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OLIVE CAKE OR DATE STONE IN RATIONS OF NEW ZEALAND WHITE RABBITS:-1- THE EFFECT ON GROWTH PERFORMANCE, SOME PHYSIOLOGICAL PARAMETERS AND CARCASS TRAITS.

Amira .A. A.[1], S.I. Ghoneim[1], F.E. El-Azzazi[2], and R. M. E. Khalifa[2]

1. Dept. of Animal & Poultry Prod., Faculty of Environ. Agri. Sc., Suez Canal Univ., El-Arish, Egypt

2. Dept. of Animal Prod. & Fish Wealth, Faculty of Agriculture, Suez Canal Univ., Ismailia, Egypt.

ABSTRACT

There is wide gap between the available feedstuffs and the requirements of animal feeding in Egypt and especially in Sinai. The present study was carried out to investigate the effect of feeding agro-industrial by-products like olive cake (OC) or crushed date stone (DS), as partial replacement of ratio yellow corn, on growth performances, carcass traits and some physiological status of New Zealand White rabbits (NZW). Thirty growing NZW weighed about 465g were divided into three similar and equal groups, six males and four females each. The 1st group was fed on commercial diet as control (C);2nd and 3rd group was fed on 6.25% OC or 6.25% DS. At the end of experiment (after 12 weeks) 3 males and 4 females were slaughtered to study the carcass traits and blood constituents. The results concluded that feeding NZW on diet containing 6.25% OC or SD has beneficial effects. The final body weight averaged 2.14, 2.49 and 2.44 kg. in C, OC and DS groups, respectively. The corresponding values of daily body gain averaged 18.3, 22.1 and21.6 g. Feed conversion (feed intake/ body gain) averaged 4.7, 4.2 and 3.9. Moreover, these substitutions hadn't any bad effects on peripheral signs of health (rectal temperature or respiration rate) or internal signs, kidney, liver, adrenal, thyroid functions or blood characteristics of NZW rabbit. Furthermore, there was an improvement in dressing percentage and total edible meat. The percentages of carcass weight and total edible parts averaged 48.6 and 57.9 respectively, in C group, 53.9 and 62.8 in OC group, 51.1 and 60.8 % in DS group.

Key words: rabbits, olive cake, date stone, growth, blood, hormones, carcass.

INTRODUCTION

The incorporation of untraditional agro–industrial by–products such as olive cake **(El-Sayed 2010)** and date stones **(Abd El–Hay *et al.,* 2012)** may partially help in solving the problem of animal feed shortage. Rabbits are in favorable situation when a competition exists between human and livestock for grains, starch and protein concentrates. This ability is of special significance in developing countries when population and food shortage are greatest.

The recent previous studies confirmed that date pits could be successfully used as good source for rabbit feeding **(Toson *et al.*, 1995; El-Kerdawy *et al.*, 1998; Orunmuyi *et al.*, 2006 and Carrion *et al.*, 2011).**

Several investigations illustrated that supplementation of olive cake in rations had beneficial effect on the efficiency of feed utilization as a result of improving digestion coefficient of different nutrients in rabbit ration **(Abdel-Magid, 1997 and El-Sayed, 2010)** and growth performance

of rabbits **(Ben Rayana *et al.*, 1994 and Chaabane *et al.*, 1997).** Therefore, the present study was designed to study partial substitution of crushed date stone or olive cake instead of the same ratio of yellow corn in commercial diets of NZW rabbits throughout their effects on growth, blood components and carcass traits.

MATERIALS AND METHODS

The present study was carried out at the Rabbit Farm, Department of Animal and Poultry Production, Faculty of Environmental Agricultural Sciences, Suez Canal University, EL-Arish, North Sinai.

Animals, housing and management

Thirty growing NZW weighed 465g in average were divided into three equal groups, six males and four females in each. Each group was fed one of three experimental diets, commercial diet as control (C); 6.25% OC or 6.25%DS.

According to the conventional methods of **AOAC (1995).**

The three experimental diets were formulated to cover the nutrient requirements for rabbits according to **NRC (1996)** as shown in Table (1). All diets were in pelleted form and were iso-caloric and iso-nitrogenous.

Rabbits were housed in double flat galvanized wire cages (40x50x60cm), two rabbits per cage. Feeds and water were available ad libitum.

The rabbits were subjected to, natural and artificial, light to be 16 hours lighting daily. Rabbit vaccinated against Haemorrhagic septcemic disease (viral and bacterial) and provided drugs against sallmonellosis and E-coli and coccidiosis.

Growth performances, feed conversion and peripheral signs of health

All rabbits were weighed individually after weaning then bi weekly till the 12th week. Body weight gain (g) was calculated.

According the equation of **Hassan *et al.* (2009)**, relative Growth rate (RGR)

Table (1): Components of the three experimental diets.

Ingredients (%)	Dietary groups		
	Control	Olive cake 6.25%	Date stone 6.25%
Yellow corn	**25**	**18.75**	**18.75**
Soya bean	15.5	15.5	15.5
Olive cake	-	6.25	-
Date stone	-	-	6.25
Wheat bran	30	30	30
Clover straw	15.1	15.1	15.1
Hejaz clover hay	10	10	10
Di calcium phosphate	1.5	1.5	1.5
Lime stone	2	2	2
Sodium chloride	0.5	0.5	0.5
Premix*	0.3	0.3	0.3
Anti-fungi**	0.1	0.1	0.1
Total	100	100	100

***One kilogram of premix contain: vit. A 12000 000 IU, vit. D3 2200 00 IU, vit. E 1000 mg, vit. K_3 2000 mg, vit. B_1 1000 mg, vit. B_2 4000, vit. B_6 100 mg, vit. B_{12} 10 mg, Pantothenic Acid 3.33 g, Biotin 33 mg, Folic Acid 0.83 g, Choline Chloride 200 g, Zn 11.79 g, Mn 5 g, Fe 12.5 g, Cu 0.5 g, I 33.3 mg, Se 16.6 mg and Mg 66.7 g.**

**** Produced by: The Egyptian French Factory**

was calculated, RGR=100[(W2-W1) /0.5 (W2 +W1)]. Throughout the experimental period, feed intake was recorded by weighing the feeds at the beginning and the end of each week. Body weight and feed intake were used to calculate feed conversion.

Feed conversion ratio was calculated according to **Wanger *et al.* (1983)**.

Rectal temperature and respiration rate were recorded twice a week (12 am and 3pm) for each animal. Rectal temperature was measured first using a clinical thermometer inserted into the rectum for 2 minutes at depth of about 2 cm. The respiration rate was recorded by counting the flank movements per minute using a hand counter (**Abdel–Monem, 1995).**

Slaughtering and carcass traits:

After 12 weeks 7 rabbits (3 males and 4 females) were slaughtered to study the carcass traits and blood constituents. Animals were kept off feed overnight and body weight was recorded next morning prior to slaughter. Complete bleeding was achieved and the head was separated. Skinning was carried out by removing the skin including the tail and feet's, then abdomen was opened up and all entrails were removed and separated. The empty carcass without head, lung, liver, kidney, heart weighed and each organ was weighed separately to nearest gram. Weights of carcass, fur, head and entrails were recorded according to **Cheek (1987).** Total edible parts percentage was calculated according to **Steven *et al.* (1981)**: **Total Edible Parts (%) = {Empty carcass (without head) Wt. + Giblets Wt. / live fasted Wt.} x 100.**

Blood samples and measurements:-

During slaughter, blood samples were collected in test tubes with Na-EDTA as anticoagulant for blood cell measurements.

Blood plasma was separated by centrifugation of blood samples at 3000 rpm for 15 minutes. Plasma was subsequently decanted into glass vials and stored at-20^{o}C until analyzes.

Concentrations of plasma glucose, total protein, albumin, total lipids, triglycerides, creatinine, uric acid, cholesterol as well as activity of aspartate (AST) and alanine (ALT) transaminases were determined in blood plasma spectrophotometrically using commercial kits. Concentrations of T3, T4 and cortisol hormone were determined using radioimmunoassay technique**.** All the previous blood characteristics were determined in private laboratory.

Data were analyzed according to SAS program **(SAS, 2004)**. The application of the least of means significance tested for the differences among the different groups or sampling times were done according to **Duncan (1955).**

RESULTS AND DISCUSSION

Live body weight and body weight gain

The present data (Table 2) revealed that feeding olive cake (OC) or date stone (DS) increased ($P<0.05$) each of, final live body weight and daily body weight gain compared to control group (C). The same treatments increased ($P<0.05$) relative growth rate comparing to control, either on period from weaning up to 8 weeks or period from weaning up to 12 weeks. Contrarly, **Carraro *et al.* (2005)** reported that daily weight gain and final live weight were not affected by the inclusion of 3 and 6% of OC meal.

Attia (1994) disagreed our findings and showed that live weight of rabbits decreased with increasing the dietary date pits levels from 5 to 20 %.Also, relative growth rate(RGR) of rabbits fed 0, 5, 10, 15 and 20% date pits was 14.58, 9.86, 11.57, 7.61 and 6.49, respectively.

However, the relative growth rate decreased (P<0.05) in males compared to females. The statistical significance in the present data was quietly disagreed with **Abdel-Magid (1997)** who reported that body weight of rabbits fed DS meal in their rations decreased insignificantly compared to control group.

In other research, **Bosco *et al.* (2007) and Dal Bosco *et al.* (2012)** studied the effect of dehydrated OC on immunity of growing rabbits. They reported an improvement of specific immunity due to richness of antioxidant components in OC.

Feed intake and conversion

Table (2) revealed that daily feed intake during the period from weaning to 12 weeks averaged, 84.1, 87.9and 90.5 g/rabbit/day in control, OC and DS diets, respectively.

The present results disagreed with **El-Sayed (2010)** who did not find significant difference in the overall mean of feed consumption of diets containing OC by rabbits. While **Kadi *et al.* (2004)** reported that feed consumption increased significantly by rabbits fed 20% of crude OC.

Also, **Abdel-Magid (1997)** studied the effect of OC and date stone at level 5, 10 and 15% from the diets and found that feed consumption increased by increasing the level of OC.

In the present study, feeding growing NZW rabbits on OC or DS improved insignificantly feed conversion compared to C group during the period from weaning to 12 weeks. The present findings are agreed with the results of **El-Lathy (2001)** who concluded that supplementation of olive pulp in rabbits diets by 10% improved feed conversion compared to control diet. In addition, **El-Sayed (2010)** stated that addition of enzyme to diet contains 15% olive cake meal gave better feed conversion value (3.09 kg)in rabbits. In addition, **Attia (1994)** reported that feed conversion increased with increasing of date pits level in the diet when used different levels of date pits (5, 10, 15 and 20%).

The present results of growth, feed consumption and conversion confirm the results by other researchers, whereas several investigations illustrated that supplementation of OC or DS in rations had beneficial effect on the efficiency of feed utilization as a result of improving digestion coefficient of different nutrients in rabbit ration **(Abdel-Magid, 1997 and El-Sayed, 2010)** and growth performance of rabbits **(Ben Rayana *et al.*, 1994 and Chaabane *et al.*, 1997).**

May be due to feed conversion improved as a result of the increased of daily body weight gain.

Rectal temperature and respiration rate

The present data Table (3) demonstrated that feeding olive cake or date stone diets did not affected significantly rectal temperature or respiration rate comparing to control group.

Rectal temperature and respiration rate were in normal ranges in all rabbit groups **(Abdel-Samee *et al.*, 2003; 2005; 2012 and 2014)**. **Abdel Ghaffar (2002)** used some treatments for amelioration of heat stress and found that, feeding diets containing olive pulp, sodium bicarbonate and vitamin C decreased (P<0.05) rectal temperature with 2.6, 2.8 and 2.8 % in California rabbits does and 2.8, 2.7 and 2.5 % in NZW does exposed to heat stress. Also, respiration rate decreased (P<0.05) in the two breeds fed the three different diets.

Regarding the sex effect, Table (3) revealed that rectal temperature and respiration rate increased (P<0.05) in males than females. The present findings revealed that feeding OC or DS rations did not adversely affected thermoregulation of rabbit bodies.

Table (2): Effect of feeding diets containing olive cake or date stone on growth performance, feed intake and conversion of NZW rabbits tell 12 weeks after weaning (Means ± SE).

Items	Treatments		
	Control	Olive cake	Date stone
Initial body weight (g)	465.0±10.6	458.5±13.1	458.1 ±13.9
Final body weight (g)	2139.0^{b}±65.7	2488 ^{a}±67.3	2442.0^{a}±56.6
Average daily body wt. gain-g	18.3^{b}±0.7	22.1^{a}±0.7	21.6^{a}±0.6
Relative growth rate (%)	129.3^{b}±2.2	137.5^{a}±1.9	136.6^{a}±1.6
Daily feed intake (g)	84.1	87.9	90.5
Feed conversion (intake/gain)	4.7± 0.18	4.2± 0.13	3.9± 0.12

$^{a, and\ b}$:Means within the same raw with different superscripts are significantly different (P<0.05).

Table (3): Feeding diets containing olive cake or date stone influences on rectal temperature and respiration rate of NZW rabbits tell 12 weeks after weaning (Means ± SE).

Items	Rectal Temperature, °C	Respiration Rate, Rpm
Treatments		
Control	39.2±0.03	94.9±1.18
Olive Cake	39.1±0.03	93.6±1.18
Date Stone	39.2±0.03	91.5±1.18
Sex		
Male	39.3^{a} ±0.02	95.1^{a} ±0.86
Female	39.1^{b} ±0.03	91.7^{b} ±1.05

$^{a, and\ b}$:Means within the same column with different superscripts are significantly different (P<0.05).

Though, rectal temperature and respiration rate did not change significantly compared to controls.

Blood haematology

Table (4), showed that feeding OC increased (P<0.05) in each of red blood cell count, hemoglobin concentration and packed cell volume compared to control. There were no significant differences in the other studied parameters of blood characteristics such as cell distribution width. Also, there were no significant effect in the total white blood cells count, differential leucocytes, platelet count, platelet distribution width, mean platelet volume and platelet crit % compared to control.

Feeding DS significantly (P<0.05) decreased red cell distribution width-S.D. In comparing with control. While, there were no significant differences in all the studied characteristics of blood between feeding DS and control diet.

Table (4), showed also that red cell distribution width-C.V and granulocytes increased significantly (P<0.05) in males than females. However, lymphocytes cell percentage decreased (P<0.05) in males compared to females. The other studied parameters of blood characteristics in male and female rabbits were almost similar.

Blood biochemical and metabolites

Effect of feeding OC or DS on blood biochemical and metabolites changes in growing NZW rabbits are presented in Tables (5and6). The data revealed that the feeding OC or DS diets resulted in a significant (P<0.05) increase in each of globulin and T_3. However, the same diets led to a significant (P<0.05) decrease in

Table (4): Feeding diets containing olive cake or date stone influences on Complete Blood Count in NZW rabbits at 12 weeks after weaning (Means ± SE).

Items	Treatment			Sex	
	Control	Olive cake	Date Stone	Male	Female
Red Blood Cells (x10^6/mm^3)	5.1^b±0.23	6.9^a±0.55	5.8^b±0.35	6.3±0.45	5.7±0.33
Hemoglobin Concentration(g/dl)	12.2^b±0.33	16.8^a±1.26	13.8^b±0.88	14.8±1.13	13.8±0.79
Packed Cell Volume (%)	34.9^b±1.17	47.2^a±3.63	38.7^b±2.39	42.2±3.00	38.8±2.31
Mean Cell Volume fL	68.3±1.38	68.6±0.71	67.3±0.90	67.1±0.67	68.8±0.85
Mean Cell Hemoglobin Pg	23.9±0.65	24.3±0.17	23.7±0.57	23.5±0.40	24.4±0.37
Mean Cell Hb concentration g/dL	35.0±0.49	35.5±0.19	35.3±0.65	35.0±0.54	35.5±0.25
Red cell Distribution Width					
R.D.W. - C.V%	15.3^{ab}±0.63	14.5^b±0.27	20.9^a±4.14	20.1^a±3.19	14.5^b±0.36
R.D.W.-S.D fL	38.1^a±1.21	35.9^a±0.90	30.0^b±3.89	32.2±3.25	36.5±0.93
White Blood Cells(×10^3 /mm^3)	7.7±0.96	9.6±1.32	9.0±2.06	10.6±1.40	7.4±0.90
Mid (%)	13.3±1.67	13.1±1.47	11.1±0.93	11.2±0.62	13.5±1.26
Mid (× 10^3 /mm^3)	1.0±0.08	1.2±0.22	1.0±0.30	1.1±0.16	1.0±0.18
Gran (%)	48.9±4.76	44.8±5.04	46.6±5.95	56.3^a±3.14	39.6^b±3.27
Gran (× 10^3 /mm^3)	3.9±0.62	4.6±1.04	4.9±1.71	6.2^a±1.10	3.1^b±0.61
Lymphocytes (%)	37.6±4.05	42.3±4.83	42.3±6.32	32.5^b±3.49	46.9^a±3.38
Lymphocytes (× 10^3 /mm^3)	2.9±0.50	3.7±0.31	3.1±0.29	3.3±0.39	3.2±0.27
Platelet Count (×10^3/mm^3)	322.9±12.48	264.29±43.23	319.4±31.46	278.7±33.85	313.0±22.36
Platelet Distribution Width	15.8±0.31	15.86±0.33	15.2±0.11	15.9±0.29	15.4±0.16
Mean platelet Volume fL	6.1±0.25	6.2±0.24	5.6±0.09	6.1±0.23	5.9±0.14
P.C.T. %	0.19±0.01	0.16±0.02	0.20±0.05	0.18±0.04	0.18±0.01

[a, and b]:Means within the same raw with different superscripts are significantly different (P<0.05).

each of albumin, A/G ratio and total lipid compared to control There were no significa differences in the other studied parameters of blood characteristics or metabolites such as total protein, glucose, cholesterol, triglycerides, kidney function, liver function, cortisol and T_4. **Abdel-Magid (1997)** reported that the value of blood total protein content ranged from 4.70 g/100 ml for rabbits fed 15 % date seed meal to 5.40 g/100 ml for those fed either 5 % date seed meal or 5 % olive cake meal. The present data agreed with the results reported by **EL-Sayed (2010)** who reported that lowest values of cholesterol and triglyceride were 68.66 and 86.66 mg/100 ml, respectively for rabbit group that fed on 15% OC meal +enzyme. Also, **Mohamed (1993); Hemid *et al.* (1995) and Abdel-Magid (1997)** reported mean of cholesterol as 100, 111, 112.2 mg /100 ml respectively in NZW rabbits fed on OC meal.

However, **El-Lathy (2001)** reported that no significant differences in cholesterol levels in NZW rabbit fed on olive cake meal and control diet. Our result agree with **Rupic *et al.* (1999a and b)** who studied the effect of 10 or 20% OC in diets for rabbit and found after 56 days of feeding, rabbits from all groups in the experiment had approximately the same concentrations of triglycerides in their blood. Thus the diet with 10% OC reduced the total serum cholesterol, whereas the diet with 20% OC increased significantly (P<0.05) this parameter in group fed 20% OC. Values of the serum total cholesterol found in our study are higher than those found in rabbits by **Kortland *et al.* (1992)**.

Carcass traits

Table (7) represents the effect of feeding olive cake (OC) or date stone (DS) on carcass traits of NZW rabbits. The present data revealed that weights (g) of pre-slaughter, blood, liver, carcass, total

Table (5): Blood metabolites in NZW rabbits at 12 weeks after weaning as affected by feeding the three different diets (Means ± SE).

Items	Treatment Groups			Sig.
	Control	Olive Cake 6.25%	Date Stone 6.25%	
Total protein, g/dl	6.5	6.6	6.6	0.591
Albumin, (A) g/dl	3.3[a]	2.5[b]	2.4[b]	0.006
Globulin, (G) g/dl	3.2[b]	4.0[a]	4.2[a]	0.010
A/G ratio	1.0[a]	0.6[b]	0.6[b]	0.012
Glucose, mg/dl	68.9	69.5	70.4	0.973
Total lipids, mg/dl	344.3[a]	244.3[b]	230.3[b]	0.001
Cholesterol, mg/dl	102.0	96.7	92.7	0.521
Triglycerides, mg/dl	96.2	72.7	78.7	0.141

[a, and b]:**Means within the same row with different superscripts are significantly different.**

Table (6): Feeding diets containing olive cake or date stone influences on thyroid and adrenal glands, liver and kidney activities of NZW rabbits at 12 weeks after weaning (Means ± SE).

Items	Treatments			Sig.
	Control	Olive Cake 25%	Date Stone 25%	
Thyroid Activity				
T3 ŋg/dl	101.3[b]	106.7[a]	106.3[a]	0.0
T4 µg/dl	4.5 ±0.11	4.5 ±0.14	4.6 ±0.10	0.771
Adrenal Activity				
Cortisol, µg /dl	1.7 ±0.34	1.4 ±0.37	1.7 ±0.33	0.753
Liver function				
SGOT (AST), U/l	62.3	62.0	62.9	0.9
SGPT (ALT), U/l	56.3 ±3.30	61.0 ±1.29	64.9 ±2.58	0.135
Kidney function				
Uric Acid, mg/dl	0.37	0.30	0.29	0.9
Creatinine, mg/dl	1.27 ±0.13	0.96 ±0.03	1.18 ±0.07	0.106

[a, and b]:**Means within the same row with different superscripts are significantly different.**

Table (7): Effect of feeding diets containing olive cake or date stone on carcass traits of NZW rabbitsat 12 weeks after weaning (Means ± SE).

Items	Treatments			Sex	
	Control	Olive Cake	Date Stone	Male	Female
Pre-Slaughter	1956.4^{b}±108	2326.6^{a}±70.	2320.7^{a}±70.	2242.9±93.	2170.0±82.1
- Blood (%)	2.94±0.13	3.09±0.16	3.11±0.20	2.91±0.11	3.15±0.07
Giblets (g)	73.5^{a}±3.84	88.5^{ab}±3.88	100.3^{a}±8.05	93.0±7.88	83.2±3.42
- Giblets (%)	3.77^{b}±0.11	3.80^{ab}±0.12	4.30^{a}±0.24	4.12±0.23	3.84±0.22
Heart (%)	0.32±0.02	0.31±0.02	0.33±0.04	0.32±0.03	0.32±0.02
Liver (%)	2.70^{b}±0.09	2.75^{b}±0.09	3.10^{a}±0.18	2.93±0.17	2.79±0.16
Kidney (%)	0.75±0.03	0.74±0.06	0.87±0.06	0.87^{a}±0.06	0.73^{b}±0.06
Carcass (g)	954.3^{b}±65.0	1254.3^{a}±40.	1185.7^{a}±39.	1158.9±55.	1110.8±56.7
- Carcass (%)	48.6^{c}±0.68	53.9^{a}±0.62	51.1^{b}±0.77	51.6±0.91	50.9±1.00
Total Edible	1134.9^{b}±72.	1459.9^{a}±44.	1410.3^{a}±47.	1373.6±63.	1306.2±62.3
Total Edible	57.9^{C}±0.60	62.8^{a}±0.74	60.8^{b}±0.76	61.2±0.91	59.9±1.01
Non-Edible	821.5±36.55	866.7±33.89	910.4±32.8	869.3±38.3	863.8±23.24
Non-Edible	42.2^{a}±0.50	37.2^{c}±0.73	39.2^{b}±0.92	38.8±1.06	40.1±1.18
Fur & Skin	16.2±0.50	15.7±0.23	16.9±0.62	16.6±0.58	16.0±0.60
Head (%)	5.5±0.13	5.1±0.22	5.4±0.18	5.5±0.19	5.2±0.22
Leg (%)	3.7±0.16	3.5±0.20	3.3±0.12	3.3^{b}±0.15	3.7^{a}±0.12
Lungs (%)	0.65±0.05	0.63±0.06	0.69±0.05	0.65±0.04	0.66±0.04
Digestive Tract	17.5^{a}±0.77	13.1^{b}±0.42	14.8^{b}±0.56	15.0±0.81	15.2±0.85
Reprod. organs	0.31^{b}±0.03	0.52^{a}±0.06	0.51^{a}±0.04	0.46±0.06	0.43±0.05
Feeding Cost per one kg of Carcass (EGP)	22.2	15.3	18.2	-	-

$^{a, b, \text{and } c}$:means within the same row with different superscripts are significantly different (P<0.05).

edible parts and reproductive system increased significantly due to OC in comparing with C. While, the other studied parameters did not change appreciably due to this diet.

On another point of view, the percentage of dressing and reproductive system increased significantly due to OC diet in comparing with control. While, digestive tract (%) and non-edible parts (%) decreased significantly due to OC treatment in comparing with control. However, the other studied parameters did not change, appreciably due to OC diet.

Feeding DS increased (P<0.05) each of, pre-slaughter weight, blood, giblets, liver, kidneys, carcass, total edible parts, fur, head and reproductive system in grams compared to control. While, the other studied parameters did not change, appreciably due to DS diet.

On the other point of view, the percentage of blood, liver, dressing parts and reproductive system increased significantly in diet containing DS compared to control, while non-edible parts and digestive tract decreased significantly. However, the other studied parameters did not change, appreciably due to DS diet.

Kidneys weight of males increased (P<0.05) than females. Leg % increased and kidney % decreased in females

compared to males. While, there were no significant differences in the other studied parameters of carcass traits due to sex. On the other side, there were no significant differences in the other studied parameters (%) of carcass parts due to sex.

The present data revealed that the feeding OC resulted in a decrease in feeding cost of one kilogram of carcass (EGP) by 30.96% compared to the controls. While, the feeding date stone resulted in a decrease in feeding cost of one kilogram of carcass (EGP) by 17.94% compared to the control groups.

EL-_Sayed (2010) showed a significant ($P<0.05$) differences in carcass weights between the feeding agro-industrial by-product diets and controls. Data showed that the best carcass weight was 1423.66g for rabbits that fed on 15% olive cake meal+enzyme followed by group that fed on15% olive cake meal (1303.66g), finally, the control group that fed on basal diet (1097.33g) of growing NZW rabbits aged 8 weeks after weaning. In another study aimed to evaluate the dietary effects of olive pulp (OP) inclusion (20%) in rabbits, **Kadi *et al.* (2004)** concluded that crude olive cake seems to replace the alfalfa-like source of fiber and did not influence the performance or carcass characteristics.

Abdel-Magid (1997)studied the effect of date seed and olive cake meal on carcass traits of NZW growing rabbit and found that the highest carcass weight (1126 g) was recorded by rabbits fed 5% date seed meal , while the lowest one (916g) was recorded by rabbits fed 15% date seed meal. Also, dressing percentage were not affected significantly by different feeding treatments, the higher value was recorded by rabbits fed 10% date seed meal , while the lower value was obtained by rabbits fed 15% olive cake meal (OCM). The same author also, found a significant differences ($P<0.05$) in liver, kidneys and heart weights. Higher liver weight (65.0 g) was recorded by rabbits fed 5% date seed and the lowest weight (43.0 g) was recorded by rabbits fed 5% and 10% OCM. Also, kidneys weight showed significant differences among treatment groups and ranged from 12.3g to 15g and at the same time heart weight showed the same trend and ranged from 6.33 g to 10.7g.

Attia (1994) demonstrated significant effect due to ground date pits GDP levels containing diets on the different parts and organ percentages of rabbits except the liver and heart fat. Similarly, feeding rabbit on control diet yielded proportionally highest carcass percentage (55.68%). While, that group fed 15% GDP yielded proportionally lower carcass percentage (48.82%). On the other hands, **Sharaf (1968)** reported that date seeds increased body weight and organs (heart, liver, spleen, kidney and ovary) in rabbits.

It could be concluded that, feeding NZW rabbits on diet containing 6.25% OC or DS instead of the same ratio of yellow corn in the commercial diet has a beneficial effects, due to the lowest price of these agro-industrial by-products.

Moreover, these diets hadn't any bad effects on peripheral or internal signs of health, kidney, liver, adrenal, thyroid functions, blood characteristics or growth performance. Furthermore, there was an improvement in dressing percentage and total edible meat.

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الملخص العربي

تفل الزيتون أونوى البلح في علائق ألأرانب النيوزيلندي الأبيض: ١. التأثير على أداء النمو وبعض القياسات الفسيولوجية وصفات الذبيحة

أميرة عبد الله عبد الشافي[١]، سمير غنيم[١]، فخري العزازي[٢]، رضا خليفة[٢]

١ قسم الإنتاج الحيواني- كلية العلوم الزراعية البيئية بالعريش- جامعة قناة السويس

٢.قسم الإنتاج الحيواني والثروة السمكية- كلية الزراعة بالإسماعيلية- جامعة قناة السويس

توجد فى مصر وفى سيناء بصفة خاصة فجوة كبيرة بين المتاح من الأعلاف واحتياجات الحيوانات الغذائية. وأجريت هذه التجربة لدراسة تأثير استخدام بعض مخلفات التصنيع الزراعى مثل تفل الزيتون ونوى البلح المطحون كاحلال جزئى محل الذرة الصفراء فى العليقة التجارية على معدل النمو وبعض الخصائص الفسيولوجية وصفات الذبيحة للأرانب النيوزيلندى البيضاء. تم استخدام ٣٠ أرنب بعد الفطام (٢٨ يوم) بمتوسط وزن ٤٦٥ جم وتم تقسيمها لثلاث مجموعات متساوية تحتوي كل مجموعة على ستة ذكور وأربعة إناث. وتم تغذية كل مجموعةعلى واحدة من العلائق الثلاثة وهى عليقة تجارية (كمجموعة مقارنة) وعليقة تحتوي ٦,٢٥٪تفل زيتون وثالثة تحتوي ٦,٢٥٪ مجروش نوى البلح. وفي نهاية التجربة (١٢أسبوع) تم ذبح أربعة إناث وثلاثة ذكور اختيرت عشوائياً من كل مجموعة لدراسة مواصفات الذبيحة ومكونات الدم. أظهرت الدراسة وجود تأثيرات مفيدة نتيجة التغذية على العلائق المحتوية تفل الزيتون ونوى البلح، حيث كان الوزن النهائي٢,١٤كجم لمجموعة المقارنة و ٢,٤٩كجم لمجموعة تفل الزيتون و ٢,٤٤كجم لمجموعة نوى البلح. وكانت قيم معدلات النمو اليومي ١٨,٣ و٢٢,١ و٢١,٦جم نمو يومي للمجموعات الثلاث على الترتيب. ايضاً كانت قيم متوسطات التحويل الغذائي ٤,٧ و٤,٢ و ٣,٩ كجم علف لكل كجم نمو للمجموعات الثلاث على الترتيب. علاوة على ذلك فإن إحلال هذه المصادر العلفية لم يكن لهتأثير ضار على المظاهر الخارجية الدالة على صحة الحيوان (درجة حرارة المستقيم وعدل التنفس) وكذلك العلامات الداخلية حيث لم تتأثر وظائف الكُلى والكبد ولا وظائف الغدة الدرقية أوالغدة الكظرية أيضاً لم تُظهر صورة الدم أي تأثيرات سلبية نتيجة المعاملة. أيضاً تحسنت صفات الذبيحة فكانت نسبة وزن الذبيحة والأجزاء المأكولة ٤٨,٦ و٥٧,٩٪ في مجموعة المقارنة و ٥٣,٩ و ٦٢,٨ ٪ في مجموعة تفل الزيتون، أما المجموعة المغذاة على عليقة تحتوي نوى البلح فكانت ٥١,١ و ٦٠,٨ ٪ على الترتيب.

الكلمات الإسترشادية: الأرانب ، تفل الزيتون، نوى البلح، النمو، الدم ، الهرمونات ،الذبيحة.

المحكمـــــون:

١- **أ.د/ عبد الشافى عبد السميع محمد** أستاذ بقسم الإنتاج الحيواني والداجنى، كلية العلوم الزراعية البيئية بالعريش، جامعة قناة السويس، مصر.

٢- **أ.د/ عبد المجـــيد السيد نصـــــر** أستاذ بقسم الإنتاج الحيواني، كلية الزراعة، جامعة الزقازيق، مصر.