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Evaluation of Fresh and Dry Olive Pulp as Dietary Ingredients For New Zeland Rabbits

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Abstract

In a feeding trial the proximate composition, acceptability, of either fresh or dry olive pulp and the effect of its inclusion in NewZeland white rabbits diets on growth performance parameters, some biochemical parameters and carcass traits were investigated . A total of 90 , five weeks old, New Zeland white rabbits with an average weight of 650.5 ±20 gm were randomly assigned to five equal (each of 18) and were fed on five isonitrogenus (% CP) and simi-isocaloric (kcal ME/kg) diets for seven weeks.The first group was served as control and fed on the basal diet ,while rabbits in groups 2 and 3 were fed on diets in which fresh olive pulp (FOP) were included at a rate of 5 and 10% of the diet respectively , and groups 4 and 5 were fed on in which dry olive pulp (DOP) were included at a rate of 2.5 and 5% of diets . Generally all diets proved to be acceptable and palatable dietary for New Zeland rabbits and promoted significant (P< 0.05) increase final live weight and improved feed conversion ratios (FCR) along the whole experiment as compared to the control group. Inclusion of either FOP and DOP at the aforementioned levels resulted in significant (P< 0.05) decrease in serum total lipids, cholesterol, triglycerides and glucose , however total serum protein, serum alanine amino transferase (ALT) , aspartate amino transferase (AST) , creatinine, calcium and phosphorous levels did not significantly affect . On The other hand , carcass traits and Chemical composition of the rabbit carcasses concerning Dry matter (DM) , Crude rotein (CP), Ether extract (EE) and total ash % contents were also improved by dietary treatments.

Key words: Olive , ingredient , nutritive value , New zeland rabbit

Introduction

The limited feed resources and the lack of sufficient feedstuffs to meet the nutrient requirements of livestock is considered one of the most critical problems facing livestock industry in Egypt as well as countries of similar conditions. In Egypt large areas are cultivated by olive trees specially in the north-western cost zone Therefore, there are great amounts of olive by-products. It has been estimated that each olive tree could produce 22 kg leaves and twigs per year and 5 kg olive cake per 100kg olive fruits.

Olive pulp (the residue from the solvent extraction of olive oil) is a waste product of high nutritive that is under utilized or even discarded due to lack of data concerning its nutritional values. From the economic point of view, the conversion of such waste product into acceptable feed stuffs for animal feed industry become an important task to be used as substitutes for expensive traditional feeds and to avoid its disposal problems.

In the other hand rabbits can be successfully used on feed stuffs that are noncompetitive with human food , as they have a good ability to eat and digest more fibrous feed such as forages grain milling by products ,food wastes and surplus garden products in comparison to poultry Cheeks(1987).

The successful use of Olive pulp as dietary ingredients for many animal species were reported by many investigators.

Youssef et al. (2001) reported that adding of olive pulp at 40% to concentrate ration of pregnant and lactating ewes is recommended during the dry season to decrease the feed cost and improving animals performance

Several attempts have been made for evaluation the chemical composition and nutritive value of some untraditional feeds inclusion in complete pelleted rabbit diets to obtain satisfactory level of production . Certain native crop residues and other agricultural products were tested for suitability as feed ingredient for rabbit aiming in reduction of ration costs , **kashaba, et al .,(2001).**

In corporation of cheap untraditional feed stuffs such as the agro industrial by products ,in the animal diets may participate in solving the problem of feed shortage ,decrease the feeding cot and alleviate the pollution problems, **Amber et al. 2002 .**

Olive pulp may be defined the residue from the solvent (hexane or trichloroethylene)on squeezing extraction of olive oil. Olive pulp have been demonstrated by many invest igators as an energy source for sheep and goats **,Abou El-Nasr ,(1985) ,El-Shaer et al.,(1986) and khamis et al (1989).**

Alicata , et al., (1986) studied the possibility of using olive pulp as agro-industrial by product in rabbits diets and its reflexes on caecum micro-

flora activity and the acidic composition of the caecum contents and they concluded that live pulp can be usefully introduced into rabbit diets .

The present study was conducted to investigate the ,palatability, acceptability of either fresh or dry olive pulp and the effect of its inclusion in New Zeland white rabbit diets on growth performance parameters, some biochemical parameters and carcass traits so as to offer the experiment results to poultry farmers as a reference .

Materials and Methods

Experimental animals:-

A total of 90 apparent healthy , five weeks old, NewZeland white rabbits with an average initial weight of 650.5 ±20 gm were randomly assigned to five equal groups (each of 18) , kept under similar environmental and hygienic conditions and were fed on five isonitrogenus (% CP) and simi-isocaloric (kcal ME/kg) pelleted diets Table (1) for seven weeks experimental period . The first group was served as control and fed on the basal diet, while rabbits in groups 2 and 3 were fed on diets in which fresh olive pulp (FOP obtained) were included at a rate of 5 and 10% of the diet respectively , and groups 4 and 5 were fed on in which dry olive pulp (DOP) were included at a rate of 2.5 and 5% of diets . The rations are composed to satisfy the nutrient requirement of the intensively reared rabbit (mixed feed) as concentration kg-¹corrected to a dry matter content of 900 g kg.

Body weight gain was recorded periodically .

At the end of experiment, the rabbits were fasted for 12 hr , and blood samples were collected from retroorbital venous plexus of the eye using heparinized capillary tubes and left to clot at room temperature,clear non hemolyzed sera were used for determination of,

Serum total lipids (**Frings et.al,1970**) , cholesterol (**Allian et.al,1974**), triglycerides (**Wahlefeled ,1974**) , serum total protein (**Doumas , 1975**) , serum albumin (**Doumas et.al , 1971**) , serum globulins (**Coles , 1974**), glucose (**Dubowski, 1962**) , serum ALT & AST (**Retmans and Frankel,1957**) . At the same time three rabbits were taken randomly to study carcass traits and Chemical composition of the rabbit carcasses concerning dry matter (DM) , crude protein (CP), ether extract (EE) and total ash % according to the method described in (**A.O.A.C.1980**).

Statistical analysis of the data was done according to **Snedecor and Cochran (1980)** .

Table (1) Composition and calculated analysis of the experimental diets

Groups / Ingredient%	Group (1)	Group (2)	Group (3)	Group (4)	Group (5)
yellow corn	35	30	25	30	25
Wheat bran	27	27	27	27	27
SBM (44%)	15	15	15	15	15
FOP	-	5	10	-	-
DOP	-	-	-	2.5	5
Clover hay	18	18	18	20.5	23
Molases	3	3	3	3	3
Lime stone	1.4	1.4	1.4	1.4	1.4
Vit. & Min. premix	0.3	0.3	0.3	0.3	0.3
Salt	0.3	0.3	0.3	0.3	0.3
Total	100	100	100	100	100
Calculated analysis:					
ME Kcal/kg	2128	2110	2093	2055	1988
CP%	16.72	16.69	19.67	16.96	17.31
CF%	7.97	9.16	10.35	8.88	9.57
EE%	3.67	3.98	4.27	3.7	3.73
ASH%	4.05	4.21	4.77	4.15	4.25

Composition of minerals and vitamins per 3kg: *Vit.A 12,000,000I.U.-Vit.D3 1,500,000 I.U.- Vitamin E 50,000mg.- Vitamin K 2,000mg.- vitamin B1 2,000mg.- Vitamin B2 6,000mg.- Vitamin B6 2,000 mg.- Vitamin B12 10 mg.- Niacin 50,000mg.- Calpan 20,000 mg.- Biotin 200 mg.- Folic Acid 5,000 mg.- Choline chloride 50% 400,000mg.- Magnesium 400,000 mg.- Zinc 70,000 mg.- Manganese 30,000 mg.- Iron 75,000mg.- Copper 5,000 mg.- Iodine 750 mg.- Selenium 150 mg.- Cobalt 250 mg.- Calcium carbonate AD 3,000 Gm.*

Table (2) Chemical composition of experimental ingredients used

Ingredients	Dry matter %	C.P %	E.E. %	C.F.%	Ca %	P %	Ash %
Hay	89.7	13.5	1.7	31.2	1.35	0.21	5.72
Wheat Bran	98.3	15.5	4.45	10.7	0.17	1.08	5.35
Yellow corn	89	9.7	3.9	1.95	0.03	0.26	7.2
SBM (44%cp)	88.5	43.75	1.87	7.9	0.31	0.63	6.75
Molasses		2	-	5			10.3
DOP	88.4	9.1	12.9	19.2	0.36	0.09	8.5
FOP	51.5	5.1	5.8	9.6	0.17	0.04	3.9

Results and discussion

Growth Performance

The data of growth Performance parameters are shown in table (2). Results indicated that the use of either FOP or DOP at aforementioned levels significantly ($p<0.05$) improved body weight gain and feed conversion ratios in comparison with control groups.

The positive effects of the dietary inclusion of these by-products on growth performance parameters can be attributed to the improved feed conversion, These observations were consistent with observations of **Ben Rayana et al. (1994)** who found that the inclusion of olive cake in diets of rabbits at levels of 11.5 and 23% for seven weeks feeding trial resulted in significant increase in weight gain and improved feed conversion .

Ghazalah and El-shahat (1994) observed a significant increase of weight gain of rabbits when olive kernel meal replaced 50% of barley, however higher levels of replacement (75 and 100 %) had a significant negative effect .

On the other hand **Tortuero et al (1989)** reported that the inclusion of olive pulp as a substitute of 10 and 20% of alfa alfa meal did not significantly affect weight gain and feed intake of rabbits .

Biochemical changes:

The data regarding the effect of dietary inclusion of either FOP or DOP at aforementioned levels on some selected blood parameters are stated in table (4). **Mehrez A.Z. and Mousa M.R.M. (2011)** reported that Serum total protein, albumin, globulin, glucose, cholesterol, urea-N, Glutamic-oxaloacetic Transaminase (GOT) and Glutamic-pyruvic Transaminase (GPT) were insignificantly ($p<0.05$) affected with olive pulp inclusion.

The results indicated that total serum protein, albumin, serum alanine amino transferase (ALT) , aspartate amino transferase (AST) ,alkaline phosphatase, creatinine, calcium and phosphorous levels did not significantly affect by any of the dietary treatments which indicate that, the liver and kidney functions are normal ,and the inclusion of either FOP or DOP at these levels has no hepatotoxic or nephrotoxic effects on young growing NewZeland white rabbits .

On contrarily the serum triglycerides, cholesterol were significantly ($p<0.05$) decreased

Carcass traits

Concerning the influence of dietary inclusion of the olive pulp on the carcass characteristics of rabbits at 12 weeks of age was presented in the table (4). The obtained date showed that there were no significant differences in the carcass traits represented by carcass weight.

Conclusion

It could be concluded that the growth performance, as well as the carcass characteristics and to some extent most of serum biochemical parameters were unaffected

Table (3) growth performance traits of exp. Rabbits

Groups / Items	Control 1	2	3	4	5
Body weight 12 g/head	2050.15 ± 180.3	2250 ±175.1	2300 ±186.4	2200 ±190.2	2280 ±195.2
Weight gain (g/ head)	1300 ±158.2	1600 ±186.2	1570 ±148.2	1630 ±150.2	1550 ±160.1
Feed consumption (g) head	6720.8 ±650.3	7806.3 ±604.2	7080.5 ±600.1	7889.2 ±701.2	7285.1 ±715.5
Feed conversion	5.167	4.86	4.5	4.9	4.7

Table (4): Carcass traits and chemical analysis of meat for growing NZW rabbits fed diets containing different levels of dried and fresh OP.

Groups / Items	Control	FOP5%	FOP10%	DOP2.5%	DOP5%
	1	2	3	4	5
Dressing	55.7	56.2	56.3	55.2	57.2
Liver heart (g)	73.2	75.7	78.4	77.3	80.2
Chemical analysis	31.2	33.8	35.4	34.7	35.4
DM%	22.8	24.6	22.5	24.1	23.4
Prot.%	7.2	7.6	7.6	8.2	7.99
Fat%	2.6	2.4	2.3	2.7	2.19
Ash%					

Table (5): Serum biochemical changes in NZW rabbits as affected by feeding diets with different inclusion rates O.P

Groups / Items	Control	FOP5%	FOP10%	DOP2.5%	DOP5%
	1	2	3	4	5
Total prot. (g/dL)	6.50 ±0.58	6.71 ±0.45	6.75 0.50±	6.68 ±0.67	6.8 NS ±0.70
Albumin (g/dL)	3.25 ±0.25	3.4 ±0.15	3.55 ±0.30	3.5 ±0.35	3.6 NS ±0.25
AST (uIL)	38.5 ±3.08	40.05 ±3.15	39.15 ±4.15	41.2 ±3.18	40.3 NS ±3.14
ALT (U/L)	29.5 ±1.25	28.9 ±1.50	29.25 ±1.70	30.12 ±1.65	29.9 NS ±1.72
A,Lkaline Phosphatase (U/dL)	28.15 ±1.33	29.1 ±2.15	28.7 ±1.45	30.2 ±1.57	30.01 NS ±1.60
Creatinine mg/dl	1.80 ±0.25	1.75 ±0.30	1.58 ±0.28	1.9 ±0.32	1.89 NS ±0.35
Cholestrol (mg/dL)	50.6 ±5.25	42.6 ±3.25	38.2 ±2.60	48.2 ±4.21	49.2*** ±5.01
Total lipids (mg/dL)	300.25 ±25.5	298.5 ±30.1	315.50 ±29.2	310.31 ±25.7	320.15*** ±30.2
Triglycerides (mg/dL)	61.6 ±6.5	50.25 ±6.25	64.21 ±5.50	58.23 ±6.42	62.8*** ±7.01
Glucose (mg/dL)	78.6 ±	68.8 ±	65.5 ±	68.9 ±	60.2*** ±
Calcium (mg/dL)	9.25 ±	8.9 ±	9.10 ±	9.2 ±	7.88 NS ±
Phosphorus (mg/dL)	67.0 ±1.20	6.25 ±1.05	6.5 ±1.25	6.9 ±1.41	7.0 NS ±1.35

* P≤0.05 ** P≤0.01 ***P≤ 0.001

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الملخص العربي

تقييم بذرة الزيتون الرطبة والجافة كمكون علفى فى الأرانب البيضاء النيوزيلاندى

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فى تجربة عملية تم إجراء تقييم لبذرة الزيتون الرطبة والجافة ومدى تقبل الأرانب البيضاء النيوزيلاندى لها وتأثيرها على معدلات الإنتاج وعناصر الدم وأجزاء الذبيحة حيث تم استخدام 90 أرنب عمرها 5 أسابيع بمتوسط وزن 650.5+ 20 جرام تم تقسيمهم إلى 5 مجموعات (18 فى كل مجموعة) قدم لهم 5 علائق متجانسة فى الطاقة الممثلة والبروتين لمدة 7 أسابيع. المجموعة الأولى تغذت على العليقى العادية بينما المجموعة الثانية والثالثة تم إضافة بذرة الزيتون الرطبة لعليقتهما بنسبة 5 و10% من العليقة فى حين ان المجموعة الرابعة والخامسة تم إضافة بذرة الزيتون الجاف لعليقتهما بنسبة 2.5 و5% على التوالى وقد أظهرت النتائج ان استخدام بذرة الزيتون الرطبة او الجافة مقبول ومستساغ بالنسبة للأرنب وهناك زيادة غير معنوية فى الأوزان ومعدلات التحويل على مدار التجربة مقارنة بالمجموعة الأولى وكذلك وجد ان هناك انخفاض فى نسبة الدهون الثلاثية والكولسترول والجلوكوز فى الدم بينما لم يحدث تأثير على نسبة الكرياتينين وإنزيمات الكبد والبروتين والكالسيوم والفوسفور وقد لوحظ تحسن فى أوزان الذبيحة ونسبة المادة الجافة والبروتين والدهون والأملاح فى اللحم