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IMPACT OF CANOLA MEAL ON GROWING RABBITS PERFORMANCE AND MEAT QUALITY

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ABSTRACT

An experiment was conducted with 45 male growing New Zealand White (NZW) rabbits, four weeks old with an average initial body weight 479.6 g were used in the present study, to assess their growth performance and meat quality when fed a graded level of canola meal in ration . The experimental diets had inclusion levels of 0%, 5% and 10% canola meal in groups I (control), II and III respectively, fifteen rabbits per group for eight weeks feeding trial. In the end of, growth was assessed by measuring body weight gain (BWG). At 12 weeks of age five animals from each group were slaughtered for carcass evaluation and meat quality . Results showed that the effect of treatments on body weight gain was insignificant. Average daily gains during the study were 27.42 , 28.17 and 28.78 gm for control group and animals fed diets contain 5% and 10% canola meal, respectively. The canola meal at the levels of 5 and 10% of diet reduced both plasma triglycerides and cholesterol value as compared with control group. The differences between groups were significant in high-density-lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C). Both levels of canola meal in the ration had insignificant effect in dressing percentage as compared with control diet . The total unsaturated fatty acid percentage of meat increased linearly as the dietary level of canola meal increase in the same time significantly ($P<0.05$) increased total phenol and vitamin E in meat ; but insignificant in RBCs, WBCs, Hb and HCT.However the thiobarbituric acid (TBA) levels in meat was significantly ($P<0.05$) lowered by supplemented with canola meal in rabbit diet.

Keywords: Rabbits, Canola meal, growth performance , meat quality and serum biochemistry.

INTRODUCTION

Rabbit is herbehavior mono gastric animal ,it can utilize a wide variety of feed sources (Bamikole *et al.,* 2000). Therefore, several experimental studies were examined the canola meal to be introduce in the animal diet. Most of this studies were found that Canola meal as a good nutritional sources of feed value with a good amino acid balance , especially high levels of methionine, cystine and histidine. In addition to high levels of phosphorus, however the canola meal is limited by its relatively low levels of lysine and energy.Therefore, Newkirk (2009) recommended to be used for animals which require intermediate levels of energy and high levels of methionine , cystine and histidine . Moreover the benefit of Canola meal as contains choline (6500 mg/kg), biotin (0.96 mg/kg), folic acid (0.8 mg/kg), riboflavin (5.7 mg/kg), thiamin (5.1 mg/kg), vitamin E (13mg/kg) potassium (1.24%), sulfur (0.86%), calcium (0.64%), and iron (162 mg/kg), and an especially good source of selenium (1.1 mg/kg) and phosphorus (1.03%) were showed by Bell and Keith, 1991; NRC 1998 and Newkirk ,2009 .In the same trend,

other studies showed that canola meal has a significant phenol content, which implies their antioxidative power (Shahidi and Naczk, 1995).In addition, Hou et al (2004) found that Sinapic acid the main phenolic compound of canola constitutes over 73% of free phenolic acids and about 80–99% of the main phenolic acids mainly occurring as esters and glucosides, with the physiological benefits of the plant phenolics which have been attributed to their potential role in inhibiting lipid peroxidation, modulating cell signal transduction pathways and inducing apoptosis .Also,the results of Adeola *et al.,* (2014) showed that antioxidant activities of canola protein hydrolysates (CPHs) have the potential to be used as bioactive ingredients in the formulation of functional foods against oxidative stress, it inhibited linoleic acid oxidation .

The previous results lied to the conclusion that partial substitution of soybean meal (SBM) by canola meal caused an increase in feed conversation rate , slightly improved the animal performance in laboratory animal feeding (Enami and Safafar,2010) Howover. Tanawong *et al* (2013) added that Canola meal is alternative ingredients which may replace soybean meal in fed diets.the present study was conducted to examine the effect of feeding defferent levels of canola (0,5 and10%) on the growth performance and meat quality of New Zealand White rabbits.

MATERIALS AND METHODS

Animals and diets:-

Forty five weaned males New Zealand white rabbits, of average four weeks of age and 479.6 gm average live body weight were randomly distributed into three comparable groups; each of 15 kids. All experimental animals were housed in individual cages provided with continues feeders and automatic water. During the eight weeks experimental period animals were weighed individuallyby weekly intervals. Rabbits groups were fed diet without canola meal (control, group I), or with 50 g canola meal /kg diet (group II), or with 100 g canola meal / kg diet (group III). Chemically the canola meal contained 8.5 % moisture, 36 % crude protein, 3.7 ether extract, 12 % crude fiber, 33.1 % nitrogen free extract (NFE) and 6.7 % ash. Table 1 showed the composition of the three experimental diets covered nutrients requirements for the growing rabbits as recommended by NRC (1977).

Slaughter and Carcass Traits:

At the end of the experimental period (at 12 weeks of age) five animals from each experimental group were selected at random and slaughtered according to the Islamic rols using the procedure described by Abou- Ashour and Ahmed (1983). Life rabbits just before slaughter and after complete bleeding were weighed, then head, giblets (heart, liver and kidneys) were weighed, and the dressing percentage was calculated. all carcasses were divided longitudinal in two similar halves for carcass composition traits. Lean samples from different carcass parts as a percentage of the carcass in the animal are mixed for chemical analysis.

Table (1): Composition of experimented three diets fed to the rabbit groups.

Nutrients	Group I 0% Canola meal	Group II 5% Canola meal	Group III 10 % Canola meal
Barley	33%	33%	33%
Alfalfa hay 12% CP	28 %	26 %	25.5 %
Soybeans 44%	16 %	10 %	5 %
Canola meal	0	5%	10%
Wheat bran	15.5 %	17.5 %	17 %
corn gluten	1%	2%	3%
Molasses	3%	3 %	3 %
Di calcium phosphate	2.2 %	2.2 %	2.2 %
Calcium carbonate	0.4%	0.4%	0.4%
Premix *	0.3%	0.3%	0.3%
Na cl	0.3%	0.3%	0.3%
Methionine	0.1%	0.1%	0.1%
Anti fungi	0.1%	0.1%	0.1%
Ani toxin	0.05%	0.05%	0.05
Anti coccidia	0.05%	0.05%	0.05%
Total	100%	100%	100%
Crud Protein %	17.4	17.3	17.4
Crud fiber %	12.9	12.9	12.9
Energy	2513	2500	2500

*__Premix: Supplied per kg. of diet: 12000 IU vit.A; 2200 IU vit. D3; 10 mg vit. E; 2.0 mg vit. K3; 1.0 mg vit. B1;4.0 mg vit. B2; 1.5 mg vit. B6; 0.0010 mg vit. B12; 6.7 mg vit. PP; 6.67 mg vit. B5; 0.07 mg B8; 1.67 mg B9; 400 mg Choline chloride; 133.4 mg Mg; 25.0 mg Fe; 22.3 mg Zn; 10.0 mg Mn;1. 67 mg Cu; 0.25 mg I and 0.033 mg Se__

Blood sample collection:

Blood samples from the slaughter animals were tested shortly after collection for blood pictures determination including, red blood cells count (RBCs, 10^6 /mm^3), white blood cells count (WBCs, 10^3 /mm^3), hemoglobin concentration (Hb, g/dl) and hematocrite value (Hct, %) according to Drew et al. (2004). The blood samples were centrifugated at 3000 r.p.m. for 20 minutes to obtain blood plasma then stored at -20 ^oC for biochemical analysis. Total cholesterol and Triglyceride were determined according to Rifai *et al.,* (1999). Cholesterol LDL was determined according to Nauck *et al.,* (2002) and Cholesterol HDL was determined according to Grove *et al.,* (1979). Calculated atherogenic lipoproteins according formula described by Ray *et al.,* (2009): Atherogenic lipoproteins = Total cholesterol/HDL ratio (TC/HDL).

Evaluation of meat quality parameters:

Proximate analyses of meat were carried out according to the Association of Official Analytical Chemists. In particular, moisture, ash, and total nitrogen content were obtained using the N. 950.46B, 920.153, and 928.08 methods, respectively (AOAC, 2012). The total protein content was calculated using Kjeldahl nitrogen and a conversion factor of 6.25. The total lipid content was extracted from 5 g of each homogenized sample and calculated gravimetrically (Folch *et al.,* 1957).

Determination of vitamin E , TBA and the water holding capacity WHC:-

Vitamin E (α–tocopherol) in rabbit meat were assayed using HPLC, according to leth and sondergaro (1983), and the Malondialdehyde (TBA) was determined according to method described by Botsoglou *et al.,* (1994). The water holding capacity (WHC) was estimated by (Nakamura and Katoh, 1985) method.

Determination of the lipid fatty acid profile of rabbit meats:-

The fatty acids (FA) profiles of extracted lipid of freezing (-20°C) meats taken after the seven day and after 30 days of slaughter were determined by gas-chromatography (Shimatzu 2010 plus equipped with a flame ionization detector; Japan) according to method by AOAC (2012). Separation of the resulting fatty acid methyl esters (FAME) was carried out on an Agilent (J&W) capillary column (60 m×0.25 mm I.D.) coated with a DB-Wax stationary phase (film thickness of 0.25 mm). The individual FA methyl esters (FAME) were identified by reference to the retention time of authentic FAME standards. The relative proportion of each FA in the samples was expressed as a percentage of total FA and calculated with GC software.

Total phenolics and Antioxidant capacity (DPPH):-

Total phenolics were determined according to the Folin–Ciocalteu method (*Singleton et al.,* 1999). Antioxidant capacity was determined by scavenging of the radical 2, 2-diphenyl-1-picryhydrazyl ($DPPH^{\cdot}$), as described by Tadolini, *et al.,* (2000).

Statistical analysis:-

Data were subjected to a one-way analysis using SAS (2000). Variables having significant differences were compared using Duncan's Multiple Range Test (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

Growth Performance Traits:

Table 2 shows the effect of supplemented rations on body weight and daily gain of the expermental NZW male rabbits no significant differences between the body weights coud be noticed ; of the final body weights were 2015, 2060 and 2090 gm for control group, rabbit fed 5% and 10% canola meal, respectively. The average daily gains followed the same trend of the body weight gains to be higher for rabbits fed canola meal than control group; it were 4.95 % in animal fed 10% Canola meal followed by 2.73 % in that fed 5% canola meal, in relation to the control group. For comparison, Scapinello, C. *et al* (2001) found that partial or total substitution of soybean by canola meal in rabbit diet did not change (P >0.05) in live weight . similar results were recorded by Petit and Veira (1994) reported that finishing steer calves fed canola meal increased average daily gain as compared control group. However , the highest improvement found in feeding canola meal may be due to its contains of high level of free fatty acids, unsaturated fatty acids (such a linolenic acid) and omega-3 fatty acids with has main effect on optimum lipid metabolism and subsequent body weight (Taylor, 2000). Moreover, Rahimi *et al*., (2011) found that the highest level of essential fatty

acids, unsaturated fatty acids and mal absorption of fatty acids in canola can play a major role in feed conversion ratio with reduces the rate of feed passage through the digestive system, which allows a better absorption of all nutrients in the diet .

Table (2): Effect of canola meal supplemented rations on body weight and daily gain in male NZW rabbits

Items	Group I 0% Canola meal	Group II 5% Canola meal	Group III 10 % Canola meal	SE
Animal number	15	15	15	
Initial Body weight (gm) (4^{th} weeks of age)	479	482	478	23.4
Final body weight(gm) (12^{th} weeks of age)	2015	2060	2090	60.3
Total body gain (from 4^{th} to 12^{th} week)	1536	1578	1612	38.2
daily gain (gm)	27.42	28.17	28.78	1.2

Carcass characteristics:-

Carcass traits of rabbits for different groups are shown in Table (3). There were in significant differences in the final slaughter body and carcass weights among the different groups. It could be noticed that the canola meal 10% groupIII showed the highest final slaughter body and carcass weights (2070 and 1306 gm, respectively), however the control was the lowest (2010 and 1245 gm respectively) . Also , the carcass traits of the experimental groups did not showed significant differences: however the highest dressing percentage was showed with canola meal 10% group III followed by canola meal 5% and the control group had the lowest percentage , without significant differences nearly similar results were obtained by Rahimi et al., (2011) that dietary supplementation with canola meal improved the performance and carcass traits in broiler chicks and improved feed intake and feed conversion ratios in the broiler chicks.

Table (3): Carcass traits of in male NZW rabbits fed experimental diet.

Carcass traits	**Group I 0% Canola meal**	**Group II 5% Canola meal**	**Group III 10 % Canola meal**	**SE**
Animal number	5	5	5	
Slaughter body weight (g)	2010	2030	2070	64.3
Hot carcass weight (g)	1245	1265	1306	45.2
Dressing (%)	61.9	62.2	63.1	1.2
Fore parts (%)	16.01	16.0	16.1	0.41
Middle part (%)	12.1	12.2	12.25	0.32
Hind parts (%)	19.2	19.1	19.77	0.36
Head (%)	9.8	10.2	10.06	0.19
Liver (%)	3.1	3.02	3.2	0.11
Kidney (%)	0.62	0.6	0.67	0.03
Heart (%)	0.30	0.34	0.32	0.02
Lung (%)	0.77	0.76	0.74	0.04

Economical evaluation of the experiment:

The economical efficiency of dietary treatments of the three experimental groups is presented in Table; 4. Generally, the profitability of using canola meal as percent of soybean in rabbit diets depends upon the price of tested diets and its reflection on the growth, carcass and meat performances of rabbits fed these diets. It was found that the Cost of one kg feed; (LE) was decreased by 2.33 and 5.6 % for groups II and III respectively; compared with control diet .No doupt that : these results is relation to the low price of canola meal and the improvement of traits performances compared to the control group. Relative economic efficiency values were 105 and 110.1 % for groups II and III which received canola meal 5 and 10% ,respectively in relation to control diet. Also , the feed cost per kg live body weight was decreased with increasing the level of canola meal in diet . These results may be attributed to the interaction of many factors in the high nutritive value of canola meal

Table 4: Economical evaluation of the experimental groups

Item	Group I 0% Canola meal	Group II 5% Canola meal	Group III 10 % Canola meal
Marketing weight; Kg	2.015	2.060	2.090
Feed consumed (as it is; kg) / rabbit;	6.8	6.72	6.76
Costing of one kg feed; LE)	3.00	2.93	2.83
Total feed cost; (LE)	20.4	19.68	19.13
Total body gain (kg)	1.536	1.578	1.612
Feed cost / kg LBW (LE)	13.28	12.47	11.86
Relative economic efficiency	100	105.5	110.1

Hematological parameters :-

The results of hematological parameters of New Zealand white male rabbits are presented in table (5) Difference between rabbit fed canola meal and control group were not significant in RBCs , WBCs , Hb and HCT. The present results were in agreement with Sina *et al* (2012) who reported that haemoglobin concentration, packed cell volume (HCT) and total erythrocyte count were not affected by canola meal used in young broiler diets . Plasma cholesterol level was significantly decreased by 19.7 and 10.4 % in group fed 10% and 5% canola meal respectively , related to control group. Similar result showed that the triglyceride and cholesterol concentration was decreased if canola meal was added to the diet (Wilson *et al*., 2000; and Berger *et al*., 2004). The improvement cholesterol level in feeding canola meal (Table 5) explained by Cicero and Gaddi (2001) the effect of components of canola meal including fatty acids, triterpene alcohols, phytosterols, tocotrienols, and *α*-tocopherol . In addition to these components, the phytosterols including gamma oryzanol are thought to be responsible for changes in blood cholesterol concentrations (Vissers *et al.,* 2000). Generally, the blood plasma triglyceride, HDL and LDL concentrations followed significantly ($P<0.05$) the same trend of cholesterol concentration to be lower for rabbits fed diet contain canola meal than control group(Table5).

Blood plasma LDL concentrations were 45.8, 38.2 and 32.5 mg /dl for control group, rabbit received at canola meal 5% and 10%, respectively. The highest decrease of LDL concentration in blood plasma in the case of feeding diet contain canola meal 10% may be due to canola meal prevent the accumulation of LDL cholesterol by enriching the monounsaturated fatty acid (oleic acid) as well the unsaturated fatty acids which consider to heart-friendly acids (Denekbasi and Karayücel, 2010).

Table (5): Effect of canola meal on blood parameters of growing NZW rabbits

Plasma parameters	Group I 0%Canola meal	Group II 5% Canola meal	Group III 10 % Canola meal	SE
Red blood cells ($x10^6$ /mm^3)	5.1	5.3	5.45	0.1
White blood cells ($x10^3$ /mm^3)	6.7	6.5	6.76	0.11
Hemoglobin(mg/dl)	12.2	12.4	12.5	0.14
Hematocrit %	35.8	36	36.2	1.46
Triglyceride (mg/dl)	96[a]	91.4[b]	87.5[c]	2.22
Total Cholesterol (mg/dl)	86 [a]	77 [b]	69 [c]	1.83
HDL (mg/dl)		34.6[b]	31[c]	0.81
LDL(mg/dl)	45.8[a]	38.2 [b]	32.5 [c]	0.87
VLDL(mg/dl)	4.2	4.3	4.2	0.12
Atherogenic lipoproteins	2.39	2.23	2.23	0.04

a, b, c,: Means in the same row bearing different superscripts are significantly different. *:P ≤ 0.05, NS: not significant.

Chemical composition of rabbit meat fed canola meal

The chemical composition of rabbit meat fed canola meal were presented in Table 6. The crud protein and lipid in rabbit meat are important nutritional parameter in spite of the deference between the control and canola meal 5 and 10% groups in chemical composition of meat , there differences were not significant, Moreover the protein and fat contains in the meat of groups fed canola meal were improved related control meat group fed normal concentrate diet with only soybean in the ration. The enrichment by increased protein% and decrease lipid % in meat may be due the role of omega 3 fatty acids in canola meal which decrease fat deposition by reducing very low density lipoprotein levels and decrease fat in blood vessels (Yang et al. 2012).The effect of canola meal on vitamin E and DPPH contain (Table 6) were significant. This could explained by the canola meal high contain of vitamin E (NRC 1998); the role of phenolic which inhibiting lipid peroxidation, modulating cell signal transduction pathways and inducing apoptosis (Hou, et al., 2004). The remarked significant increase of fed the examined two ratio canola meal may be improve quality of meat and water holding capacity Zhang *et al.,* (2011) .

The effect of dietary supplementation with canola meal on meat pH was significantly differed ($p<0.05$) . pH was varied from 5.76 in control group to 5.44 in 10% canola meal (group III) . Generally Bozkurt, (2006) found that decline in the pH value is very important as it inhibits growth of undesired bacteria.The obtained pH values of rabbit meat were could be affected by addition of plant polyphenols from canola meal, resulted in decreasing pH values . The TBA and DPPH values are illustrated in Table (6). It could be

noticed that TBA values in rabbit meat were lowered (P<0.05) by feeding canola meal as compared to control diet. The decrease of TBA may be due to the high level of vitamin E concentration in rabbit meat fed canola (table ;6) which made reduce the lipid oxidation . However the observed negative correlation between the α-tocopherol content of the muscle and the rate of lipid oxidation (TBA value) could be found in the present study this is supported by previous studies of Corino *et al*.; (2007); Oriani *et al*. (2001); Botsoglou *et al*. (2004); and Lo Fiego *et al*. (2004) table 6 also showed improvement DPPH%. This may be caplained by the enrichmentof canola meal in polyphenols, including caffeic, cinnamic, p-coumaric, ferulic, gentisic, p-hydroxybenzoic, salicylic , sinapic and syringic acids (Shahidi and Naczk, 2003) with high radical-scavenging activities (Kosinska,*et al*, 2005).

Table (6):Chemical composition of rabbit meat fed canola meal

Variable	Group I 0%Canola meal	Group II 5% Canola meal	Group III 10 % Canola meal	SE
Moisture	74.7	74.15	72.81	2.26
Protein	21.31	21.77	23.18	1.21
Lipids	2.64	2.62	2.56	0.49
Ash	1.35	1.46	1.45	0.30
Vitamin E (mg /kg)	2.6^{c}	2.85^{b}	3.13^{a}	0.09
Total phenolic (mg/g dw)	34.5	35.4	37.2	0.5
TBA (mg/100g)	7.51^{a}	6.21^{b}	5.29^{c}	1.15
DPPH• activity Scavenging activity %	43.18^{c}	49.5^{b}	58.9^{a}	1.7
PH	5.76^{a}	5.74^{b}	5.44^{c}	0.13
WHC (%)	32.98^{a}	37.34^{b}	39.10^{d}	0.53
Cooking loss (%)	34.65^{c}	28.47^{b}	21.69^{a}	0.44

a, b, c,: Means in the same row bearing different superscripts are significantly different. *:P ≤ 0.05, NS: not significant.

Fatty acid profile

Fatty acid profile of frozen meat at the days 7 and 30 post slaughter is illustrated in Table 7 . The proportions of polyunsaturated fatty acids were higher (P<0.05) in groups fed on canola meal , while the proportion of saturated fatty acids (SFAs) were lower (P<0.05) as compared to the control in the days 7 and 30. This results might be due to canola meal had a significant phenol content, which implies their antioxidative power (Shahidi and Naczk, 1995). However, Sinapic acid the main phenolic compound of canola meal constitutes (over 73% of free phenolic acids and about 80–99% of the main phenolic acids) mainly has been attributed to their potential role in inhibiting lipid peroxidation, to be protective fatty acids from oxidative damage during storage (Hou, et al., 2004). These results supported by the results of He et al. (2013) who reported that the level of polyunsaturated fatty acids (PUFA) in diaphragm was higher in feedlot steers supplemented with canola meal at 30% relative to 15% .the same investigators also reported that the percentage of conjugated linoleic acid (CLA) and vaccenic acid (VA) and total n-3 fatty acids in diaphragm increased as a level of canola meal. However,

as evidenced by the results of Rule et al.(1994) and He et al. (2013) that animal tissue fatty acid composition can be manipulated by feeding unsaturated fat sources such as canola seed or pressed canola meal.

Table (7): Fatty acids profiles as present of total fatty acids of rabbit frozen meat fed with canola meal .

Fatty acids composition	Group I 0%Canola meal (after 7 day)	after storage period (30 days)	GroupII 5%Canola meal (after 7 day)	after storage period (30 days)	GroupIII 10%Canola meal (after 7 day)	after storage period (30 days)	SE
C10:0	-	1.2	0.61	-	0.15	1.28	0.08
C12:0	0.16	0.58	0.34	-	0.16	0.36	0.03
C14:0	2.19	2.39	1.36	1.63	1.2	1.6	0.03
C15:0	0.55	0.22	1.04	0.77	0.72	0.85	0.04
C16:0	27.13	30.6	22.11	25.12	23.8	22.68	0.61
C17:0	0.86	-	1.33	1.24	1.32	1.53	0.045
C18:0	8.3	10.2	7.24	8.28	2.1	3.7	0.13
C22:0	1.62	2.145	0.97	1.46	-	-	0.033
Total SFA	40.81	47.335	35	38.5	29.45	32	0.65
C14:1ω5	0.25	-	-	-	0.18	0.22	0.026
C16:1ω7	8.8	7.82	15.3	16.2	16.2	20.3	0.69
C16:1ω9	0.31	-	0.72	0.83	0.67	0.58	0.053
C18:1ω 9	23.75	22.27	20.5	18.24	14.8	12.9	0.17
C18:1ω 7	-	-	2.18	1.84	-	-	0.023
C18:1ω 5	0.86	0.25	0.56	0.37	-	-	0.046
C20:1ω9	4.25	3.99	3.01	3.76	8.87	6.68	0.063
C22:1ω9	0.26	0.36	-	-	0.23	0.33	0.034
Total MUFA	38.48	34.07	42.27	41.24	40.95	41.1	0.78
C18:2ω6	16.2	15.6	16.8	15.75	18.38	16.81	0.38
C18:2ω5	0.44	0.105	0.54	0.18	2.4	1.69	0.062
C18:2ω4	-	-	-	-	0.39	0.28	0.035
C16:3ω4	-	-	-	-	0.32	0.75	0.029
C18:3ω6	0.27	0.103	0.28	0.25	0.53	0.41	0.062
C18:3ω3	2.37	1.45	2.49	1.7	4.5	3.8	0.284
C18:3ω4	0.3	0.238	0.43	0.36	0.83	0.74	0.06
C20:4ω6	0.13	0.1	0.93	0.43	1.25	1.21	0.13
Total PUFA	19.71	17.595	21.47	18.67	28.6	25.69	0.93
TUSAT	58.52	51.66	63.74	59.9	69.55	66.79	1.12

CONCLUSION

In spite of ; the present results which showed that canola meal did not affect the growth , haematolology but it showed effect on plasma biochemistry and meat quality of rabbits; It may be recommended as good feeding stuff addetive for concentrate feed formulation for rabbits at 5% or 10 % levels. This recomdation basicd on the present obtaine resultes regarding the economical evalution and substitate the soybean as a part by the beinefit of the canola meal and reach to nearly similar results in growth and carcass performances .

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تاثير كسب الكانولا على اداء الارانب النامية وجودة لحومها

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لمركز الاقليمى للاغذية والاعلاف –مركز البحوث الزراعية –الجيزة –مصر

اجريت الدراسة لتقيم تاثير كسب الكانولا على اداء الارانب النامية وجودة لحومها .استخدم 45 ارنب نيوزيلاندى ابيض ذكر مفطوم على عمر اربع اسابيع متوسط الوزن 479.6 جرام . قسمت الارانب عشوائيا الى ثلاثة مجموعات متساوية بكل منها 15 ارنب. تم اسكان الحيوانات فى اقفاس منفردة .استمرت التجربة لمدة 8اسابيع . المجموعة المقارنة غذيت على عليقة بها 0 % كسب كانولا . المجموعة الثانية 5% كسب كانولا المجموعة الثالثة 10% كسب كانولا وعند عمر 12 اسبوع تم ذبح 5 حيوانات من كل مجموعة .لتقيم جودة الذبيحة وجودة اللحم: .وكان اهم النتائج المتحصل عليها عدم وجود فروق معنوية بين المعاملات فى كل من الوزن الحى ومعدل النمو اليومى وكان متوسط معدل النمو اليومى 27.42 و 28.17 و 28.78 لكل من المجموعة المقارنة والمجموعة المغذاة على 5% و 10% كسب كانولا على التوالى . المعامله بكسب الكانولا حسن نسبة التصافى ومحتوى اللحوم من فيتامين هـ والفينولات الكلية . كان تاثير التغذية بكسب الكانولا على عدد كرات الدم الحمراء ونسبة الهيموجلوبين والهيماتوكريت غير معنوى بالمقارنة بالمجموعة المقارنة . كذلك استخدام كسب الكانولا قلل نسبة الكليسترول والجليسريدات الثلاثية LDL-c وزود مستوىHDL-c والاحماض الدهنية الغير مشبعة فى المجموعتين المغذاة على كسب الكانولا اذا قورنت بالمجموعة المقارنه. التغذية بكسب الكانولا بنسب 5 و 10% قللت من تركيز TBA اذا قورنت بالمجموعة الضابطة.