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Effect of different levels of trace mineral sources on economics & livability of commercial broiler chicken

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Abstract

An experiment set up to evaluate the effect of different levels of trace mineral sources on economics and livability of commercial broiler chicken. A total of 120 day old cobb - 400 broiler chicks was allotted into 5 groups with 4 replicates of 24 birds each. Control diet supplemented with 100 percent inorganic trace minerals (ITM) while, experimental diets 2, 3, 4 and 5 supplemented with 75 percent ITM and 25 percent organic trace minerals (OTM), 50 percent ITM and 50 percent OTM, 25 percent ITM and 75 percent OTM and 100 percent OTM, respectively. Livability percentage and economics of rearing of broiler birds were recorded during the experimental period of 6 weeks. Results indicated that dietary supplementation of 100 percent organic trace minerals in feed showed higher livability percentage and higher economic return compare to control diet.

Keywords: Broiler, inorganic trace minerals, organic trace minerals, livability, return over feed cost

Introduction

Poultry sector is one of India's most rapidly growing agriculture sectors. Feed is an essential part in broiler production. For broiler production, feed cost considered as 70 to 80% of the total cost [1]. Livestock diets supplemented with minerals to avoid deficiencies that can lead to clinical and pathological disorders [2]. The chicken requires minimum 14 inorganic components for proper nutrition. Based on the required amount that is essential by the bird they are classified into two categories. First, the macro-elements, generally reported as a percentage of the diet, are vital constituents of tissues, playing structural and metabolic roles. Secondly, the trace minerals, which also called as micro minerals are present in minor amounts in animal tissues and primarily play role as enzyme catalysts and physiological regulators [3].

Zinc (Zn), copper (Cu), iron (Fe), iodine (I), manganese (Mn), cobalt (Co), selenium (Se), chromium (Cr) and molybdenum (Mo) are vital trace minerals typically supplemented to broiler feeds. Micro minerals are required in a number of digestive, physiological and biosynthetic processes within the body and also play major role in body growth [4]. Organic minerals include different compounds in the form of amino acid chelates or proteinates and recently derived organic acid chelates [5]. Organic forms of these trace minerals are available commercially and have a more bioavailability than inorganic trace minerals. Organic trace minerals spread less environmental pollution. Feeding organic trace minerals results in certain benefits like mortality is low, skin strength increases, improvisation in feathering, skin lesions reducing and carcass quality improved [6].

Materials and Methods

The experimental study was conducted at Poultry Research Station, College of Veterinary Science & Animal Husbandry, Kamdhenu University, Anand, Gujarat. The experiment was carried out on one hundred and twenty (120) straight run day old commercial broiler chicks of a single hatch purchased from a private hatchery. The duration of the experiment was six weeks (26th February, 2021 to 8th April, 2021). On arrival, chicks were wing banded and weighed individually. The chicks were then distributed randomly to five treatment groups, consisting 24 chicks in each treatment group. Each treatment group consisted of four replicates with 6 chicks per replicate. Birds were immunized for Marek's disease at hatchery and New Castle disease at 7th and 21st day of age with Lasota vaccine and infectious bursal disease at 14th day of age. Broiler pre-starter (0 - 7 days), starter (8 - 21 days) and finisher (22 - 42 days) feeds were prepared. The inorganic trace minerals and glycinated organic trace minerals purchased from commercial sources. The five treatments were: T₁ diet (basal diet with supplementation of 100 percent ITM), T₂ diet (basal diet with supplementation of 75 percent

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ITM and 25 percent of OTM), T₃ diet (basal diet with supplementation of 50 percent ITM and 50 percent OTM), T₄ diet (basal diet with supplementation of 25 percent ITM and 75 percent of OTM) and T₅ diet (basal diet with supplementation of 100 percent OTM). The basal diets for all treatments, however, were identical and isocaloric and iso-nitrogenic.

Table 1: Proportion of feed ingredients (%) used for preparation of broiler diets (control diet)

Sr. No.	Ingredients	Name of diet		
		Broiler pre-starter (0-1 week)	Broiler starter (2-3 weeks)	Broiler finisher (4-6 weeks)
1	Yellow maize	56.000	58.000	60.000
2	Soyabean De Oiled Cake	37.600	35.580	30.000
3	De Oiled Rice Bran	1.660	0.430	2.300
4	Lime Stone Powder	1.368	1.360	1.360
5	Di Calcium Phosphate	0.960	1.000	1.100
6	Vitamins	0.050	0.050	0.050
7	Vitamin-B ₁₂	0.010	0.010	0.010
8	Choline chloride 60 %	0.100	0.100	0.100
9	Lysine	0.057	0.005	0.050
10	Methionine	0.148	0.110	0.134
11	Phytase	0.010	0.010	0.010
12	Enzymes	0.020	0.020	0.020
13	Salt	0.250	0.250	0.250
14	Sodium bicarbonate	0.100	0.100	0.100
15	Liver tonic	0.100	0.100	0.100
16	Immunomodulators	0.050	0.050	0.050
17	Toxin binder	0.100	0.100	0.100
18	Anticoccidial	0.050	0.050	0.050
19	Emulsifier	0.050	0.050	0.050
20	Vegetable Oil	1.220	2.520	4.070
21	Inorganic trace minerals	0.100	0.100	0.100
22	Organic trace minerals	-	-	-
	Total	100.00	100.00	100.00
	CP (%)	23.00	22.00	20.00
	ME (kcal/kg feed)	3000.00	3100.0	3200.00

Results and Discussion

Livability

The livability percentage of birds during experiment has been shown in Table 2. The livability (%) of birds supplemented with T₁, T₂, T₃, T₄ and T₅ ration were 91.67, 95.83, 100, 100 and 100 %, respectively. It was observed that the livability (%) of birds fed with T₃, T₄, and T₅ ration reported no mortality at all and only T₁ and T₂ group shown 8.33 % and

4.17 % mortality. The present findings were in accordance with the findings of Nollet *et al.* (2008) [7], M'sadeq *et al.* (2018) [8], Abdullah *et al.* (2009) [9] and Baloch *et al.* (2017) [10] who reported that supplementation of organic trace minerals in diet reduced mortality than broilers supplemented with inorganic trace minerals in diet. The current finding contradicted the previous finding of Bao *et al.* (2009) [3], who reported that broilers supplemented with organic trace minerals in diet had higher mortality (8.0%) compared with broilers supplemented with inorganic trace minerals in diet (7.5%).

Economics: Feed is major input item for broiler rearing. It accounts for more than 75% of the total cost of production. The economics of broiler production in terms of return over feed cost (ROFC) clearly expresses the profitability of broiler production. The return over feed cost can be derived by subtracting the feed cost from income of selling of birds. ROFC (Rs./bird) for birds fed with T₁, T₂, T₃, T₄ and T₅ ration were found to be 58.48, 72.19, 79.09, 76.83 and 85.20, respectively. The highest ROFC was found in the birds fed with T₅ ration followed by T₃, T₄, T₂ and T₁. Result indicated that diet T₅ with 100 percent organic trace minerals resulted in highest economic return in terms of return over feed cost (ROFC). The present findings were in accordance with the findings of Lu *et al.* (2020) [11], Khatun *et al.* (2019) [12], Ahamed *et al.* (2019) [13], Trivedi *et al.* (2019) [14] and Das *et al.* (2011) [15]. They reported that treatment supplemented with organic trace minerals in diet had higher ROFC than treatment supplemented with inorganic trace minerals in diet. The current findings contradicted the previous findings of Ma *et al.* (2015) [16], who reported that broilers fed 25 percent organic trace minerals in diet gave more profitability than supplementation of 100 percent organic trace minerals in diet. Ciurescu *et al.* (2007) [17] concluded that it was not economically feasible to replace inorganic trace minerals with organic trace minerals in broiler diet.

Table 2: Livability (%) of broilers fed with different treatment diets

Particulars	Treatments				
	T ₁	T ₂	T ₃	T ₄	T ₅
No. of birds at day-old age	24	24	24	24	24
No. of birds died up to 6 th week	2	1	0	0	0
No. of birds at the end of experiment i.e. at 6 th week	22	23	24	24	24
Livability (%)	91.67	95.83	100	100	100

Table 3: Return Over Feed Cost (Rs./ bird) of different treatment diets

Particulars		Treatments				
		T ₁	T ₂	T ₃	T ₄	T ₅
Feed consumption (g)	Pre-starter	160.21	158.91	161.99	162.12	165.87
	Starter	874.24	895.33	886.99	888.54	924.62
	Finisher	2008.29	2119.63	2323.26	2111.8	2394.07
	Total	3042.74	3173.87	3372.24	3162.46	3484.56
Cost of feed (Rs./kg.)	Pre-starter	29.23	29.27	29.30	29.34	29.38
	Starter	30.76	30.80	30.83	30.87	30.91
	Finisher	32.25	32.29	32.33	32.36	32.41
Feed cost (Rs./bird)	Pre-starter	4.68	4.62	4.75	4.75	4.85
	Starter	26.88	27.57	27.35	27.41	28.56
	Finisher	64.76	68.42	75.11	68.31	77.59
Total feed cost (Rs./bird)		96.32	100.61	107.21	100.47	111.00
Average live body weight		1.72	1.92	2.07	1.97	2.18
Cost of feed (Rs./Kg. broiler bird)		56.00	52.40	51.79	51.00	50.92
Income from selling of birds @ 90 Rs./Kg. rate (Rs./bird)		154.80	172.80	186.30	177.30	196.20
ROFC (Rs./bird)		58.48	72.19	79.09	76.83	85.20
ROFC (Rs./Kg. broiler bird)		34.00	37.60	38.21	39.00	39.08

Conclusion

Broiler birds fed with higher percentage of organic trace minerals had more livability percentage and got higher return over feed cost. Overall, it can be concluded that to get higher economic return and better livability percentage commercial broiler chicken can be fed with 100 percentage organic trace minerals.

References

- Osei SA, Amo J. Research note: palm kernel cake as a broiler feed ingredient. *Poultry Sci.* 1987;66(11):1870-3.
- Nollet L, Van der Klis JD, Lensing M, Spring P. The effect of replacing inorganic with organic trace minerals in broiler diets on productive performance and mineral excretion. *J Appl Poult Res.* 2007;16(4):592-7.
- Bao YM, Choct M, Iji PA, Bruerton K. The digestibility of organic trace minerals along the small intestine in broiler chickens. *Asian-Australas J Anim Sci.* 2009;23(1):90-7.
- Bao YM, Choct M. Trace mineral nutrition for broiler chickens and prospects of application of organically complexed trace minerals: a review. *Anim Prod Sci.* 2009;49(4):269-82.
- Ghasemi HA, Hajkhodadadi I, Hafizi M, Taherpour K, Nazaran MH. Effect of advanced chelate technology based trace minerals on growth performance, mineral digestibility, tibia characteristics, and antioxidant status in broiler chickens. *Nutr Metab.* 2020;17(1):1-12.
- Tavares T, Mourão JL, Kay Z, Spring P, Vieira J, Gomes A, Vieira-Pinto M. The effect of replacing inorganic trace minerals with organic Bioplex® and Sel-Plex® on the performance and meat quality of broilers. *J Appl Anim Nutr.* 2013;2.
- Nollet L, Huyghebaert G, Spring P. Effect of different levels of dietary organic (Bioplex) trace minerals on live performance of broiler chickens by growth phases. *J Appl Poult Res.* 2008;17(1):109-15.
- M'Sadeq SA, Wu SB, Choct M, Swick RA. Influence of trace mineral sources on broiler performance, lymphoid organ weights, apparent digestibility, and bone mineralization. *Poultry Sci.* 2018;97(9):3176-82.
- Abdallah AG, El-Husseiny OM, Abdel-Latif KO. Influence of some dietary organic mineral supplementations. *Int J Poult Sci.* 2009;8:291-8.
- Baloch Z, Yasmeen N, Pasha TN, Ahmad A, Taj MK, Khosa AN, *et al.* Effect of replacing inorganic with organic trace minerals on growth performance, carcass characteristics and chemical composition of broiler thigh meat. *Afr J Agric Res.* 2017;12(18):1570-5.
- Lu WB, Kuang YG, Ma ZX, Liu YG. The effect of feeding broiler with inorganic, organic, and coated trace minerals on performance, economics, and retention of copper and zinc. *J Appl Poult Res.* 2020;29(4):1084-90.
- Khatun A, Chowdhury SD, Roy BC, Dey B, Haque A, Chandran B. Comparative effects of inorganic and three forms of organic trace minerals on growth performance, carcass traits, immunity, and profitability of broilers. *J Adv Vet Anim Res.* 2019;6(1):66.
- Ahamed Z, Das SC, Dey B, Azad MR, Islam KMS. Supplementation of natural minerals on the performance of broiler. *Bangladesh J Anim Sci.* 2019;48(2):92-8.
- Trivedi SP, Patil SS, Garg DD, Savsani HH, Pawar MM, Gohel BC. Effect of dietary supplementation of organic chromium on feed intake, growth performance and economics in commercial broiler chickens. *J Entomol Zool Stud.* 2019;7(2):374-8.
- Das B, Sarkar SK, Panda S. Effect of dietary supplementation of inorganic and organic trace minerals on the performance of broiler chickens. *Indian J Poult Sci.* 2011;46(2):247-9.
- Ma M, Hassan HMA, Youssef AV, Gad SM. Feeding broilers on finisher diet of low trace mineral levels and its effect upon performance, carcass characteristics, mineral excretion and net profit. *Int J Poult Sci.* 2015;14(6):338-42.
- Ciurescu G, Anca G, Nagy CI. Effects of the mineral premix based on phosphate fritte with chelated bioelements on broiler performance. *Arch Zootech.* 2007;10:26-32.