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Effect of chemicals (minerals) on the growth performance of rabbit

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ABSTRACT

The rabbit farming is emerging as an important enterprise in India due to its high prolificacy, short generation intervals and better growth rate. The role of minerals like Ca^{2+} , Zn^{2+} , Cu^{2+} , Co^{2+} etc. in living organisms is an emerging area of strong interest for producers, feed manufacturers and scientists because trace elements unquestionably play an important role in Pathology and Physiology of biological system. The effect of minerals at different rates was studied in 18 apparently healthy weaned rabbits (6 week of age). At 6th week of age, 18 weaned rabbits were randomly divided into three groups. Group G_1 was considered as control group maintained on basal diet without minerals. G_2 and G_3 groups were supplemented with 2% and 4% minerals respectively along with basal diet. The present results showed that the rabbits of G_3 group had higher body weight than G_2 and G_1 groups during whole experimental period. At 12th week of age, the average body weight of the rabbit of G_3 group (1629.00 ± 57.09 g) maintained on 4% mineral mixture along with basal diet was observed to be significantly higher than the rabbits of G_1 (1258.00 ± 76.20 g) control group. However, G_3 group did not differ significantly from that of G_2 (1424.67 ± 87.30 g) group. At the end of experiment (i.e. 13th week) the average body weight of the rabbit of G_3 group (1713.00 ± 46.76 g) was observed to be significantly higher than the rabbits of G_2 (1481.33 ± 84.64 g) and G_1 (1296.67 ± 78.86 g) groups. During 6-12th week of age, overall body weight gain of the rabbits of G_3 (1000.67 ± 23.85 g) group was observed to be significantly higher followed by G_2 (789.67 ± 39.35 g) and G_1 (623.67 ± 48.93 g) groups. At 13th week of age also similar pattern for overall body weight gain was observed. The weekly feed consumption of the rabbits of G_3 group was observed to be higher followed by the rabbits of G_1 and G_2 groups during whole experimental period (i.e. 6-13th week). During 6-12th week of age, overall feed conversion efficiency in the rabbits of G_3 group (3.71 ± 0.52) was significantly better than the rabbits of G_1 (5.27 ± 0.24) group. However, G_3 group did not differ significantly from G_2 (4.22 ± 0.43) group. At the end of experiment (i.e. 13th week), overall feed conversion efficiency was non-significantly better in the rabbits of G_3 group (4.42 ± 0.84) followed by G_2 (5.34 ± 1.19) and G_1 (7.05 ± 1.79) groups. The present findings indicated that the rabbit may be fed 4% mineral mixture containing Ca^{2+} , Zn^{2+} , Cu^{2+} , Co^{2+} etc. ions along with basal diet to boost up rabbit farming with proper growth and better feed conversion efficiency. Further, it is also suggested that the rabbits may be sold in the market at the age of 12th week for better return.

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KEYWORDS

Rabbits;
Chemicals;
Growth performance.

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INTRODUCTION

The rabbit is very much in use as laboratory animals for research and also provides good quality white meat with low percentage of cholesterol and sodium^[1]. The rabbit farming is emerging as an important enterprise in India due to its high prolificacy, short generation intervals and better growth rate. The role of minerals like Ca²⁺, Zn²⁺, Cu²⁺, Co²⁺ etc. in living organisms is an emerging area of strong interest for producers, feed manufacturers and scientists because trace elements unquestionably play an important role in Pathology and Physiology of biological system.

In recent years the inorganic constituents in biological system have been receiving increasing attention. About 30 elements are recognized as essential to life^[2]. Some are required in bulk, or at least in macroscopic amount, essentially in all forms of life. The important elements are H, Na, K, Mg, Ca, C, N, O, P, S and Cl. The others occur in trace quantities, although Fe, Cu and Zn are at the top end of this "trace" scale and are apparently also essential to all forms of life. One of the major roles played by metallic element in biochemistry is in metalloenzymes and in the enzyme catalysis. The role of the metal atoms in enzymic catalysis is currently an active subject of research. Therefore, effect of minerals was studied in 18 weaned rabbits of 6 weeks of age.

MATERIALS AND METHODS

At 6th week of age, 18 weaned rabbits were randomly divided into three groups. Each group was having 6 rabbits. The differences in body weight among different groups were non-significant. Group G₁ was considered as control group maintained on basal diet without minerals. G₂ and G₃ groups were supplemented with 2% and 4% minerals respectively along with basal diet.

The rabbits were fed *ad lib* given in the morning after weighing and subsequently the consumptions of feed were recorded after subtracting the left over feed in the feeder and wastage from the total feed given daily in the morning.

The individual body weight at weekly interval and body weight gain both were recorded during the ex-

perimental period and accordingly the analysis was done by using standard statistical methods^[5]. On the basis of actual feed intake and gain in body weight, the feed conversion ratio was calculated by using the following formula:

Feed conversion ratio =

$$\frac{\text{Feed consumed in a particular period.}}{\text{Body weight gain during the same period.}}$$

TABLE 1 : Composition of rations of different treatment groups given to the rabbits.

Ingredients	G ₁	G ₂	G ₃
Maize (%)	30	30	30
Groundnut cake (%)	26	26	26
Wheat bran (%)	43	43	43
Common salt (%)	1	1	1
Mineral mixture (%)	-	2	4

TABLE 2 : Composition (per kg) of mineral mixture (Agrimin high power powder) given to the rabbits.

Sl. No.	Ingredients	Amount
1.	Cobalt	150mg
2.	Copper	1200mg
3.	Iodine	325mg
4.	Iron	5000mg
5.	Magnesium	6000mg
6.	Manganese	1500mg
7.	Potassium	100mg
8.	Selenium	10mg
9.	Sodium	5.9mg
10.	Sulphur	0.922%
11.	Zinc	9600mg
12.	DL-metionine	1920mg
13.	L-LysineMono-hydrochloride	4400mg
14.	Phosphorus	12%
15.	Calcium	24%

RESULTS AND DISCUSSION

The effect of chemicals on body weight of rabbit was found to be significant from 8th week of age (TABLE 3). The perusal of TABLE 3 indicated that the rabbits of G₃ group had higher body weight than G₂ and G₁ groups during experimental period from 7th to 13th week of age. At 12th week of age, the average body weight of the rabbits of G₃ group

(1629.00±57.09 g) maintained on 4% mineral mixture along with basal diet was observed to be significantly higher than the rabbits of G₁ (1258.00±76.20g) group. However, G₃ group did not differ significantly from that of G₂ (1424.67±87.30g) group. At the end of experiment (i.e. 13th week) the average body weight of the rabbits of G₃ group (1713.00±46.76g) was observed to be significantly higher than the rabbits of G₂ (1481.33±84.64g) and G₁ (1296.67±78.86g) groups. However, G₂ and G₁ groups did not differ significantly from each other (TABLE 3). The effect of minerals was observed to be significant on body weight gain also during different periods of growth (TABLE 4). During 6-12th week of age, overall body weight gain of the rabbits of G₃ (1000.67±23.85g) group was observed to be significantly higher followed by G₂ (789.67±39.35g) and G₁ (623.67±48.93g) groups. The overall body weight gain during 6-13th week of age in rabbits of G₃ (1084.67±22.32g) group was found to be significantly higher followed by G₂ (846.33±37.75g) and G₁ (662.33±53.46g) groups. The present findings are in conformity with the findings of³¹ who reported that minerals supplementation affected significantly body weight and daily weight gain in rabbit⁶¹. Also reported similar results in respect of effect of minerals on body weight and weight gain in rabbit⁴¹. Also reported beneficial effect of the multi-nutrient blocks on the improved growth rate, reduction in the time required to reach slaughter live weight and lower cost of production in rabbit. The weekly feed consumption of the rabbits of G₃ group was recorded to be higher followed by the rabbits of G₁ and G₂ groups during whole experimental period (i.e. 6-13th week). During 6-12th week of age, overall feed conversion efficiency in the rabbits of G₃ group (3.71±0.52) was significantly better than the rabbits of G₁ (5.27±0.24) group. However, the G₃ group did not differ significantly from the rabbit of G₂ (4.22±0.43) group. At the end of experiment (i.e. 13th week), overall feed conversion efficiency was non-significantly better in the rabbits of G₃ group (4.42±0.84) followed by G₂ (5.34±1.19) and G₁ (7.05±1.79) groups. Perusal of TABLE 4, 5 and 6 clearly indicate that the rabbits of all three groups consumed maximum feed during 12-13th week of age but the gain during this period was extremely minimum as compared to other

TABLE 3 : Average body weight (g) of rabbit at various ages raised on different types (composition) of feed.

Periods (week)	G ₁	G ₂	G ₃
6 th week	634.33±51.41	635.00±54.12	628.33±48.60
7 th week	719.33±43.72	791.67±58.37	881.00±30.61
8 th week	811.33±42.53 ^a	894.67±67.10 ^a	1054.67±35.88 ^b
9 th week	925.00±58.30 ^a	1011.00±74.56 ^a	1213.00±32.79 ^b
10 th week	1028.00±66.56 ^a	1156.00±80.95 ^{ab}	1350.00±39.05 ^b
11 th week	1136.67±73.64 ^a	1262.67±85.27 ^a	1484.33±43.47 ^b
12 th week	1258.00±76.20 ^a	1424.67±87.30 ^{ab}	1629.00±57.09 ^b
13 th week	1296.67±78.86 ^a	1481.33±84.64 ^a	1713.00±46.76 ^b

Each value is the average of 6 observations. Mean under the same superscript in a row did not differ significantly.

TABLE 4 : Average weekly body weight gain (g) of rabbit during various periods of growth maintained on different types (composition) of feed.

Periods (week)	G ₁	G ₂	G ₃
6 th -7 th week	85.00±23.37 ^a	156.67±18.49 ^b	252.67±22.12 ^c
7 th -8 th week	92.00±14.77 ^a	103.00±10.61 ^a	173.67±18.29 ^b
8 th -9 th week	113.67±15.90 ^a	116.33±12.54 ^a	158.33±8.68 ^b
9 th -10 th week	103.00±12.43 ^a	145.00±7.19 ^b	137.00±7.88 ^b
10 th -11 th week	108.67±12.25	106.67±10.15	134.33±8.07
11 th -12 th week	121.33±9.39	162.00±11.09	144.67±17.55
12 th -13 th week	38.67±8.53 ^a	56.67±6.79 ^{ab}	84.00±12.27 ^b
6 th -12 th week	623.67±48.93 ^a	789.67±39.35 ^b	1000.67±23.85 ^c
6 th -13 th week	662.33±53.46 ^a	846.33±37.75 ^b	1084.67±22.32 ^c

Each value is the average of 6 observations. Mean under the same superscript in a row did not differ significantly.

periods. This finding suggests that the optimum age for the sale of rabbit in the market may be considered as 12th week of age. However⁶¹, reported non-significant effect of mineral blocks on feed conversion ratio, although the effects of minerals on body weight and weight gain were significant in rabbit.

The above findings indicated that the rabbit may be fed 4% mineral mixture containing Ca²⁺, Zn²⁺, Cu²⁺, Co²⁺ etc. ions along with basal diet to boost up rabbit farming with proper growth and better feed conversion efficiency. Further, it is also suggested that the rabbits may be sold in the market at the age of 12th week for better return.

Regular Paper**TABLE 5 : Total weekly feed consumption on group basis.**

Period (Week)	G ₁	G ₂	G ₃
6-7 th	2436 (406.00)	2494 (415.67)	2640 (440.00)
7-8 th	2770 (461.67)	2890 (481.67)	2906 (484.33)
8-9 th	3108 (518.00)	3068 (511.33)	3384 (564.00)
9-10 th	3698 (616.33)	3238 (539.67)	3656 (609.33)
10-11 th	3810 (635.00)	3724 (620.67)	3992 (665.33)
11-12 th	3952 (658.67)	3912 (652.00)	4142 (690.33)
12-13 th	4112 (685.33)	4122 (687.00)	4386 (731.00)
6-12 th	19774 (3295.67)	19326 (3221.00)	20720 (3453.33)
6-13 th	23886 (3981.00)	23448 (3908.00)	25106 (4184.33)

Figures under parenthesis are average weekly feed consumption per rabbit.

TABLE 6 : Feed Conversion Ratio (FCR) of rabbit during various periods of growth of rabbit maintained on different types (composition) of feed.

Period (Week)	G ₁	G ₂	G ₃
6-7 th	4.78	2.65	1.74
7-8 th	5.02	4.68	2.79
8-9 th	4.56	4.40	3.56
9-10 th	5.98	3.72	4.45
10-11 th	5.84	5.82	4.95
11-12 th	5.43	4.02	4.77
12-13 th	17.72	12.12	8.70
6-12 th	5.27±0.24 ^b	4.22±0.43 ^{ab}	3.71±0.52 ^a
6-13 th	7.05±1.79	5.34±1.19	4.42±0.84

Each value is the average of 6 observations. Mean under the same superscript in a row did not differ significantly.

REFERENCES

- [1] A.Chakrabarti, S.Biswas, A.Goswami; Rabbit Farming, Kalyani Publishers, Rajendra Nagar, Ludhiana-8, Haryana, (1999).
- [2] E.Frieden; J.Chem.Educ., **62**, 917 (1985).
- [3] I.F.M.Marai, M.S.Ayyat, U.M.Abd El-Monem; Tropical and Subtropical Agroecosystem, **6**, 149-155 (2006).
- [4] R.Ramchurn, J.Raggoo, A.Ruggoo; Livestock Research for Rural Development, **12(1)**, 2000 (2009).
- [5] G.W.Snedecor, W.G.Cochran; Stastical Methods. 8th Edition, Iowa State University Press, Ames, Iowa (1994).
- [6] N.Zerrouki, F.Lebas, C.Davoust, E.Corrent; Effect of Mineral Blocks Addition on Fattening Rabbit Performance. 9th World Rabbit Congress-June 10-13, Verona-Italy, 853-857 (2008).