1.515	149	195	1.8	432
242	1.14	57	196	1.67	432	243	1.08	57
256	1.27	438	211	1.135	57	213	1.035	57
224	1.295	438	214	1.14	57	226	1.265	484
263	1.025	109	255	1.275	438	265	1.01	109
237	0.975	109	227	1.35	438	239	0.985	109
252	1.14	429	253	1.035	428	222	1.195	429
254	1.125	429	220	1.21	429	262	1.21	18
233	1.2	429	234	1.145	223	236	1.105	223
SE	0.073			0.059			0.079	

Table 1: Particulars of the piglets used in the experiment.

Treatment I (T1) served as control and these piglets were fed with deionized water daily . Treatment II (T_2) and Treatement III (T_3) were fed Zinc Oxide (ZnO) and Zinc Methionine (ZnM) (BIO-PLEX) daily (50 ppm) as oral suspension. Piglets were allowed to suckle dam's milk *ad libitum* during the growth trial, till the completion of duration of study.

Housing and management

The experimental animals (piglets) were maintained in three groups along with their respective sows in separate concrete pens of size 4.2 x 2.8 meter. Pigs were allowed in open yard in the morning for exercise and had access to grass and sunlight. Plenty of fresh water was made to available all the time. During the whole experimental period the sows along with their piglets were kept under hygienic condition. Pens were daily washed and kept dry and clean. Fifteen days prior to farrowing deworming was carried out using pipeparzine adipate at the rate of 100mg per kg body weight. Sows were allowed *ad libitum* access to feed i.e., the kitchen waste was fed in concrete feeders provided in the pens and for the entire duration of the study the piglets were allowed to suckle milk from the respective mothers without any extra supplementation.

Skin coat condition

Hair coat condition as a health descriptor was scored based on appearance is rated either 0 (normal) or 1 (poor) as described [5]. Normal referred to a hair coat in which hairs were evenly distributed, fine, appropriately oriented on the body, and carrying a sheen, Poor referred to a hair coat in which bald patches were present or hairs were unevenly distributed, coarse, woolly, crimped, or lying in a disoriented fashion, or appearing dull.

Statistical analysis

Data on growth performance, incidence of nonspecific scours, piglet mortality, skin coat condition and gut microbial status were analyzed by ONE WAY ANOVA using statistical software (SPSS, Version 16) for windows (2008).

Results and Discussion

The hair coat was similar among all piglets regardless of the treatment groups during the entire period of the study. How- ever, statistical analysis revealed there was no significant differ- ence between control (T_1), zinc oxide (T_2) and zinc methionine (T_3) groups respectively. (Table 2). The results of the present study are consistent with earlier observations made e [3,5].

Figure 1: The piglets selected for the experimental trial.

Treatment/ wks	1 week	2 weeks	3 week	4 week	5 week	6 week	7 week	8 week
T_1	0	0	0	0	0	0	0	0
T_2	0	0	0	0	0	0	0	0
T_3	0	0	0	0	0	0	0	0

Table 2: Coat condition score in different treatment group. F value is not significant.

Conclusion

The hair coat was similar and did not vary significantly among all piglets regardless of the treatment groups (T_1), (T_2), (T_3) during the entire period of the study. This might be the lower dosage used during the experiment.

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