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Effect of feeding various sources of selenium on growth performance and production efficiency in Kuroiler chickens

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Abstract

Study was conducted at Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (UP) to assess the growth performance, feed utilization, blood-biochemical and carcass traits utilizing 160 Kuroiler chickens from June 10th to August 5th, 2022. Feeding trial was designed into 04 dietary groups viz. T_1 (Control, without selenium), T_2 (0.3 ppm inorganic Selenium), T_3 (0.3 ppm organic Selenium) and T_4 (0.3 ppm Nano - Selenium) in different treatment groups along with basal starter and finisher diet. Body weight was found to have significant variation in all the treatment groups from 2nd to 8th weeks of age and increases in all dietary groups. Weekly feed consumption was observed to have significant variation from 1st to 8thweek. Feed consumption in the 8th week was highest in T_1 (999.10 g) followed by T_3 (935.25 g), T_2 (911.00 g) and T_4 (816.60). Feed conversion ratio was found to be statistically non-significant during starter phase (1d-21d) whereas, significant differences were observed for FCR during finisher phase (22d-56d). However, FCR was found to have non-significantly affected by feeding selenium during overall phase (1d-56d). Therefore, it may be concluded that Inorganic, organic and nano selenium @ 0.3 ppm improved the growth performance and carcass characteristics in Kuroiler chickens without adversely affecting the blood- bio-chemicals.

Key words: Selenium, Kuroiler, Growth performance

Introduction

Indian poultry industry is the fastest growing segment of agriculture sector and presently ranks 3rd and 5th place in layer and broiler production, respectively. In spite of astonishing growth, per capita availability of eggs and poultry meat is only 91 eggs and 3.96 kg per year, respectively. Significance of poultry as nutrition, source of subsidiary income and employment generation particularly for the people belonging to lower strata of the society is well documented. Kuroiler is a colored dual purpose strain developed by Kegg Farms Pvt Ltd, Gurugram, Haryana well suited for backyard as well as semi-intensive system of poultry farming in rural areas. Role of selenium as antioxidant in poultry as well as other livestock species has already been recognized by several workers but scanty work has conducted on Krroiler, hence, present investigation was taken up to assess the effect of feeding various sources of selenium on growth and carcass parameters.

Materials and Methods

The study was carried out at Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (UP) for a period of 08 weeks started from 10.06.2022 utilizing 160 Kuroiler chicks procured from Kegg Farms Pvt Ltd, Gurgaon, Haryana. Ad-libitum crumble feed of Godrej Agrovet Ltd was offered as Starter and Finisher up to 1-3 and 4-8 wks of age, respectively. Chicks were randomly divided in to T_1 (Control, basal diet without selenium), T_2 (Basal diet with inorganic selenium @ 0.3 ppm), T_3 (Basal diet with organic selenium @ 0.3 ppm) and T_4 (Basal diet with nano-selenium @ 0.3 ppm) treatment groups containing 40 chicks in each group which were again divided into 04 replicates having 10 birds each. Chicks were reared

Table1: Analyzed nutrient content of experimental diet (g/kg as DM) for various attributes

Attributes	Starter Feed	Finisher Feed
Dry Matter	872.50	870.50
Ash	153.80	177.60
Crude Protein	230.60	188.80
Ether Extract	47.20	46.20
Crude Fiber	39.10	52.950
Nitrogen free extract	533.30	550.30
NDF	309.00	349.70
ADF	111.80	122.20
Calcium	13.80	10.20
Phosphorous	9.90	9.20

under deep litter system keeping housing and managemental conditions identical for each treatment. Aim of study was to evaluate the practical feasibility of feeding different sources of selenium and its effect growth performance and production efficiency in Kuroiler chickens. Nutrient composition of experimental diet is presented in Table 1.

The proximate for dry matter, total ash, crude protein, ether extract, crude fiber and nitrogen free extract of starter feed were found to be 87.25%, 15.38%, 23.06%, 4.72%, 3.91% and 53.33%, respectively whereas, corresponding values of finisher feed were observed as 87.05%, 17.76%, 18.88%, 4.62%, 5.29% and 5.50%, respectively. Proximate analysis for moisture, crude protein, crude fat, crude fiber, NFE and total ash including calcium and phosphorous were estimated as per method of AOAC (1995). Body weight, body weight gain, feed intake and feed conversion ratio were recorded for each replicate on weekly basis following the standard protocols Data obtained were statistically analyzed as per the standard statistical procedure (Snedecor and Cochran, 1994) using IBM Statistical Package for the Social Sciences (IBM SPSS version 20). Significant differences ($P<0.05$) among treatments and separation of homozygous subset was determined as per Duncan's Multiple Range Test (Duncan 1995).

Results and Discussion

Growth Performance:

An appraisal of Table 2 indicated that body weights of chicks at day one were recorded as 39.10, 40.00, 38.43 and 39.33 g for T_1, T_2, T_3 and T_4, respectively. The average body weight of Kuroiler bird at 57th day/ 8th week of dietary groups were estimated as 1724.13, 1812.00, 1930.23 and 2092.30 g T_1, T_2, T_3 and T_4 groups, respectively (Fig 1). This trait was found to be significantly influenced by feeding of selenium over the control. Nano-selenium supplemented group was found to have highest body weight than organic and inorganic form of selenium. Weekly feed consumption was found to be increased till 6th week and after that it becomes consistent. Similarly, initial feed consumption of 2nd week for group without selenium (T_1), Inorganic Selenium (T_2), Organic Selenium (T_3) and Nano-Selenium (T_4) observed to be 119.88, 121.20, 121.35 and 115.63 g, respectively while at 8th week, it was estimated as 999.10, 911.00, 935.25 and 816.60 g, respectively. Feed consumption was found to differ significantly among the treatments from 1st to 8th week. These results were supported by various workers viz. Dong *et al.*, (2011), Macalintal *et al.*, (2011).

Table 2: Effect of feeding different levels of different sources of Selenium on growth performance in Kuroiler chicken

Age (Day/Week)	Weekly body weight						Weekly feed intake					
	Dietary groups*				SEM	P-Value	Dietary groups*				SEM	P-Value
	T_1	T_2	T_3	T_4			T_1	T_2	T_3	T_4		
1st week (8th d)	39.10	40.00	38.43	39.33	0.57	0.28	119.88^{b}	121.20^{b}	121.35^{b}	115.63^{a}	0.84	<0.01
2nd week (15th d)	122.18^{a}	125.68^{b}	124.83^{ab}	132.25^{c}	0.78	<0.01	225.33^{b}	221.45^{ab}	221.68^{ab}	217.38^{a}	1.22	<0.01
3rd week (22nd d)	265.05^{a}	315.00^{c}	289.30^{b}	190.35^{b}	1.28	<0.01	300.40^{c}	270.50^{b}	276.53^{b}	255.60^{a}	2.19	<0.01
4th week (29th d)	410.68^{a}	515.15^{bc}	522.45^{c}	507.05^{b}	4.03	<0.01	531.78^{c}	417.33^{a}	433.20^{b}	416.20^{a}	0.52	<0.01
5th week (36th d)	627.83^{a}	695.93$_{b}$	728.53^{b}	712.45^{b}	9.44	0.03	608.68^{c}	563.05^{b}	557.23^{b}	505.73^{a}	3.31	<0.01
6th week (43rd d)	854.80^{a}	963.78^{b}	984.48^{c}	1040.08^{d}	3.40	<0.01	744.43^{c}	628.05^{b}	626.43^{b}	555.10^{a}	10.16	<0.01
7th week (50th d)	1204.68^{a}	1351.38^{c}	1267.18^{b}	1344.55^{c}	8.39	0.03	735.68^{b}	743.38^{b}	753.95^{b}	625.75^{a}	9.43	<0.01
8th week (57th d)												
Final	1421.30^{a}	1517.48^{b}	1544.00^{c}	1513.58^{b}	5.26	<0.01	999.10^{d}	911.00^{b}	935.25^{c}	816.60^{a}	4.46	<0.01

$^{a, b, c, d}$ Means with different superscripts in a row differ significantly ($P<0.05$)

* T_1: Control; T_2: 0.3 ppm inorganic Selenium; $T_{3:}$ 0.3 ppm organic Selenium; T_4: 0.3 ppm Nano Selenium

Table 3: Effect of feeding different sources of Selenium on weekly feed conversion ratio (FCR) in Kuroiler chicken

Age (Week)	Dietary groups*				SEM	P-Value
	T_1	T_2	T_3	T_4		
1st week	1.45[b]	1.42[b]	1.42[b]	1.25[a]	0.02	<0.01
2nd week	1.58[c]	1.17[a]	1.36[b]	1.38[b]	0.02	<0.01
3rd week	2.21[b]	1.37[a]	1.20[a]	1.18[a]	0.05	<0.01
4th week	2.49[c]	2.25[b]	2.15[b]	1.82[a]	0.05	<0.01
5th week	2.78[c]	2.11[b]	2.28[b]	1.61[a]	0.06	<0.01
6th week	2.26[b]	1.63[a]	2.09[b]	1.83[a]	0.06	<0.01
7th week	3.69[b]	4.67[c]	3.00[a]	2.33[d]	0.13	<0.01
8th week	3.54[c]	3.20[c]	2.72[b]	2.16[a]	0.13	<0.01
FCR (Starter)	2.00	1.57	1.53	1.51	0.47	0.15
FCR (Finisher)	2.84[d]	2.56[c]	2.41[b]	1.83[a]	0.04	<0.01
FCR (Overall)	2.54[d]	2.19[c]	2.08[b]	1.71[a]	0.02	<0.01
FCR (Starter)	2.00	1.57	1.53	1.51	0.47	0.15

[abcd]Means with different superscripts in a row differ significantly (P<0.05)

* T_1: Control; T_2: 0.3 ppm Inorganic Selenium; T_3: 0.3 ppm Organic Selenium; T_4: 0.3 ppm Nano Selenium

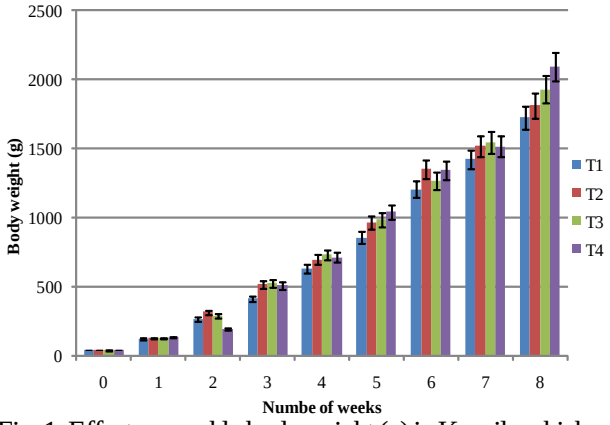

Fig. 1: Effect on weekly body weight (g) in Kuroiler chicken

Feed conversion Ratio:

Effect of feeding different sources of Selenium on weekly feed conversion ratio (FCR) in Kuroiler chicken is presented in Table 3. The initial FCR for T_1, T_2, T_3 and T_4 groups were recorded as 1.45, 1.42, 1.42 and 1.25, respectively, whereas values for final FCR at 8th week were recorded to be 3.54, 3.20, 2.72 and 1.42, respectively for the corresponding treatments. Feed conversion ratio was found to be influenced significantly among the treatments from 1st to 8th weeks of age. Mean FCR was recorded as 2.54, 2.19, 2.08 and 1.71, respectively for T_1, T_2, T_3 and T_4 dietary groups. Overall FCR was recorded to be 2.54, 2.19, 2.08 and 1.71, respectively. Finisher and overall FCR were found to be differ significantly among the groups. These results were supported by various workers viz. Rozbicka- Wieczorek *et al*. (2012) and Zia *et al.*, (2016) in various strains and species of poultry.

Conclusion

Based on the results obtained in present investigation, it may be concluded that supplementation of inorganic, organic and nano- selenium @ 0.3 ppm has improved growth performance at various stages.

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