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GROWTH, CARCASS AND CAECAL TRAITS IN V-LINE AND CROSSBRED RABBITS FED DIETS CONTAINING DISCARDED DATES

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Abstract: A total of 78 rabbits representing two genetic groups of V-line and crossbred of V-line x Saudi Gabali were used to evaluate dietary treatments containing discarded dates (DD) for post-weaning growth performance, feed consumption and conversion, carcass characteristics, caecal parameters, and blood constituents. In the control diet (C), no DD was added, while in the other diets DD were incorporated to replace partially barley, wheat bran, molasses and corn by 15% (D15 diet) or 30% (D30 diet). Feed conversion ratio at interval of 4-12 weeks was significantly in favour of the control diet. Carcass traits and caecal parameters were not significantly affected by any of the 3 dietary treatments. Total caecal bacterial count was significantly increased in favour of rabbits fed D30. Crude protein, ether extract and ash in the lean were in favour of the diets containing 15 or 30% DD; indicating an improvement of 5.3 or 3.9% in crude protein and 7.3 or 14.4% in ash relative to the control diet, respectively. Rabbits fed D30 recorded a significant decrease in the plasma cholesterol. Crossbred rabbits were heavier in body weights and gains than that of the V-line rabbits. Feed conversion ratios were in favour of V-line rabbits. Fat in carcass and meat to bone ratio in crossbred rabbits were significantly higher than that in V-line rabbits, while percentages of the lean and bone in V-line carcasses were higher. Caecal bacterial count in crossbred rabbits was lower than that in V-line rabbits. Carcass traits, tissues compositions, caecal parameters and blood constituents were significantly affected by interaction of dietary treatments with genetic groups, while most of the lean constituents were not affected. Crossbred rabbits fed D30 conversed feed lesser (2.57) than crossbred rabbits fed the other two dietary treatments since feed conversion ratio was 2.48 for C diet and 2.49 for D15 diet. But, V-line rabbits fed C diet conversed better (2.95) than V-line rabbits fed D15 or D30 since feed conversion ratio was 3.29 for D15 and 3.04 for D30.

Key words: Rabbit, genetic line, dates, growth performance, meat quality, caecal microflora, blood parameters

INTRODUCTION

In Saudi Arabia, a national project of rabbits was established recently to detect the possibilities of producing meat rabbits under industrialized conditions (Khalil *et al.,* 2002). For this reason, a genetic improvement programme of crossing Spanish V-line rabbits with Gabali Saudi rabbits was developed to synthesize new maternal and paternal lines convenient for hot climate Arabian countries. In spite of this achievement, commercial rabbit farming in these countries is rather limited in comparison with other species because, among other factors, the complete pelleted diets suitable for rabbits are very expensive due to the increasingly high price of the concentrates. Accordingly, it is necessary to reduce the costs and, at the same time, to maintain the production efficiency. El-Hag *et al*. (1993) reported that Saudi Arabia is the first country in the world producing palm dates. Because dates packaging for export and local consumption became a big industry in this country, a considerable amount of low graded dates are discarded from packaging (Homeidan *et al*., 1993). Palm date by-products such as discarded dates and date pits could be used in formulation of diets for animals as energy sources not only for ruminants but also for rabbits (Al-Yousef *et al*., 1993), replacing a part

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of the energy concentrates in the diet. In this concept, the results of recent studies involving non-traditional local agricultural products and by-products in diets of rabbits were encouraging factors to attain high performances in this species (e.g. Ha *et al.*, 1996; Laswai *et al.*, 2000). Using non-traditional diets, however, could affect the caecal microflora activities (Marty and Vernay, 1984; Aderibigde and Cheeke, 1993) as well as carcass and meat quality.

The present study was conducted: (a) to detect the possibility to replace the concentrate feed by discarded dates (DD) in three diets offered for rabbits of two genetic groups (V-line and crossbred of V-line with Saudi Gabali), (b) to determine the effects of these dietary treatments on growth traits, carcass characteristics, tissues composition, caecal bacterial count, meat quality and blood constituents, and (c) to verify if the dietary treatments interact with any of the genetic groups.

MATERIAL AND METHODS

Housing

This experiment started in October 2004 in the rabbitry of Al-Qassim University, Saudi Arabia. At weaning (4 weeks), rabbits were ear tagged, transferred to individual wire cages and housed in a semi-closed rabbitry. In this rabbitry, the environmental conditions were monitored; temperature ranged from 20 to about 32°C, the relative humidity ranged from 20 to 50% and photoperiod was 16L:8D. All the cages were equipped with feeding hoppers and drinking nipples.

Diets and animals

A total of 78 V-line and V-line×Gabali crossbred weaned male rabbits were randomly distributed into three comparable dietary groups (26 animals each with 13 animals from each genetic group). Animals of the first group (control, diet C) was fed a basal diet where no DD was added, while animals of the other two groups were fed diets supplemented with 15 and 30% of DD in treatments D15 and D30 respectively to substitute the same levels of concentrate sources (corn, wheat bran and barley) and molasses (Table 1). Experimental diets were fed *ad libitum* to the animals from 4 (weaning) to 12 weeks of age (slaughter). The proximate chemical compositions of the experimental diets and the ingredients used in formulating these diets were determined according to A.O.A.C. (1990) and shown in Tables 1 and 2. Chemical composition was similar in the three experimental diets. During the experimental period, the rabbits appeared healthy and only 6 rabbits out of 78 died.

Growing period

Animals were weighed at the beginning of the trial (4 weeks) and every two weeks thereafter up to 12 weeks. Weight at 12 weeks of age is a common market weight for the Saudi consumers. Animals were fasted 12 h before recording their weights to avoid the gut content weight effect. Feed intake and residual feed were recorded individually at 14-d intervals to be used in feed conversion calculations at intervals of 4-8 weeks, 8-12 weeks, and total 4-12 weeks. Feed conversion ratio (FCR) was calculated as feed consumed divided by weight gain.

Slaughter and carcass dissection

At 12 weeks of age, 72 animals out of 78 were alive and were slaughtered at morning and carcass and organs weights were recorded. Rabbits were dissected for edible parts and non-edible ones. Hot carcass, offal, head, skin and gut were weighed. Lean, fat, and bones were weighed separately and meat-to-bone ratio was calculated.

At slaughter, blood samples were taken from all animals, centrifuged and plasma samples were separated, and then stored at –15 Cº. Blood parameters were determined in the plasma using commercial kits (Biomerieux, France). Plasma parameters included total proteins, albumin, globulin, cholesterol, total lipids, cholesterol index, triglycerides, high density lipoprotein cholesterol and urea.

Table 1: Ingredients and proximate chemical composition of the experimental diets

		Diet C	Diet D15	Diet D30
Ingredients (%)	Discarded dates (DD)	-	15.0	30.0
	Alfalfa hay	35.0	35.0	35.0
	Wheat bran	8.0	6.75	5.5
	Barley grain	9.0	4.5	-
	Corn grain	20.5	10.25	-
	Soybean meal, 44% CP	22.78	25.38	27.98
	Molasses	3.0	1.5	0
	Limestone	1.2	1.1	1.0
	Salt	0.25	0.25	0.25
	Vitamin premix[1]	0.27	0.27	0.27
Chemical composition (%DM):	Dry Matter (DM)	89.6	89.6	89.5
	Crude protein	18.4	18.3	18.2
	Crude fibre	12.6	12.6	12.5
	Ca	0.87	0.86	0.85
	P	0.41	0.36	0.32
	DE (kcal/kg DM[2])	2903	2969	2969

[1]Vitamin premix contains (per kg premix) Vit. A 4000,000 IU, Vit. D3 730000 IU, Vit. E 3300 mg, Vit. B1 330 mg, Vit. B2 1300 mg, Vit. B6 500 mg, Vit. B12 305 mg, Pantothenic acid 3500 mg, Niacin 7000 mg, Biotin 15 mg, Folic acid 350 mg.

[2]DE was calculated according to Fekete and Gippert (1986) as: DE (kcal/kg DM) = 4253 - 32.6(Crude fibre % DM) - 144.4(ash % DM).

Caecal parameters

To evaluate the effect of dietary treatment on caecal fermentation, 36 weaned rabbits of V-line and crossbred were randomly selected from the three dietary groups (12 each and 6 animals from each genetic group). Immediately after slaughter, full caecum was separated from the digestive tract and the full and empty weights of the caecum were recorded. Percentages of full and empty caecum relative to slaughter weight were also calculated. Part of the caecal contents was taken by sterile McCartney and kept in ice path for bacterial count. The pH of caecal contents was also measured using a portable pH-meter. Caecal bacterial count was determined using the pour plate technique for total bacterial colony count (Maturin and Peeler, 1998). Ten-fold dilution was prepared from each sample in peptone water. Three empty sterile Petri plates were inoculated from each dilution by transferring 1 ml from the dilution into each plate. The inoculum was thoroughly mixed with sterile molten plate count agar (Winlab, Leicestershire, England) previously held in a water bath at 50°C. The agar plates were allowed to be solidified and then incubated at 37°C for 24 hours. Bacterial colonies were counted in plates that yielded 30-300 colonies using an electronic counter (Gallenkamp, England).

Carcass dissection and meat analysis

For the lean composition traits, all carcasses were divided longitudinally into two similar halves. The right half-carcasses were frozen at –15 Cº until chemical analysis. Frozen half-carcasses were thawed and separated into lean, fat, and bone. The lean from each animal was analysed. Dry matter (DM; using an air-evacuated oven for 16 hours), crude protein (CP; N × 6.25), ether extract (EE) and ash in the lean were determined according to A.O.A.C. methods (1990).

Table 2: Chemical compositions (% DM) of the ingredients included in the diets

	DM	CP	EE	NFE	TDN	CF	Ca	P	Ash
Discarded dates (DD)	88.0	3.8	3.4	79.5	84.0	2.8	0.17	0.03	10.4
Alfalfa hay	90.9	17.0	3.4	41.7	56.6	30.1	1.19	0.24	7.8
Wheat bran	89.0	17.4	4.3	60.4	70.5	11.3	0.14	1.27	6.6
Barley grain	88.6	13.0	2.0	76.6	85.9	5.7	0.05	0.38	2.7
Corn grain	88.0	8.5	4.1	83.4	87	2.5	0.02	0.35	1.5
Soybean meal	89.0	44.0	1.3	41.3	88	6.5	0.33	0.71	6.9
Molasses	90.0	8.5	0.2	79.4	77	0.5	0.17	0.03	11.4

DM = dry matter; CP = crude protein; EE = ether extract; NFE = nitrogen free extract; TDN = total digestible nutrients; CF = crude fibre; Ca= calcium; P= phosphorous.

Statistical analysis

A factorial experiment of completely random design was used. All sets of data were analysed using GLM procedure of SAS (1996). Data were analyzed using the following linear model:

$Y_{ijk} = \mu + A_i + B_j + AB_{ij} + eijk$

where: Y_{ijk}= Observation on ijkth trait; µ= Overall mean; A_i= Effect of ith dietary treatment (i= 1 to 3); B_j= Effect of jth genetic group (j= 1, 2); AB_{ij}= Effect of two-order interaction of A_i and B_j; and e_{ijk}= random error.

Data measured as percentages were subjected to an *arc-sin* transformation to approximate normal distribution before being analyzed. Duncan test (1955) was used to compare the treatment means.

RESULTS AND DISCUSSION

Diets

Growth performances of rabbits fed diets containing 0, 15 or 30% of DD are reported in Table 3. All over the experiment period, partial replacement of concentrates (corn and barley) and molasses with date flesh did not attain significant differences in growth performance (Table 3). Opposite to body weights and gains, differences in feed consumption and conversion among dietary treatments were significant (Table 3). FCR at interval of 4-12 weeks was significantly in favour of the control diet compared with diets containing 15 or 30% DD.

Differences among the three dietary treatments for main carcass characteristics and tissues components were non-significant (Table 4). These results claimed that concentrates in the rabbit diets can be partially replaced by DD without impairing growth performance and carcass compositions.

As what concerns lean composition (DM basis), CP and ash were favourable in the groups D15 and D30, showing an improvement by 5.3 and 3.9% in CP and 7.3 and 14.4% in ash relative to the control diet, respectively (Table 4). Higher CP and ash and lesser EE in the lean of the dietary treatments indicate that these traits were significantly in favour of diets containing DD.

No significant differences among the three dietary treatments were observed for all caecal parameters with the exception of caecal bacterial count (Table 5). All caecal parameters studied are within the normal limits cited by García *et al.* (2000). Relative to the control diet, caecal bacterial count was significantly decreased in rabbits kept on diet D15, while increased in rabbits fed diet D30 (Table 4). Garcia *et al.* (1999) reported that inclusion of alternative sources of fibre in rabbit diets could influence significantly caecal fermentation. Belenguer *et al.* (2000) reported that the caecal bacteria count was more in rabbits kept on barley diets than in rabbits kept on corn diets (P<0.05).

Table 3: Live weights, weight gain and feed consumption and conversion

	No.	Dietary treatment (T)			Genetic group (G)		T x G[1]	RSD[2]
		C	D15	D30	V-Line	Crossbred		
Live weight, g:								
4 weeks	78	610	605	650	584[a]	660[b]	NS	126
8 weeks	75	1778	1805	1836	1765	1848	NS	204
12 weeks	72	2708	2722	2783	2685[a]	2789[b]	NS	204
Daily weight gain, g/d:								
4-8 week	75	41.7	42.8	42.4	42.1	42.4	NS	6.6
8-12 week	72	33.2	32.7	33.8	32.9[a]	33.6[b]	NS	4.2
4-12 week	72	37.3	37.8	38.1	36.2[a]	39.3[b]	NS	3.1
Daily feed consumption, g:								
4-8 week	75	89[a]	103[b]	95[ab]	89[a]	103[b]	*	19
8-12 week	72	104	107	106	85[a]	127[b]	**	18
4-12 week	72	97[a]	105[b]	101[a]	87[a]	115[b]	*	14
Feed conversion ratio:								
4-8 week	75	2.40	2.63	2.55	2.54[a]	2.51[a]	*	0.43
8-12 week	72	3.16	3.27	3.22	2.59[a]	3.84[b]	*	0.65
4-12 week	72	2.58[a]	2.76[b]	2.66[ab]	2.41[a]	2.92[b]	*	0.35

[1]T x G: Significance of the interaction. [2]RSD= Residual standard deviation. [a,b] Values having different superscripts within each row and factor are significantly different (P<0.05). NS= Non-significant; *P<0.05; **P<0.01

Table 4: Carcass traits, tissues compositions and chemical composition of lean

	Dietary treatment (T)			Genetic group (G)		T x G[1]	RSD[2]
	C	D15	D30	V-Line	Crossbred		
Rabbits, No.	24	24	24	36	36		
Carcass traits:							
Hot carcass weight, g	1528	1528	1531	1494[a]	1564[b]	*	129
Dressing %	52.3	52.3	52.5	51.0[a]	53.8[b]	*	4.8
Offal, %[3]	5.1[a]	4.2[b]	4.1[b]	4.7[a]	4.2[b]	***	0.5
Head, %[3]	8.8	8.7	8.5	8.7	8.6	***	0.6
Fur, %[3]	10.7	10.6	10.6	10.1[a]	11.1[b]	***	1.1
Viscera, %[3]	17.0	16.6	16.7	17.9[a]	15.6[b]	**	2.2
Tissues compositions:							
Lean, %[3]	34.3	35.2	35.5	35.7[a]	34.4[b]	NS	2.8
Bone, %[3]	10.8	10.1	11.4	11.8[a]	9.7[b]	NS	3.2
Fat, %[3]	3.5	3.3	3.6	2.4[a]	4.5[b]	NS	1.4
Meat-to-bone ratio	3.52	3.83	3.35	3.31[a]	3.82[b]	NS	1.36
Chemical composition of lean (% DM)							
Crude protein	74.7[a]	78.4[b]	77.6[ab]	77.0	76.8	NS	5.6
Ether extract	20.9[a]	16.9[ab]	17.4[b]	18.0	18.8	NS	6.0
Ash	4.4[a]	4.7[b]	5.0[b]	5.0[a]	4.4[b]	NS	0.6

[1]T x G: Significance of the interaction. [2]RSD= Residual standard deviation [3]Traits expressed as percentages relative to slaughter weight.. [a,b] Values having different superscripts within each row and factor are significantly different (P<0.05). NS= Non-significant; *P<0.05 **P<0.01; ***P<0.001.

Blood parameters were not significantly affected by the dietary treatments (Table 6). For the cholesterol level, a quiet significant decrease in cholesterol level was noticed in blood of rabbits fed diet containing 30% DD. The real mechanism is not well explained but it could be through the inhibition of a key enzyme(s) in cholesterol and lipid synthesis. Comparing the lipogram parameters of this study with those parameters in the reviewed studies, it is noticed that the level of total lipids was higher in our study although the cholesterol level was lower as stated also by El-Mahdy *et al.* (2002).

Genetic groups

Body weights and gains of crossbred rabbits were higher than that of the V-line rabbits during the whole period of the experiment (Table 3). This could be partially attributed to that crossbred rabbits are theoretically containing 50% of their constituents from the Gabali genes which are more adapted to the Saudi climatic conditions. Opposite to body weights and gains, FCR were in favour of V-line rabbits; ranging from 2.41 to 2.59. Bianospino *et al.* (2005b), Metzger *et al.* (2006a) and Orengo *et al.* (2004) found that post-weaning body weights and gains in crossbreds were heavier than those in purebreds.

Carcasses of V-line rabbits have shown some advantages over the crossbred counterparts (Table 4). Fat percent in carcass of V-line was significantly lower (P<0.05), and lean percent in V-line carcass was also significantly higher (P<0.05) where meat is the main objective in rabbit production. Results in the literature comparing breeds of large size with small size and straightbreds with crossbreds are partially not consistent (Lukefahr *et al.*, 1982, 1983; Pla *et al.*, 1996; Bianospino *et al.*, 2005a) because they are made at different slaughter weights but it can be partially due to true genetic differences between breeds. Since the digestive tract develops early (Pla *et al.*, 1996) thus line V of the present study shows a lower dressing percentage (P<0.05) than crossbred rabbits (Table 4). Despite the fact that the head is an organ with a very early development (Gomez *et al.*, 1998), no significant difference was found between the two breeds of the present study. Offal percent in V-line carcass was slightly heavier than in crossbred rabbits. However, liver and heart are organs of early development and animals with high growth rate also have an earlier development (Gomez *et al.*, 1998). In respect of non-edible parts, crossbred rabbits were heavier than V-line rabbits by 10.6% in the fur, while the reverse was observed for the viscera by 22%. However, viscera and fur in the carcass were always considered to be an important factor to explain the differences between breeds. Bianospino *et al.* (2005a) found that crossbred rabbits showed heavier fur and empty gastro-intestinal tract relative to the straightbred rabbits.

V-line and crossbred rabbits have shown some differences (P<0.05) in favour of V-line rabbits for tissues measurements of the carcass (lean, bone, fat, and meat to bone ratio; Table 4). In this concept,

Table 5: Caecal parameters and bacterial count

	Dietary treatment (T)			Genetic group (G)		T x G[1]	RSD[2]
	C	D15	D30	V-Line	Crossbred		
Rabbits, No.	12	12	12	18	18		
Full caecum, %[3]	5.2	4.9	4.8	5.6[a]	4.4[b]	**	0.6
Empty caecum,%[3]	1.6	1.5	1.5	1.6	1.4	*	0.1
Caecum contents, %[3]	3.7	3.4	3.3	4.0[a]	3.1[b]	**	0.5
Caecal pH	6.2	6.4	6.4	6.2[a]	6.5[b]	NS	0.2
Caecal bacterial count (x 10^5)	2.49[a]	1.01[b]	3.73[c]	1.82[a]	2.91[b]	***	0.99

[1]T x G: Significance of the interaction. [2]RSD= Residual standard deviation [3]Traits expressed as percentages relative to slaughter weight.. [a,b,c] Values having different superscripts within each row and factor are significantly different(P<0.05). NS= Non-significant; *P<0.05, **P<0.01; ***P<0.001.

Table 6: Blood plasma parameters

	Dietary treatment (T)			Genetic group (G)		T x G[1]	RSD[2]
	C	D15	D30	V-Line	Crossbred		
Number of animals	24	24	24	36	36		
Total protein, g/100 ml	5.62[ab]	6.31[a]	5.51[b]	5.82	5.81	*	1.08
Albumin, g/100 ml	2.98	3.15	3.09	3.12	3.02	NS	0.38
Globulin, g/100 ml	2.64	3.16	2.42	2.70	2.78	NS	1.10
Albumen: globulin ratio	1.35	1.24	1.68	1.40	1.46	NS	1.01
Cholesterol, mg/100 ml	70.7[ab]	72.8[a]	54.5[b]	63.2[a]	28.8[b]	*	30.3
Total lipids, mg/100 ml	386	386	359	403[a]	352[b]	*	95
Cholesterol index[3]	18.1[a]	18.8[a]	15.4[b]	17.3	17.6	*	6.7
Triglyceride, mg/100 ml	235[a]	220[a]	175[b]	225[a]	194[b]	*	109
High density lipoprotein, mg/100 ml	132[a]	126[a]	138[b]	138[a]	127[b]	***	46
Urea, mg/100 ml	19.7	22.3	19.7	20.5	20.7	NS	4.3

[1]T x G: Significance of the interaction. [2]RSD= Residual standard deviation [3]Cholesterol index= (Cholesterol/Total lipids) x 100. [a,b]Values having different superscripts within each row and factor are significantly different($P<0.05$). NS= Non-significant; $^{*}P<0.05$, $^{***}P<0.001$.

meat to bone ratio could be improved with the maturity (Pla *et al.*, 1996) and consequently crossbred rabbits had better meat to bone ratio than V-line rabbits. Although the fat percent of the carcass in rabbits is low relative to the other animals, fat deposited in the carcass of crossbred rabbits (4.5%) was significantly higher than that in V-line rabbits (2.4%). However, fat is a late developing tissue and its content increases with age. Similar breed differences in fat deposited in the carcass have been reported by Gomez *et al.* (1998) and Metzger *et al.* (2006a, b).

CP and EE in the lean have shown little differences between V-line rabbits and crossbreds (Table 4), while ash content showed significant differences ($P<0.05$), i.e. chemical components of the lean in V-line rabbits and crossbreds were nearly similar. In Hungary, Metzger *et al.* (2006a) with purebreds and crossbreds found that the differences in protein and ash contents of the lean were limited, while fat content in the lean was in favour of the crossbred rabbits. Differences among V-line and crossbred rabbits for most caecal parameters were significant (Table 5). Full and empty caecum in the carcass was in favour of V-line rabbits, while total caecal bacterial count was in favour of crossbred rabbits (Table 5). Such decrease in caecal bacterial count may be a disadvantage in V-line rabbits of this study.

Blood concentrations in terms of cholesterol, total lipids, triglycerides and high density lipoprotein in V-line rabbits were higher than those in crossbreds (Table 6). On the other hand, both genetic groups were nearly similar for other blood parameters.

Dietary treatments by genetic group interaction

All body weights and gains were not significantly affected by interaction of dietary treatments×genetic groups, while feed consumption and conversion during the whole period of the experiment were clearly affected by such interaction as shown in Table 3. The intersected curves in Figure 1 indicated that crossbred rabbits fed diet containing 30% DD had a lower feed efficiency (2.57) than crossbred rabbits fed the other two diets (2.48 in diet C and 2.49 in diet D15). On the other side, V-line rabbits fed the control diet had a better feed conversion (2.95) than V-line rabbits fed diet D15 (3.29) and D30 (3.04).

Most carcass traits, tissue compositions and caecal and blood parameters were significantly affected by interaction of dietary treatments with genetic groups as shown in Tables 4, 5 and 6. Across the

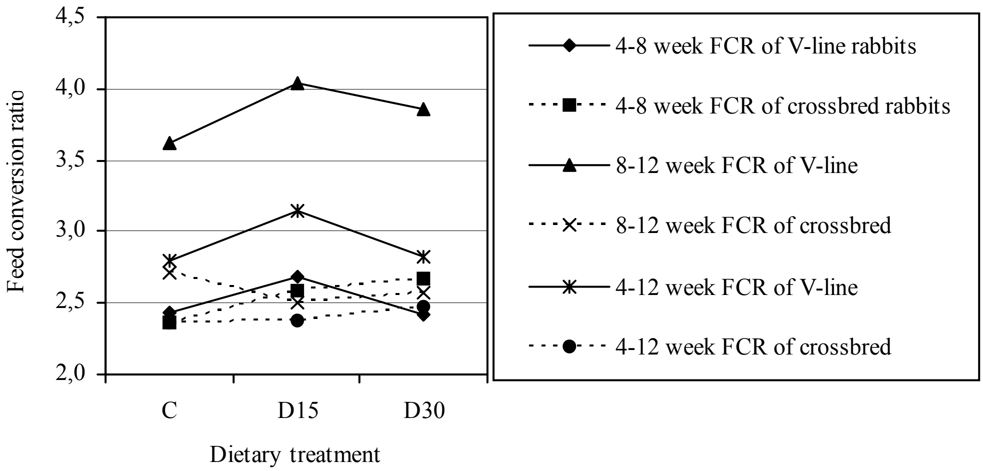

Figure 1: Feed conversion ratio (FCR) in different levels of interaction between dietary treatments and genetic groups

three dietary treatments, results of interaction showed that crossbred rabbits fed diet containing 30% DD recorded the highest percentages of lean, bone, head, fur and viscera; with the least percentages of hot dressing carcass, meat to bone ratio, fat and offal (Figure 2), *i.e.* crossbred rabbits included V-line in their constituents could be raised in hot climate areas and those rabbits may be characterizing by good carcass traits and tissue compositions particularly in the case of using diets containing DD. For V-line *vs.* crossbred rabbits, interaction effects indicate that the control diet for V-line rabbits recorded the highest percentages of hot carcass, fat, head, fur and offal, with the least percentages of lean, bone and viscera (Figure 2) as compared with crossbred rabbits. For crossbred rabbits in the three dietary treatments, diet containing 30% DD gave the highest full and empty caecum, caecum contents, and caecal pH; with the least caecal bacterial count (Figure 3). For V-line rabbits, diet containing 15% DD recorded the highest full and empty caecum, caecum contents, and caecal pH; with the least caecal bacterial count (Figure 3).

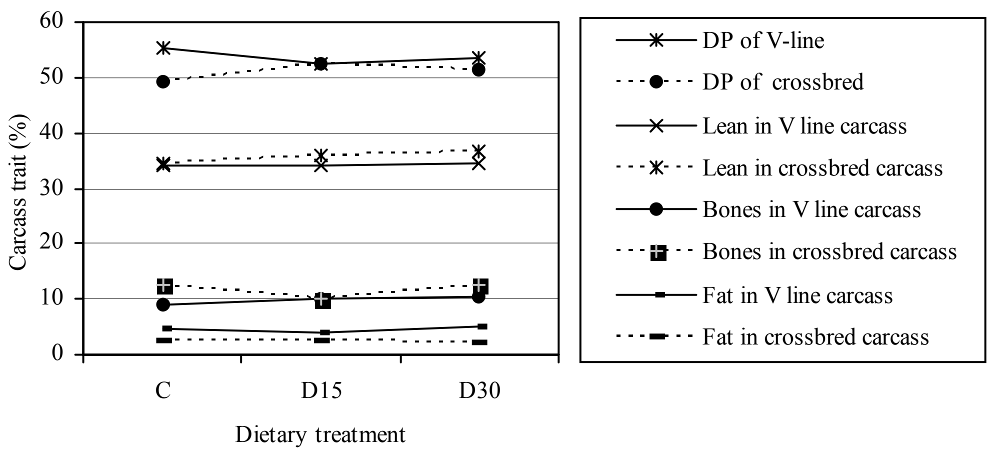

Figure 2: Dressing percentage (DP), lean, bones, and fat in carcass of different dietary treatments and genetic groups

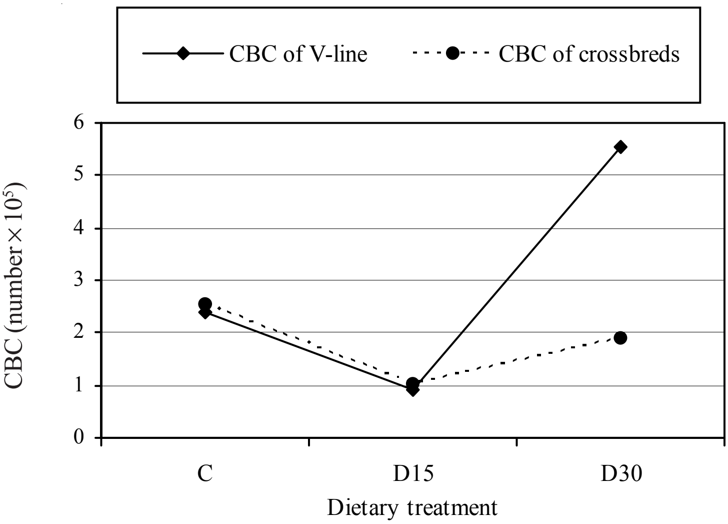

Figure 3: Caecal bacterial count (CBC) in different dietary treatment

All lean compositions were not significantly affected by interaction (Table 4), *i.e.* carcasses of any genetic group (V-line rabbits or crossbred) could give similar tissues composition when using any dietary treatment (included or not included DD).

CONCLUSIONS

To minimize the costs of rabbit production in hot climate countries, low-priced discarded dates can safely partially replace the concentrates in diets of growing rabbits without any deleterious effects, and their inclusion until 30% in the diet was associated with an increase in carcass performance and crude protein and ash of the lean, a reduction in feed conversion, ether extract and cholesterol level in the blood, along with a suitable microbial activity in the caecum.

V-line and crossbred rabbits could perform efficiently in terms of feed conversion and carcass performance in hot climate areas when using the diet containing discarded dates. Carcasses of any of the two genetic groups (V-line or crossbred rabbits) could give similar compositions of carcass and tissues when using one of the two dietary treatments with discarded dates.

Genetic groups by dietary treatments interaction showed that rabbits of any genetic group (V-line or crossbred involving V-line) could be grown efficiently in hot climate areas using any of the dietary treatment studied (included or not included discarded dates).

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