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EFFECT OF LASALOCID ADDITION IN DIET ON GROWTH PERFORMANCE, DIGESTIBILITY, CARCASS TRAITS, AND BLOOD CONSTITUENTS IN GROWING RABBITS

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SUMMARY - Sixty four New Zealand white rabbits about 5 weeks old were allotted to four groups. Treatments consisted of two levels of crude protein High (18.1%) and Low (14.2%). Each level was tested with and without Lasalocid at 40 mg/kg diet. During 6 weeks, live weight and feed intake were recorded weekly. At the last week the feaces and urine were collected to determine the apparent digestibility and nitrogen balance. Six animals from each group were sacrificed to study carcass characteristics. Final body weight, growth rat and Live weight gain were improved by ($p \leq 0.001$) as a result to increase protein level and lasalocid addition . DM intake (g/d) was decreased ($p \leq 0.001$) by 7.8g when protein level increased and 2.2 g by lasalocid supplemented .Also feed conversion rate (g/g) was improved ($p \leq 0.001$) by 1.13 and 0.31 % due to increase protein level and lasalocid addition respectivetly. The DM, EE and CF digestibility were improved significantly by 3.9, 3.5 and 5.9 % respectivly when protein level increased in diets the same trend observed with lasalocid supplmentation 1.8, 2.4 and 1.0 % with lasalocide supplimention. The Cp digestability was improved by ($p \leq 0.001$) by 3.7% and 3.4% due to increase protein level and lasalocid addition . Dressing % was increased ($p \leq 0.01$) while bone % was decreased ($p \leq 0.05$) when protein level increased. The CP and EE contents of carcass were influenced by ($p \leq 0.05$ & $p \leq 0.001$)) with hight protein level but ash content was decreased ($p \leq 0.05$) while Lasalocid addition had no significant affected . Total protein and albumin in plasma increased ($p \leq 0.05$) when protein level increased, while the GOT, GPT, Alkaline phosphatase, Urea and Createnine were not statstically affected.

Key words: Rabbits, Lasalocid, Growth, Feed intake, Digestibility, Carcass and Blood.

INTRODUCTION

Lasalocid is on the anti - coccidials of the chemical type Known as Ionophores. An ionophore is substance Whose molecules have the capability of combining with certain Ions, and facilitating the passage of these Ions through Lipophilic biolgical membranes. Disruption of cellular Ion balance results in death of coccidial parasites and changes in rumen bacteria population as results of selective anti microbial activity (Dennis et al.,1981). Foreyt et al., (1981)reported that Lasalocid increased gain of Lambs fed pelleted ration containing alfalfa (60%), barley (20%),and wheat (20%). A positive growth promoting effect has consistently been demonstrated both in young growing broilers and turkeys. As a result, the use of lasalocid in feeds for these birds produces optimum live- weight gains. Taylor et al .,(1974) found that the recommended level, the drug proved very effective in reducing morbidity and preventing mortaity due to coccidiosis. Lasalocid was found by mitrovic et al.,(1975) to provide better or equal performance than eight other coccidiostats. Lasalocid has the widest safty margin of all the Ionophores, and is the most compatible of the ionophores with other feed additives and therapeutic substances

The purpose of present work was to study the effect of lasalocid addition in diets of 14.2% and 18.1% crude protein content on growth performance , digestion traits and cracass traits in growing rabbits.

MATERIALS AND METHODS

Animals

Sixty four 5 weeks old unsexed NZW rabbits were obtained from experimental poultry research farm Shebin El-Kom, Menofiya University, EGYPT. The rabbits were alloted at random to the four

experimental diets. Each diet had 16 rabbits. The rabbits were housed in individual cages where stander management techniques and environmental conditions were applied. All rabbits had free access to feed and water throughout the entire experiment. During 6 weeks , live body weight and feed intake were recorded weekly. At the end of the experiment, six rabbits from each diet were scrificed to study carcass characteristics. Plasma samples were kept at -20°C for analysis by commerical kits (Bio-Merieux, France)

Diets

Four pelleted diets were formulated as detailed in table (1). Diets were consisted of two levels of crude protein as follow: high (18.1%) and low (14.2%). Each level was tested with and without lasalocid (X-537A - AVATEC® Roche Products Ltd., Dunstable, U.K.) at 40 mg/kg diet.

Table 1: Nutrient compositions of the diets

Ingredients %	Diet			
	1	*2*	*3*	*4*
Clover hay	32.00	32.00	32.00	32.00
Wheat bran	33.00	33.00	33.00	33.00
Barley	24.00	23.96	14.00	13.96
Sobean meal (44%)	6.50	6.50	16.50	16.50
Molasses	3.0	3.0	3.0	3.0
Limestone	0.95	0.95	0.95	0.95
Salt	0.30	0.30	0.30	0.30
Premix *	0.21	0.21	0.21	0.21
Lasalocid (40mg/kg)	----	0.04	----	0.04
Total	100	100	100	100
Chemical analysis (% as fed):				
Drymatter	90.56	90.56	91.20	91.20
DE kcal/ kg	2612	2612	2654	2654
Crude protein	14.2	14.2	18.1	18.1
Ether extract	2.70	2.70	2.50	2.50
Crude Fiber	13.51	13.51	13.10	13.10
Ash	9.70	9.70	9.30	9.30
NFE	59.89	59.89	57.0	57.0

* Each kg of premix contains: Vit. A2.000.000 iu; Vit.$_3$ D 15000 iu; Vit. E 8.33g; vitk 0.33g; B_1 0.33g; Vit. B_2 1.0g, Vit B60.33g, Vit B_9 8.339; Vit B_{12} 107mg; pantothanic acid 3.33g; Biotine 33 mg; mg 66.7 gm; Folicacid 0.83g; choline chloride 200 gm; Zn 11.7g; Fe 12.59; cu 0.5; I 33.3 mg; Se 16.6 mg and Mn 59 mg.

Digestibility Trial

At the last week, 6 rabbits per diet were kept in individual metabolic cages that allowed separation of feaces and urine. The feaces were collected during five consecutive days and stored at -20°C for analysis.

Analytical Methods

Chemical analysis of diets and faeces were conducted according to methods of AOAC (1984) for dry matter, ash, CP, CF and ether extract. Gross energy was determined by adiabatic bomb calorimetry.

Statstical analysis

Data were subjected to analysis of variance using the GLM procedure (SAS, 1989)

RESULTS AND DISCUSSION

Growth Performance

Data presented in table (2) provide within experiment comparisons by dietary protein levels with and without lasalocid supplement , the average final body weight, daily weight gain growth rate, dry matter

intake, dry matter/gain and feed cost/kg/gain. Effect of dietary protein levels on the parameters studied could be detected through comparing results of diet (1) 14.2% CP with those of diet (3) 18.1 % CP. It is evident that live weight gain , growth rate, DM intake and feed conversion rate were improved significantly ($p \leq 0.001$) with increased the protein level. These findings are in agreement with those obtained by Campose *et al.*, (1977) , Omole (1982) and sonbol et al., (1992). The addition of lasalocid caused a significant positive effect on all parameters studied but the effect was more clearly in the case of 14.2% CP than with 18.1% CP. Final body weight, growth rate and live weight gain were improved by 4.8%,8.3% and 4.4% respectively with diet(2) when compared with diet(1) unsupplemented. A similer pattern of response was noted with diet(4) for final body weight, live weight gain and growth rate were better by 4.4%, 7.6% and 4.3% respectively when compared with diet (3). The DM intake was decreased significantly ($P \leq 0.001$) while feed conversion rate was improved significantly ($P \leq 0.05$) as result of improvement of nutrients digestibility by the addition of lasalocid and increased protein level (14.2 to 18.1%)in diet. These results agreed with that results of Funk *et al.* (1986), Worrell *et al* ., (1990) and Baraghit(1995). The feed cost/ kg gain was lowered with increased protein and the addition of lasalocid of diet.

Table 2. Performance traits of Growing Nzw rabbits as affected by dietary protein levels and lasalocid (LSM ± SE)

Parameters	Diet						
	1	*2*	*3*	*4*	*L*	*T*	*LxT*
Initial weight (g) 5 weeks	80.5 ± 4.9	810 ± 4.9	815 ± 4.9	810 ± 4.9	NS	NS	NS
Final weight (g)11 weeks	1815 ± .03	1905 ± .03	2146 ± .03	2241 ± .03	***	***	NS
Live Weight gain (g/ day)	24.1 ± 0.19	26.1 ± .19	31.7 ± .19	34.1 ± .19	***	***	NS
Growth rate (%)	77.1 ± 0.5	80.7 ± 0.5	89.9 ±0.5	93.8 ± 0.5	***	***	NS
DM Intake(g/ day)	88.1 ± 2.0	85.4 ± 2.0	80.3 ± 2.0	78.7 ± 2.0	**	NS	NS
DM Intake/ gain (g/g)	3.66 ± 0.1	3.27 ± 0.1	2.53 ± 0.1	2.31 ± 0.1	***	***	NS
Feed cost/ kg. gain, (LE)	2.14 ± 0.12	1.96 ± 0.1	1.90 ± 0.1	1.76 ± 0.1	NS	NS	NS

- Cost per kg feed were 0.584, 0.590, 0.750 and 0.762 for diets 1, 2, 3 and 4 respectively.
- Price per one kilogram gain was 6.00 (LE).
- **= ($P \leq 0.01$), ***= ($P \leq 0.001$), NS= Non Significant
-L = protein level, T = treatment,

Digestion Trial

Digestibility and nutritive value of different nutrients is given in table(3) . Dry matter (DM), organic matter (OM) crude protein (CP), ether extract (EE) and crude fiber(CF) were increased signifcantly ($P \leq 0.001$) as protein level increased (14.2% to 18.1% CP). Aboul-Ela *et al* ., (1993) reported that dietary protein level had signifcant ($P<0.05$) effect on DM, OM and CP digestibilities. the nutritive values of the diet expressed as digestible crude protein (DCP) was significantly higher ($P<0.001$) with high protein level than low protein level but the DE and TDN had no significant differences Sankhyan *et al* ., (1990). The addition of lasalocid to diet (2) and diet (4) was yielded highest values of DM, EE, CP, and TDN. Our results were consistent with previous studies (Baraghit.1995 and Funk *et al.* 1986) Also, it could be noted that value of CP digestibility of diet (2) (14.2% CP and lasalocid) was slightly high than in diet (3) (18.1% CP and without lasalocid) , our results were in agreement with the results of previous studies (Paterson et al.,1983, and Delfino et al 1988) they observed increased protein digestibility with lasalocid addition. Generly our results may be due to the beneficial effect of lasalocid on inhibition of pathogens bacteria potentility that may allow more activity for the cellulolytic bacteria species present in ceacum.

Carcass traits

The results obtained for carcass traits are presented in table (4) . the level (18.1% CP) resulted higher significant ($p < 0.05$ & $p \leq 0.001$) values of carcass % and dressing %.,while the level (14.2% CP) showed that highest values of bone %. Similar results were obtained by Aboul- Ela *et al.*, (1993). On the other hand Sankhyan *et al* ., (1991) reported that dressing percentage weights of parts and organs weight of the carcass were not affected significantly by protein levels .Boneless meat % and head % have no signifcant differences. The addition of lasalocid tended to slighly increased in carcass %, dressing % boneless meat % and head % while bone % was decreased. Similar effect has been reported by Morris *et al.* (1990) and Barahit,(1995). When the dietary protein level increased from

14.2% to 18.1% led to signifcant increase ($p < 0.05$ & $p \leq 0.001$) in the CP% and EE% in the carcess, whereas ash % was led to lower significant ($p<0.05$) with higher protein diet. Our results are in agreement with data reported by Aboul-ELa *et al.*, (1995).

Table 3. Digestibilities of nutrient components % (LSM ± SE)

Nutrient	Diet						
	1	*2*	*3*	*4*	*L*	*T*	*LxT*
DM	66.3 ± 0.97	68.4 ± 0.97	70.2 ±0.97	71.7± 0.97	**	NS	NS
OM	64.0 ± 0.60	64.8 ± 0.60	66.2 ± 0.60	67.0 ± 0.60	**	NS	NS
CP	74.3 ± 0.61	78.2 ± 0.61	78.0 ± 0.61	80.9 ± 0.61	***	***	NS
EE	64.6 ± 0.95	66.1 ±0.95	68.1 ±0.95	71.4 ± 0.95	***	*	NS
CF	45.0 ± 0.56	45.6 ±0.56	50.9 ± 0.56	52.3 ± 0.56	***	*	NS
NEE	71.4 ± 0.72	73.3 ± 0.72	76.2 ± 0.72	78.5 ± 0.72	***	**	NS
Nutritive value (%)							
DCP	10.6 ±0.57	11.1 ± 0.57	14.1 ±0.57	14.6 ±0.57	***	***	NS
TDN	63.3 ± 0.87	65.0 ± 0.87	68.0 ± 0.87	70.1 ± 0.87	NS	NS	NS
DE KcaL/Kg	2521 ± 26.7	2540 ± 26.7	2570 ± 26.7	2582 ±26.7	NS	NS	NS

- *= (P ≤0 .05) , **= (P ≤0 .01), ***= (P ≤0 .001), NS= Non Significant
-L = protein level, T = treatment,

Table 4. Carcass traits of NZW rabbits as affected by dietary protein levels and lasalocid. (LSM ± SE)

Traits	Diet						
	1	*2*	*3*	*4*	*L*	*T*	*LxT*
preslaugnter weight,g	1820 ± 19.9	1910 ± 19.8	2150 ± 19.8	22.35 ± 19.8	***	***	NS
Carcass %	57.80 ± 1.88	59.5 ± 1.88	61.9 ± 1.88	65.0 ± 1.88	*	NS	NS
Dressing %	47.3 ± 0.7	48.7 ± 0.7	50.8 ± 0.7	53.7 ± 0.7	***	**	NS
Boneless meat %	83.2 ± 1.76	85.0 ± 1.76	86.0 ± 1.76	87.0 ± 1.76	NS	NS	NS
Bone %	16.8 ± 0.86	15.0 ± 0.86	14.0 ± 0.86	13.0 ± 0.86	*	NS	NS
Head %	6.4 ± 0.19	6.6 ± 0.19	6.76 ± 0.19	6.80 ± 0.19	NS	NS	NS
Carcass analysis (%)							
Moisture	70.9 ± 1.1	70.3 ± 1.1	69.5 ±1.1	69.0 ± 1.1	NS	NS	NS
Crude protein	20.5 ± 0.3	20.7 ± 0.3	21.0 ± 0.3	21.4 ± 0.3	*	NS	NS
Ether Extract	5.20 ± 0.28	5.53 ± 0.28	6.70 ± 0.28	7.00 ± 0.28	***	NS	NS
Ash	1.70 ± 0.10	1.62 ± 0.10	1.48 ± 0.10	1.30 ± 0.10	*	NS	NS

- *= (P ≤0 .05) , **= (P ≤0 .01), ***= (P ≤0 .001), NS= Non Significant
-L = protein level, T = treatment,

Blood Constituents

From table (5) it can be noted that when dietary protein levels increased ($p<0.05$) total protein and albumin in plasma increased but lasalocid addittion had no significant differences. The increase in the hepatic function of rabbits treated with lasalocid may be a suggestive evidence that lasalocid may act through affecting the metabolic rat. the results of trancaminases activity GOT, GPT and Alkaline phosphatase confirmed that their were no damge of hepatic cells due to addition of lasalocid while Mezey (1976) reported that GOT and GPT increased in the serum, when the hepatic cells were damged or their membranes were disrupted. The kidney function seemed to be un affected by using such lasalocid at both levels tested, This reslts confirmed that lasalocid has the widest safty margin of all the Ionophores.

In conclusion the addition of lasalocid to diet of growing rabbit seems to have a possitive effect on performance traits and to reduce feed cost. This effect may be due to the better utilization of low protein level with lasalocid addition

Table 5. Some blood constituents in growing NZW rabbits as affected by dietary protein levels and lasalocid. (LSM ± SE)

Parameter	Diet						
	1	2	3	4	L	T	LxT
Total protein, (g/100ml)	5.6 ± 0.35	6.0 ± 0.35	6.3 ± 0.35	6.9 ± 0.35	*	NS	NS
Albumine (g/100ml)	2.4 ± 0.24	3.0 ± 0.24	3.2 ± 0.24	3.6 ± 0.24	*	NS	NS
Globulin (g/100ml)	3.2 ± 0.31	2.9 ± 0.31	3.1 ± 0.31	3.3 ± 0.31	NS	NS	NS
GOT, (µ/L)	43.5 ± 1.46	44.3 ± 1.46	46.2 ± 1.46	47.0 ± 1.46	NS	NS	NS
GPT, (µ/L)	20.8 ± 0.96	21.3 ± 0.96	22.1 ± 0.96	22.3 ± 096	NS	NS	NS
Alk. Phos. (µ/L)	33.2± 1.2	35.25± 1.2	35.31 ± 1.2	35.36 ± 1.2	NS	NS	NS
Urea - N (mg/100ml)	16.0 ± 0.78	16.3 ± 0.78	16.7 ± 0.78	16.9 ± 0.78	NS	NS	NS
Creatinine(mg/100ml)	0.96 ± 0.13	1.0 ± 0.15	1.1 ± 0.15	1.15 ± 0.15	NS	NS	NS

- *= (P ≤0 .05) , NS= Non Significant
-L = protein level, T = treatment,

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