J. Agric. Sci. Mansoura Univ., 32 (11): 8943 - 8951, 2007

RESPONSE OF GROWING RABBITS TO GRDED LEVELS OF WHEAT BRAN IN THEIR DIETS

Tag El-Din, T. H. *; Amina A. El-Serwy; El-Samrah H.A-Abo.Egla**; M.A.Awad*** and Nahla A.M.Mostafa****

*** Fac. of Agric., Damietta , Mansoura Univ.**

**** Fac. of Agric., Mansoura Univ.**

***** Anim. Prod, Research Institute, Ministry of Agriculture .**

ABSTRACT

The present study aimed to investigate the effects of wheat bran level in rabbit diets on growth performance , feed utilization , carcass traits , blood plasma constituents, feed cost and economic efficiency of rabbits . They were fed diets contained 15 , 30 , 45 and 60 % wheat bran . The level of wheat bran had no significant effects on live body weight at all studied ages , except at 14 weeks of age where the rabbits of 45 % WB were the heaviest . The rabbits fed on 45 % WB surpassed the other groups in respect of daily weight gain at all intervals . The rabbits of 30 and 45 % WB consumed more feed daily than those of 15 and 60 % with significant differences among groups . Although the rabbits of 45 %WB had the best value of feed conversion ratio at all intervals , the wheat bran level had no significant effects on feed conversion ratio at 6-10 and 6-14 weeks . The protein efficiency ratio reached the best value for the rabbits of 45 % WB followed by those of 60 , 15 and 30 % in a descending order with significant differences .

The rabbits fed on diets contained 30 , 45 and 60 % WB needed less amount of energy to gain one unit of live weight than the control ones . The performance index was significantly affected by wheat bran level , and those of 45 % were the best in this respect . The digestibility coefficient for all nutrients except protein were significantly affected by wheat bran level . Those of 45 % WB had the best values . The nutritive values (DCP %, TDN %, and DE) were significantly varied according to the level of wheat bran . The rabbits fed on diet contained 45 % WB had the best values of feed cost / Kg gain and economic efficiency among all groups . The diets wheat bran level had no obvious effects or all studied carcass traits . The total protein, albumine, creatinine and GOT were generally increased with elevating the level of weat bran level in the diet . However, the opposite situation was found for total lipids, cholesterol and GPT values .

Keywords : wheat bran, rabbits, growth performance, feed utilization, blood plasma, carcass traits.

INTRODUCTION

In Egypt, although wheat bran is one of the most agro-industrial by-products available and widely used for livestock feeding , its feeding value and the amount that can be used in rabbit diets has not been well-defined . The amount used often is limited to approximately 15 to 30 % of the complete diets . However, in practical field, there are great variations for the ratio of wheat bran that include in the commercial manufacturing diets due to the continuing quick changes in its price and availability along the year . Almostly, it have no concern about these great variations, in particular with high level of wheat bran in the diets and its effects on stock performance . The increase

in human population in Egypt over the last decades has influenced greatly the demand for food products of animal origin . In consequence, this requires a considerable development of animal production .

Rabbit can be a semi ruminant , because it has caecum, which contained microflora that has the ability to convert the cellulose of by-products into sugars and single cell protein as reported by cheeke et al. (1986) . The present study aimed to investigate the effects of graded levels of wheat bran in growing rabbit diets on their growth performance, feed utilization, carcass traits, blood plasma constituents and economic efficiency up to marking age .

MATERIALS AND METHODS

The field work of this study was conducted in a private called rabbitry TOCTAD located at Shrinkash village about 12 km at the north of Mansoura city during the period from May to August 2006, however the chemical analysis of diets and feces as well as blood analysis were carried out at the Laboratory of Poultry Production Department , Faculty of Agriculture, Mansoura University . It aimed to investigate the effects of wheat bran level in the diet (15, 30, 45, and 60 %) on growth performance, feed utilization, economic efficiency, carcass traits and blood plasma constituents .

Table (1) :- Composition of the experimental diets : -

Ingredient	Control (15%WB)	Diet 2 (30%WB)	Diet 3 (45%WB)	Diet 4 (60%WB)
Barley	16	16	12	8
Alfalfa hay	30	20	10	.....
Wheat bran	15	30	45	60
Yellow corn	16	8	4	.....
Soybean meal(44%)	16	16	15.5	15
Wheat straw	3	6	9.5	13.
Molasses	2	2	2	2
Dicalcium P	0.7	0.7	0.7	0.7
Common salt	0.4	0.4	0.4	0.4
Limestone	0.6	0.6	0.6	0.6
Premix*	0.3	0.3	0.3	0.3
Total	100	100	100	100
Calculated analysis :				
DE	2868	2863.2	2864.7	2866.2
DM %	87.69	87.5	87.28	87.05
OM %	81.74	81.5	81.22	80.93
CP %	17.92	17.87	17.57	17.26
CF %	12.20	12.38	12.61	12.84
EE %	2.96	2.67	2.79	2.92
NFE %	48.66	48.58	48.25	47.91

*** Each kilogram contains : Vit A 2000000 IU; Vit D3 150000 IU; Vit E 8.33g; Vit B1 1.0g; Vit B2 1.09; Vit B5 8.33g; Vit B6 0.33g; Vit B12 1.7mg; Pantothenic acid 3.33g; Zn 11.79g; Fe 12.5g; Cu 0.5g; Co 1.33mg; Se 16.6mg; Mg 66.79mg; Niacin 8.33g; Biotin 33mg; Folic acid 0.83g; Choline chloride 20g and Mn 5g .**

****Calculated according to Cheeke et al (1987) .**

Fourty males of NewZealand White (NZW) rabbits at 6 weeks of age were randomly divided into six groups , each of 10 individuals . All groups had nearly similar live weight means (ranged from 901.0 to 944.0g) . All rabbits were individually housed in galvanized steel cages . Each cage was supplied with a stainless wire nipple for drinking as well as a feeder enable us to calculate the consumed feed . Cages were kept in open – sided well ventilated pen . Four experimental complete pelleted diets were formulated in the Poultry Production Unit , Experimental and Research Center , Faculty of Agriculture Mansoura University . Each group of rabbits were assigned for one of these experimental diets . All diets were nearly isonitrogenous and isocaloric . The composition and chemical analysis of the diets are presented in Table (1).

Rabbits were fed ad libitum and fresh drinking water was available all the time. Individual live weight and individual feed intake were determined on the same day every week . At the end of the experiment at 14 weeks of age , 3 males of each treatment were randomly chosen , fasted for 12 hours and then slaughtered , skinned and eviscerated, in order to determine some carcass traits. Dressed weight (total edible parts)were calculated as the total weight of carcass plus head ,liver, heart and kidneys. At the end of the experiment at 14 weeks of age , 3 males of each treatment were used in the digestion trials . The digestion trials lasted 8 days, 3 as a preliminary period and 5 days as a collection period of feces . Samples of feed and faeces were chemicals analysed after A.O.A .C (1990), using duplicate sample .

It was calculated as follows :

$$ADC = \frac{\text{Total nutrient intake - Total nutrient in faeces}}{} \times 100$$

Production index (PI) was calculated as live weight (Kg)\ Feed conversion × 100 according North (1981) for a certain period .

Digestible energy(DE)was calculated according to Schiemann(972) as follows DE(Kcal/kg)= 5.28(DCP g/Kg)+9.5(DEE g/Kg)+4.2(DCF g/Kg)+4.2(DNFE g/Kg) .

While the total digestible nutrient (TDN) was calculated according to the classic formula of cheek et al (1982) as follows :

TDN = %DCP + %DCF + %DNFE + %DEE × 2.25 . where :

DCP: digestible crude protein . DCF: digestible crude fiber DNFE: digestible nitrogen free extract , and DEE: digestible ether extract . Samples of feed and faeces were analysed for organic matter (OM), crude protein (CP), ether extract(EE), crude fiber (CF) and ash according to the conventional method of A.O.A .C (1990), using duplicate sample Feed cost /kg gain (LE)was calculated as the feed conversion value × price of one kg diet at the periods of 6-14 weeks of age . Economic efficiency was calculated at the periods of 6-14 weeks of age as follows :

Economic efficiency = (price of one kg live weight – feed cost /kg gain /Feed cost /kg gain) × 100

Samples of feed and faeces were analysed for organic matter (OM), crude protein (CP), ether extract(EE), crude fiber (CF) and ash according to the conventional method of A.O.A .C (1990), using duplicate samples Data were analyzed by the analysis of variance according to programme of SAS(2000) . significant differences among means were detected according to Duncan's New Multiple Range Test (Duncan, 1955) .

RESULTS AND DISCUSSION

The level of wheat bran in the diet had no significant effects on live body weight at all ages studied except at the end of the experiment at 14 weeks old where the differences were significant (P≥ 0.05). In comparison to the control group (15%WB) , the live weight of rabbits fed 30, 45 and 60 % WB in their diets at 14 weeks of age respectively, to 103.5, 112.1 and 98.2 % , respectively . (Table 2). The increasing of wheat bran level in growing rabbit diets had no obvious effects on live body weight as reported by Roy et al (2003) , Kadi et al (2004) and Lakabi *et al* (2005) . On the other hand, Berchiche et al (2000) and Gidenne and Perez (2000) obtained negative effects . The wheat bran level in the diet had slight effects on daily weight gain at 6 – 10 weeks of age . However, its effects were significant (P>-0.01) at 10 – 14 and 6 – 14 weeks of age. The increase in wheat bran level in rabbit diets had adverse effects on daily weight gain as reported by Kyciazakis and Emmans (1995) , Muir and Massaete (1996) , Berchiche *et al* (2000) and Gu *et al* (2002) . Hoever, kadi *et al* (2004) and lakabi *et al* (2005) found no considerable differences due to this factor .

In comparison to the control group, the groups of rabbits consumed diets included 30, 45 and 60% of wheat bran represented to about 94.7, 107.6 and 97.3% at 6 – 10 weeks and 106.9, 119.9 and 98.3% at 6-14 weeks of age, respectively (Table 2). Through out the interval 6-10 weeks of age, the control group(T1WB) consumed slightly less amount of feed than the other three groups (30,45 and 60% WB) . However, during the intervals 10 – 14 and 6 – 14 weeks the T4 rabbits of 60% WB consumed significantly (P ≥ 0.05 or P ≥ 0.01) the least amount of feed among all groups, and followed by those of T1, T3 and then T2 in an ascending order (Table 2) .

Daily feed intake of rabbits was increased in the elevating the WB level in the diet as found by Muir and Massaete (1996) , Kadi *et al* (2004) . On the other hand, negative effects were reported by Blas et al (2000) and Gu *et al* (2002) . It was observed that the wheat bran level had no significant effects on feed conversion ratio at the intervals 6-10 and 6-14 weeks , meanwhile , this effect was significant (P ≥ 0.05) at 10-14 weeks where those of 45 % WB(T3) were the best and those of 30 % WB (T2) and 15 % WB (T1)were the poorest in this concern(Table 2) . Differences in performance index due to the effect of wheat bran level at 6 – 10 , 10 – 14 and 6 – 14 weeks were significant (P ≥ 0.05 or P ≥ 0.01) . The rabbits fed diets contained 45% WB(T3) showed better performance index values, than the other three groups which were approximately equal (Table 2) .

Difference in protein efficiency ratio due to the effect of dietary wheat

bran level were significant (P ≤ 0.05) at all intervals studied . The noticeable observation is that the rabbits of 45% WB(T3) had the best values of protein efficiency ratio at all intervals studied (Table3). Meanwhile, those of T1,T2 and T4 had slightly different values of protein efficiency ratio .

Table (2) : Growth performance traits of rabbits as affected by dietary wheat bran level .

Experimental diets	Wheat bran level (%)			
	15%(T1)	30%(T2)	45%(T3)	60%(T4)
Live body weight (g) at				
6 wks	930.0±72.0	921.0±78.3	944.0±51.8	901.0±60.6
10 wks	1666.5±72.1	1619.5±72.6	1736.0±62.4	1617.0±60.2
14wks	2224.0±72.2b	2302.5±55.0ab	2493.0±63.5a	2184.4±89.6b
Daily weight gain (g) at				
6-10 wks	26.3±1.7	24.9±0.8	28.3±1.1	25.6±1.4
10-14 wks	19.9±0.6b	24.4±1.2a	27.0±0.9a	21.1±1.3b
6-14 wks	23.1±1.0b	24.7±0.8b	27.7±0.8a	22.7±1.2b
Daily feed intake (g) at				
6-10 wks	66.5±1.8b	73.0±2.0a	71.8±1.4ab	69.9±2.3ab
10-14 wks	87.0±2.9ab	97.7±3.4a	96.6±2.0a	69.2±12.9b
6-14 wks	76.7±2.3ab	85.3±2.5a	84.2±1.5a	69.5±5.9b
Feed conversion ratio (g feed/g gain)at				
6-10 wks	2.62±0.18	2.94±0.09	2.58±0.13	2.79±0.15
10-14 wks	4.39±0.16a	4.09±0.22ab	3.60±0.11b	4.22±0.27a
6-14 wks	3.37±0.14	3.49±0.14	3.07±0.11	3.47±0.19
Performans index at				
6-10 wks	65.78±5.15ab	55.28±2.18b	69.14±4.74a	59.06±3.68ab
10-14 wks	51.17±2.25b	57.87±3.65b	70.35±3.42a	52.95±5.75b
6-14 wks	66.26±3.40b	66.89±2.79b	82.77±4.25a	64.79±5.66b

a-b : Means within each column having similar superscripts letter (s) are not significantly different (p ≤ 0.05)

Throughout the whole experimental period (6 –14 weeks) the best value of protein efficiency ratio was recorded for those rabbits of T3 followed by those of T4,T1 and T2 in a descending order . The rabbits fed 30% WB(T1) in their diets at 6 – 10 weeks needed more energy to gain one unit of live weight than the other three groups which were slightly different (Table3) . However, those of T3 were the best in this concern. During the following interval (10–14 weeks) and the whole experimental interval (6 – 14 weeks), it was observed that the rabbits of T2, T3 and T4 needed less amount of energy to gain one unit of live weight than the control group (T1)by about 11.2 , 19.7 and 6.3% at 10 – 14 weeks, and by about 1.4 , 10.7 and 0.4% at 6 – 14 weeks, respectively.

Differences in digestibility coefficients of nutrients due to the effect of wheat bran level in the diet were significant (P ≤ 0.05 or P ≤ 0.01) for all nutrients except crude protein where the four groups had approximately similar values .The rabbits of 45% WB(T3) showed the highest values of digestibility coefficients among all groups for OM and NFE. However, the

control group(T1) surpassed the others in respect of digestibility coefficients of EE and CF .Gidenne and Perez (2000) , and Gu et al (2002) found that increasing WB level in the diet had no considerable effects no digestibility of most nutrients.

Table (3) : Feed utilization parameters of rabbits as affected by dietary wheat bran level .

	Wheat bran level (%)			
	15%(T1)	30%(T2)	45%(T3)	60%(T4)
Protein efficiency ratio (PER)				
6-10 wks	2.19±0.13ab	1.04±0.06b	2.32±0.10a	2.13±0.11ab
10-14 wks	1.29±0.04b	1.4. ±0.09b	1.66±0.05a	1.40±0.10b
6-14 wks	1.68±0.07b	1.65±0.07b	1.95±0.06a	1.69±0.10b
Efficiency of energy utilization (EEU)				
6-10 wks	7.74±0.50	8.36±0.27	7.57±0.38	7.92±0.43
10-14 wks	13.10±0.47a	11.63±0.64ab	10.52±0.33b	12.28±0.86ab
6-14 wks	10.03±0.41	9.89±0.40	8.96±0.31	9.99±0.57
Digestibility coefficient				
OM	78.55±76.15a	76.15±0.25b	78.84±0.29a	76.21±0.23b
CP	81.89±0.98	80.33±0.23	81.63±0.39	80.13±0.56
CF	52.48±2.15a	46.65±0.33b	51.98±0.75a	44.67±0.43b
EE	80.83±0.66a	71.90±0.30b	71.62±0.79b	71.31±1.30b
NFE	83.67±0.68ab	81.95±0.40c	84.52±0.18a	82.92±0.13bc
Nutritive value				
DCP	14.69±0.18a	14.18±0.04b	13.89±0.07bc	13.72±0.10c
TDN	67.20±0.81a	64.03±0.18b	66.23±0.28a	63.76±0.24b
DE (kcal/kg feed)	2982.60±35.75a	2443.77±7.32b	2932.70±12.60a	2827.60±10.94b

a-b and c : Means within each column having similar superscripts letter (s) are not significantly different ($p \leq 0.05$)

The nutritive values of diets were significantly ($P \geq 0.01$) affected by wheat bran level (Table) .The DCP values was gradually decreased with elevating wheat bran level in the diet from 15 up to 60 % .The TDN% values of T1 (15% WB) and T3 (45% WB) were nearly similar and both were significantly ($P \geq 0.01$) higher than those of T2 (30%WB) and T4 (60% WB) which were nearly equals . The DE (kcal/kg diet) of T1 and T3 were approximately equal and both were significantly ($P \geq 0.01$) higher than those of T2 and T4 which were also nearly similar .

The wheat bran level in the diet had significant effects on feed cost /kg and economic efficiency at 6-14 weeks of age . The diets contained 15 and 30 % WB had similar values of feed cost /kg gain and they were higher than those of 45 and 60 % WB groups . The best value of feed cost /kg gain was recorded for the rabbits fed diet contained 45 % WB . The same trends were found in respect of economic efficiency where the rabbits of 45 % WB were the superiors followed by those of 60 % and then those of 15 and 30 %WB in a descending order (Table 3) .

The absolute weights of empty carcass , head , liver , heart , kidneys and total edible parts were slightly changed among feeding

treatments . Therefore, the wheat bran level had no significant effects on these carcass traits (Table 4) .

Table (4) :- Effect of wheat bran level in the diet on carcass traits and plasma constituents .

	Wheat bran level (%)			
	15%(T1)	30%(T2)	45%(T3)	60%(T4)
Feed cost/kg gain at 6-14 wks	3.93±0.159a	3.93±0.158a	3.32±0.12b	3.64±0.21ab
Economic efficiency (%) at 6-14 wks	262.14±15.03b	261.04±14.40b	326.29±13.94a	293.48±22.89ab
Carcass traits at 14				
Empty carcass wt (g)	1030.0±56.86	1070.0±57.06	1130.0±60.28	1033.3±43.36
Empty carcass (%)	52.2±1.62	49.9±0.87	52.4±0.52	50.1±2.14
Head wt (g)	136.3±4.27	146.7±3.35	143.3±6.64	137.9±1.50
Head (%)	6.9±0.17	6.9±0.35	6.7±0.35	6.7±0.12
Liver wt (g)	42.7±3.0	55.2±6.35	46.8±4.73	41.7±1.27
Liver (%)	2.2±0.12	2.6±0.23	2.2±0.23	2.0±0.06
Heart wt (g)	7.0±0.81	7.0±0.87	7.5±1.10	6.0±0.87
Heart (%)	0.35±0.03	0.32±0.03	0.35±0.05	0.29±0.04
Kidneys wt (g)	12.9±0.87bc	15.6±0.75a	14.1±0.35ab	11.6±0.23c
Kidneys (%)	0.65±0.04	0.73±0.05	0.66±0.05	0.56±0.01
T . edible parts wt (g)	1228.9±61.60	1294.5±80.60	1341.7±63.74	1230.6±39.84
T . edible parts (%)	62.3±1.44	60.4±0.69	62.2±0.44	59.7±2.02
Plasma constituents				
T . protein g/100ml	5.17±0.53	7.01±1.46	7.29±1.44	7.39±0.41
Albumin	2.47±0.47	2.80±0.54	2.57±0.68	3.26±0.37
T . lipids g/l	309.6±47.61	250.2±39.34	294.5±34.75	340.00±54.05
Cholesterol mg/100ml	102.6±7.74a	91.0±9.30ab	118.8±14.55a	58.5±8.89b
Got u/l	14.00±1.00	14.33±1.33	15.67±1.67	15.00±0.58
Gpt u/l	24.00±4.04a	16.33±2.40ab	18.67±3.76ab	10.67±0.88b
Creatinine	15.52±0.97bc	12.12±1.39c	17.16±1.91ab	20.74±0.72a
Uric asid	1.84±0.46	3.43±1.13	2.71±0.32	3.95±1.03

a-b and c : Means within each column having similar superscripts letter (s) are not significantly different ($p \leq 0.05$)

Similarly, the relative weights of carcass traits were not greatly affected by the level of wheat bran in the diet . It was observed that the control group (15% wheat bran) had slightly the best value of most studied carcass traits . The absolute weights of blood loss and fur were not greatly changed with wheat bran level in the diet . Similarly, the relative weight of them were approximately equal for all wheat bran levels .

The increasing of wheat bran level in the diet had no or slight effects on carcass and offal traits as reported by Muir and Massaete (1996) , Berchiche et al (2000) , Gidenne and Perez (2000) , Kadi et al (2004) and Lakabi et al (2005) . The total protein content of plasma was increased gradually with elevating the wheat bran level in the diet from 15 up to 60 % .The same trend was found in respect of albumen contend where the control group had less value than the other three groups (Table 4). The total lipids content of plasma was decreased with increasing the wheat bran level in the diets , except with 60 % where it was higher than that of the control .The same trend was found for cholesterol concentration in plasma , but the highest value was obtained for the rabbits of 45 % wheat bran . The elevating of the wheat bran level in the diet increased plasma creatinine

than the control group except with 30% wheat bran . Similarly , the uric acid concentration in plasma was increased with increasing the wheat bran level than the control group . Although the GOT values of the rabbits fed on 30 , 45 and 60 % wheat bran were greatly higher than that of the control group , The GPT values were decreased with elevating the wheat bran level in the diet in comparison to that of the control . Similar results were found by Gidenne et al (2001) . The obtained results from this study show that . the wheat bran could be in corporated growth rabbit diets up to 45 % with obtaining good response in respect of growth performance, feed utilization, feed cost and economic efficiency.

REFERENCES

A .O .A .C . (1990) . Association of Official Analytical Chemist . Official Methods of Analysis . 13th Ed . Washington , D . C .

Berchiche , M . , S .A . Kadi and F .Lebas (2000) . Valorization of wheat by- products by growing rabbits of local Algerian population . 7 th World Rabbit Congress , Valence (Spain)

Blas ,E .; J .Fernandez – Carmona , G .Cervera and J .J . Pascual (2000) . Nutritive value of coarse and fine wheat bran for rabbits . Animal Feed Science and Technology 88 : 239 -251 .

Cheeke , P . R . (1986) . Potential of rabbit production in tropical and subtropical agriculture systems. Jornal of Animal Science 63 : 1581-1856 .

Cheeke ,P . R . (1987) .Rabbit Feeding and Nutrition . Academic Pres ., Orlando , FL .Duncan , D. B. (1955). Multiple Range and Multiple F . test . Biometrices , 10 :11 .

Gidenne , T . ; P. Arveux and O. Madec (2001) . The effect of the quality of dietary lignocellulase on digestion , 300 technical performance and health of the growing rabbit . Animal Science , 73 : 97 – 104 .

Gidenne ,T .and J .M .Perey (2000) .Replacement of digestible fiber by starch in the diet of the growing rabbits .1. Effects on digestion , rate of passage and retention of nutrients . Ann.Zootech . 49 :357-368 .

GU , Z . L . ; B .J . Chen ; J . LI ; C . Zhao ; B . Dong and J . Ge (2002). Study on the optimal crude fiber content of growing Rex rabbit diet . proceedings of the 7th World Rabbits Congress : 865 – 868 .

Kadi , S .A .; N Belaidi-gater and F. Chebat (2004) . Inclusion of crude olive cake in growing rabbits diet : Effect on growth and slaughter yield . Proceedings of the 8 th World Rabbits Congress . Mexico Septamber 7-10 , 2004 .

Kyriazakis , I . and G .C . Emmans (1995) . The voluntary feed intake of pigs given feeds based on wheat bran , dried citrus pulp and grass meal , in relation to measurement of feed bulk . British Journal of Nutrition , 73 : 191-207 .

Lakabi, D.; M . Berchiche and S .A . Kadi (2005) . Increase of incorporation Level of wheat by-products in growing rabbits diet : Effect on growth and slaughter yield . Proceed . the 4 th Int . Conf . on Rabbit Production in Hot Climat ., Sharm El-Sheikh , Egypt : 309 – 312 .

Muir ,J.P .and E .Massaete (1996) . Seasonal growth in rabbits fed wheat and maize bran with tropical forages . Livestock Research for Rural Development , Vol .8 (1) : 235-238 .

North, O . M . (1981) . Commercial Chicken Production Manual . 2nd Ed. AVI Publishing Company , Inc . Westpor , Connecticut .

Roy . J; N . Sultana , Z Khondoker , A . Reza and S .M . J . Hossain(2003) Effect of different sources of protein on growth and reproductively performances of rabbits. Pakistan Journal of Nutrition,1(6):279–281

SAS (2000). SAS User s Guide . Statistical Analysis System . Institute , Inc . Cary . , NC .

Schiemann , R. Nehring ; L . Hoffmann; W . Jestsch and A. Chudy (1972) Energetische Futterbewertung und Energianormen. VEB Deuoscher Landwirscha Fsverlags , Berlin , P . 72 .

استجابة الأرانب النامية لمستويات متدرجة من نخالة القمح في العلائق

تاج الدين حسن تاج الدين*، أمينة عبد المطلب السروي ، السمرة حسن أبو عجلة** ، مجدي عوض*** و نهلة عبد الرازق محمد مصطفى****

* كلية الزراعة بدمياط جامعة المنصورة .

** كلية الزراعة جامعة المنصورة .

*** معهد بحوث الإنتاج الحيواني – وزارة الزراعة .

استهدفت الدراسة الحالية بحث تأثير مستوى نخالة القمح في علائق الأرانب على أداء النمو ، الاستفادة من الغذاء ، صفات الذبيحة ، مكونات بلازما الدم ، تكاليف التغذية و الكفاءة الاقتصادية . تم تغذية ٤٠ أرانب نيوزيلاندي عمر ٦ أسابيع حتى عمر ١٤ أسبوع على علائق متساوية تقريباً في محتوى الطاقة والبروتين بها ١٥ ، ٣٠ ، ٤٥ ، ٦٠ % نخالة قمح .

لم يكن لمستوى النخالة في العليقة تأثيرات معنوية على وزن الجسم الحي في الأعمار المدروسة ماعدا في نهاية التجربة عند عمر ١٤ أسبوع حيث كانت أرانب المجموعة ٤٥% نخالة الأثقل وزناً . تفوقت أرانب هذه المجموعة على المجموعات الأخرى بالنسبة للزيادة الوزنية في وزن الجسم في جميع الفترات .

ازداد استهلاك العلف اليومي في المجموعات ٣٠ ، ٤٥ % نخالة عن المجموعات ١٥ ، ٦٠ % نخالة مع وجود فروق معنوية بين المجموعات . مع أن أرانب المجموعة ٤٥ % نخالة كانت الأفضل في معدل التحويل الغذائي في كل الفترات فلم يكن لمستوى الناخلة تأثيرات معنوية في الفترات ٦ – ١٠ ، ٦ – ١٤ أسبوع . وصل معدل تحويل البروتين أقصى قيمة لأرانب المجموعة ٤٥ % نخالة تلاها مجموعات ٦٠ ، ١٥ ، ٣٠ % نخالة في ترتيب تنازلي مع وجود فروق معنوية . احتاجت أرانب المجموعة ٣٠ ، ٤٥ ، ٦٠ % نخالة كميات أقل من الطاقة لزيادة وحدة وزنية واحدة عن مجموعة الكنترول وقد تأثر دليل الأداء معنوياً بمستوى النخالة وكانت مجموعة ٤٥ % نخالة هي الأفضل .

تأثرت معاملات هضم كل العناصر معنوياً بمستوى النخالة فيما عدا البروتين . وقد تحققت أفضل القيم للمجموعة ٤٥ % نخالة . اختلفت معنوياً القيم الغذائية تبعاً لمستوى النخالة في العليقة . وقد سجلت أفضل قيم لتكاليف التغذية والكفاءة الاقتصادية للمجموعة ٤٥ % نخالة . لم يكن لمستوى النخالة تأثيرات واضحة على صفات الذبيحة المدروسة . ازدادت مستويات البروتين والألبيومين والكرياتينين ، GOT في بلازما الدم مع زيادة مستوى النخالة في العليقة وقد كان العكس صحيحاً بالنسبة للبيدات الكلية والكولسترول و GPT .

تشير النتائج المتحصل عليها من هذه الدراسة إلى أنه يمكن إدخال نخالة القمح في علائق الأرانب النامية حتى مستوى ٤٥ % مع الحصول على استجابة جيدة في معدل أداء النمو ، الاستفادة من الغذاء ، تكاليف التغذية و الكفاءة الاقتصادية .