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PERFORMANCE AND BLOOD CHEMISTRY OF BROILER BIRDS FED DIFFERENT LEVELS OF DIETARY RASHAD (*LEPIDIUM SATIVUM*)

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Effects of supplementing diets with rashad (*Lepidium sativium*) on performance and blood parameters of broiler chicks was investigated using 128 Cobb strain unsexed day old broilers were randomly distributed into four dietary treatments and each contained four replicates (8 birds/replicate). The birds were assigned to four isocaloric and isonitrogenous diets containing (0, 0.5, 1 and 1.5%) rashad. Feed and water were provided *ad libitum* till the termination of the trial after 42 days. Growth performance parameters and blood parameters (serum lipids, cholesterol and total protein) were measured. No significant ($P > 0.05$) differences were observed between dietary treatment groups for feed intake, weight gain and feed conversion ratio (FCR) of six weeks old broiler chicks. Total serum lipids increased significantly ($P < 0.05$) by feeding diets containing rashad at levels 0.5% (446.20 mg/100ml), 1% (432.37 mg/100ml) and 1.5% (577.33 mg/100ml) compared to control (0% rashad) (393.43 mg/100ml). Cholesterol levels also increased significantly ($P < 0.05$) by feeding diets containing 0.5% rashad (176.97 mg/100ml), 1% rashad (176.63 mg/100ml) and 1.5% rashad (178.6763 mg/100ml) rashad compared to control group (147.27 mg/100ml). The different levels of dietary rashad had no significant effect ($P > 0.05$) on serum total protein content. Economically birds received 0.5 and 1% rashad obtained low cost of production and better effect on net profit than control groups.

Key words: Broilers, Rashad, Cholesterol, Lipids, Performance

Animal nutritionist have attempted to use new non-conventional to improve performance and reduce cost as a means of bridging the protein gab (Rose, 1997). The *Lepidium sativum* plant and seeds are well known in the community of Saudi Arabia and some other Arabic countries. This plant was used in the community of Saudi Arabia as an important element in Saudi folk medicine for multiple applications, but mainly in fracture healing. (Ageel et al., 1987). Locally known as Rashad is an annual tall glabrous herb, with erect stem, widely distributed in many countries of the world (Morton, 1981). It known to be grown in the Sudan mainly in sinnar state and the Northern parts of the upper Nile state, the common market seed type in the Sudan is the red one, no black or white types were seen marketed. *Lepidium satvium* is a good source of essential amino acids such as lysine, methionine and minerals such as Iron. (Al Jassir, 1992). *Lepidium sativm* seed were found to be effective against many diseases (Houghton et al., 1995), and are used medicinally for indigestion and constipation (Najeeb et al., 2011). The root is used in the treatment of secondary syphilis and tenesmus (Chopra et al., 1986). The seeds are galactogogue. They have been boiled with milk and used to procure an abortion, they have been applied as a poultice to pains and hurts and have also

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Table 1. Determined chemical composition of rashad (***Lepedium. Sativum***)

Items	DM %	CP %	EE %	CF %	Ash %	NFE %
Rashad	95.85	28.79	22.80	7.38	11.11	25.76

CP = Crude protein; CF = Crude fiber; EE = Ether extract; DM = Dry matter; NFE = Nitrogen free extract.

Table 2. Calculated and determined chemical composition of the experimental diets

	Rashad level %			
Ingredient	0	0.5	1	1.5
Sorghum	65.20	65.20	65.0 0	64.80
Groundnut meal	18.30	18.45	18.22	18.00
Sesame meal	09.70	09.20	09.20	09.20
Wheat bran	00.20	00.00	00.00	00.00
Super concentrate*	05.00	05.00	05.00	05.00
Di-calcium phosphate	00.15	00.15	00.15	00.14
Limestone	00.90	00.90	00.80	00.80
Nacl	00.25	00.25	00.25	00.25
Lysine	00.04	00.09	00.12	00.05
Methionine	00.01	00.01	00.01	00.01
Premix	00.25	00.25	00.25	00.25
Rashad	00.00	00.50	1.00	01.50
Total	100	100	100	100
Calculated analysis				
ME (kcal/kg)	3120.3	3120.0	3120.2	3120.6
Crude protein	22.68	22.61	22.61	22.03
Crude fiber	4.32	4.34	4.39	4.45
Calcium	1.21	1.20	1.16	1.16
T. Phosphorus	0.67	0.67	0.67	0.66
Lysine	1.10	1.15	1.18	1.10
Methionine	0.46	0.45	0.45	0.45

*Composition of super concentrate: crude protein 40%, crude fiber 2%, crude fat 2%, Ca 10%, available P 4%, lysine 12%, methionin 3%, methionin + cystine 3.2%, ME 2100 Kcal/kg, sodium 2.6%.

been used as an aperients (Chopra et al., 1986). Aqueous extract of *Lepidium sativum* was found to have antihypertensive and diuretic effect when studied both in normotensive and spontaneously hypertensive rats (Maghrani et al., 2005). Addition 1 or 2% of rashad to broiler chickens diet had no significant effect on the performance (Salih, 1994). In laying hens there was effected in the live weight, feed conversion ratio and egg production with high level of rashad (Nada, 1999). The objectives of the present study are to determine the effect of varying levels of dietary rashad (*Lepidium sativum*) supplementation on broiler chicks performance, blood serum parameters and economic benefits.

MATERIALS AND METHODS

Study location: This study was conducted in a poultry house within the premises of Khartoum.

Experimental birds and management: One hundred and twenty eight one-day old commercial unsexed broiler chicks (Hubbard) were used for the study. Thirty two chicks of approximately the same weight were assigned randomly for each dietary treatment with four replicates. They were reared eight birds per pen. Each pen represents a replicate. Feed and water were provided *ad-libitum* throughout the experimental period, feed intake and live body weight were recorded weekly to obtain the body weight gain, feed and protein

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Table 3. Determined chemical composition of the experimental diets

Items	Rashad level %			
	0	0.5	1	1.5
Dry matter	91.30	91.77	91.17	92.03
Crude protein	24.92	23.35	24.74	22.40
Ether extract	3.59	4.52	4.50	4.45
Ash	6.49	7.48	8.74	6.92
Crude fiber	8.21	6.33	5.43	9.95

Table 4. Effect of feeding different levels of rashad on broiler

Parameters	**Rashad level %**				±SE
	0	**0.5**	**1**	**1.5**	
Feed intake (g/bird)	2335.53	2650.36	2712.19	2350.97	98.93
Weight gain (g/bird)	1196.62	1321.48	1361.78	1225.92	52.80
Feed conversion ratio	1.97	2.05	2.00	1.93	0.11

SE: standard error of men

Table 5. Effect of feeding different levels of rashad on live weight, carcass and dressing percentage of broilers

Parameters	**Rashad level %**				±SE
	0	**0.5**	**1**	**1.5**	
Live weight (g/bird)	1334.5^{a}	1369.9^{a}	1364.8^{a}	1195.9^{b}	52.98
Carcass weight (g/bird)	1013.8^{a}	1058.1^{a}	1075.8^{a}	838.8^{b}	50.2
Dressing percentage	76.0	77.8	78.1	73.8	1.4

^{a,,b}: values within a row with different superscripts differ significantly. ± SE: Standard error of the mean

Table 6. Effect of feeding different levels of rashad on serum total lipids,, cholesterol and total Protein of broilers

Parameters	**Rashad level %**				±SE
	0	**0.5**	**1**	**1.5**	
Total lipids (mg/100ml)	393.43^{b}	446.20^{b}	432.37^{b}	577.33^{a}	26.95
Cholesterol (mg/100ml)	147.27^{b}	176.97^{a}	176.63^{a}	178.67^{a}	9.05
Total protein (g/100ml)	3.02^{b}	3.98^{ab}	3.83^{a}	3.45^{ab}	0.33

^{a,,b}: values within a row with different superscripts differ significantly. ± SE: Standard error of the mean

Table 7. Economic appraisal of experimental di

Items	Rashad level %			
	0	0.5	1	1.5
Cost (SDG)				
Chicks	2.5	2.5	2.5	2.5
Feed	3.119	3.543	3.222	2.930
Total cost	9.61	8.092	7.722	9.43
Revenues				
Average carcass weight	0.915	1.581	1.0636	0.9047
Price Kg of bird	12	12	12	12
Total revenues	10.90	12.97	12.76	10.85
Profitability/of chick	1.29	4.92	5.76	1.42
Profitability/ratio	1	3.81	4.47	1.1

SDG = Sudanese Pounds

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were starved overnight from feed only. Three birds were selected randomly from each replicate (i.e. 12 birds for each treatment), they were weighted, tagged, slaughtered, scalded, manually plucked using boiling water and allowed to drain. Blood samples were taken from jugular vein during slaughtering, three birds from each replicate (12 birds/treatment) and blood serum was separated to be analyzed for cholesterol lipid and total protein. Hot and cold dressing percentages were calculated by expressing them to the live weight. Carcasses were weighted and chilled for overnight at 4ºC, cold weights were determined.

Experimental Diets: Four experimental diets were formulated according to the recommended nutrient requirement standard of broiler chicks as outlined by National research council (1994). In addition to the control diet 0% rashad, three diets were formulated to contain 0.5, 1 and 1.5% rashad. The chemical analysis (DM) of rashad (*Lepedium. Sativum)*, ingredient composition and calculated analysis of the experimental diets are shown in Tables 1 and 2.

Chemical methods: Feed sample were analyzed for proximate components according to the method of AOAC (1980). Serum cholesterol was determined according to enzymatic colorimetric test (Richmoned, 1973) and serum lipid was determined by the methods described by Frings et al, (1970). Serum total protein was analyzed by Biuret colorimetric method as described by Weischselbaum (1946),

Statistical analysis

The data obtained from the experiment were subjected to analysis of variance. The software used was the statistical package for social science (SPSS) version 11.5.

Differences of means determined by the Duncan Multiple Range Test as described by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The average data on feed intake, body weight gain and feed conversion ratio for the production of chickens fed treated diets are presented in Table 4. The results reflected that no significant differences were observed between treatment groups for feed consumption, body weight gain and feed conversion ratio (FCR). This results in line with that obtained by Nada (1999) and Salih (1994) who observed that addition of dietary rashad at level 1 and 2% had no significant effect on broilers performance. The treatment had a significant effect ($P < 0.05$) on live and carcass weights (Table 5). Chicks fed on diets contained 0, 0.5 and 1% rashad were showed the highest live weight (1334.5g, 1369.9g and 1364.8g) respectively, and those fed the diet contained 1.5% rashad obtained the lowest live weight (1195.9g). Carcass weight was higher for birds received diets contained 0, 0.5 and 1% rashad (1013.8g, 1058.1g and 1075.8g) respectively compared to those fed 1.5% rashad (838.8g). The results for live body weight and carcass weight were agreement with findings of Eissa (1996) who reported that rashad supplementation improved the final live weights of broiler chicks. No significant ($P > 0.05$) difference was observed between treatment groups for dressing percentage. Rashad treatment had a protective effect upon the treated birds and did not caused any mortality but some causes due to heat stress.

Blood serum parameters are shown in Table 6. There was a significant ($P < 0.05$) effect on serum cholesterol. The lowest level of serum cholesterol was obtained by chicks fed diet of 0% rashad. Serum cholesterol level for birds consumed 0.5, 1 and 1.5% rashad diets were comparable ($P > 0.05$). Serum cholesterol level was increased by the addition of rashad. The current study showed that there was a significant ($P < 0.05$) effect on total serum lipids. Chicks fed on diet 1.5% rashad showed a higher serum total lipids (577.33mg/100ml) while chicks received 0, 0.5 and 1% rashad diets were receded significantly ($P > 0.05$) similar value of total serum lipids (393.43, 446.2 and 432.37mg/100ml) respectively. The high level of serum lipid that obtained for birds received 1.5% rashad may attributed to the percent of the high lipid content of rashad (Komarov, 1968). No significant ($P > 0.05$) difference was observed between treatment groups for serum total protein.

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Feeding economics of experimental diets are presented in Table 7. The result showed that diets contained 0.5 and 1% rashad obtained lower production cost than control. Broiler chicks received diet contained 1% rashad recorded the highest profitability (5.76SDG) it followed by 0.5% rashad (4.92SDG) and 1.5% rashad (1.42SDG) while the control groups (0% rashad) recorded less profitability (1.29SDG).

CONCLUSION

It is concluded that inclusion of rashad in the broiler chickens diet at level 0.5 and 1% decreased the volume of serum lipids, more profitable and it had adverse effect on performance, whoever rashad diets increased serum cholesterol concentration.

REFERENCES

1. Ageel, A.M., Tariq, M., Mossa, J.S., Al-Yahya, M.A., Al-Said, M.S. (1987) Plants used in Saudi folk medicine. Riyadh, Saudi Arabia. KACST, King Saud University Press. pp 245-415.
2. AI Jassir, M.S. (1992) Chemical composition and microflora of black cumin (Nigella Sativa L.)seed growing in Saudi Arabia. J. food Chemistry.45:239.
3. A.O.A.C. (1980) Official methods for analysis. 13th.ed., Association of Official Analytical Chemists, Washington DC.
4. Chopra, R.N., Nayar, S.L. and Chopra, I.C. (1986) Glossary of Indian medicine and plants (Including the Supplement). Council of Scientific and Industrial Research. New Delhi.
5. Eissa, B.M.B. (1996) Use of molasses. Based rations for Fattening Rabbit lets. MSc thesis, University of Khartoum. Sudan.
6. Frigs, C.S. and Dunn, R.T.J. (1970) Calorimetric methods for determination of serum total lipids, Based on phosphovanillin reaction. Am. J. Clin. Path 53.89-91.
7. Houghton, P.J., Zarka, R., Delas-hervas, B. and Hoult, J.R. (1995) Fixed oil of Nigella sativa and derived thymoquinone inhibit eicosanoid generation in leukocytes and membrance lipid peroxidation. Planta. Med. 61(1):33.
8. Komarov, V.L. (1968) Flora of the USSR. Israel Program for Scientific Translation.
9. Maghrani, M., Zeggwagh, N.A., Michel, J.B., Eddouks, M. (2005) Anti hypertensive effect of Lepidium sativumL. in spontaneously hyper-tensive rats. J Ethnopharmacol. 100 (1-2):193-197.
10. Morton, J.E. (1981) Atlas of Medicinal Plants of Middle America. Charles C. Thomas Publishers, Bannerstone House, Springfield, Illinois, USA, 2 5 1.
11. Nada, K.H.A. (1999) Studies on effect of Lepidium sativum on the performance of laying hens MSc thesis, University of Khartoum, Sudan.
12. Najeeb, Ur-Rehman., Mehmood, M.H,, Alkharfy, K,M,, Gilani, A.U. (2011) Prokinetic and laxative activities of Lepidium sativum seed extract with species and tissue selective gut stimulatory actions. J Ethnopharmacol. 2011 Feb 2.
13. Richmond, W. (1973) Cholesterol determination Clin.Chem.5:150.
14. Rose, E. (1997) Towards Bytecode Verification on a Java Card'. In: M. Abadi (ed.): Workshop on security and languages. Palo Alto, California
15. Salih, A.M. (1994) Studies on medicinal plant: Peganum harmala and Lepidium sativum. MSc thesis, University of Khartoum, Sudan.
16. Steel, R.G.D., J.H. Torri, (1980) Principles and procedures of statistics: A Biometrical Approach.2nd ed. McGraw Hill, Kogakusha Ltd., Tokyo.
17. Weichselbaum, T.E. (1946) An a curate rapid for determination of protein small amount of blood serum and plasma. Amer. J. Clin. Path.. 16–40.

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