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EFFECT OF SOME NUTRITIONAL TREATMENTS OF OLIVE CAKE MEAL ON DUCKS PERFORMANCE UNDER SOUTH SINAI CONDITIONS

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ABSTRACT: Three hundred and sixty at 7days old Muscovey ducklings were individually weighed and randomly distributed into 12 treatment groups, four levels of olive cake meal OCM (0, 10, 20 and 30 %) and the same levels were supplemented with 300 mg. of antibiotics (colistin+tylosin) or 300 mg. of Rosemary extract. Results showed that increasing OCM levels in duckling diets decreased body weights, gain , feed intakes ,conversions and digestibility coefficients with no effect on blood parameters. Duckling diets contained OCM and supplemented with300 mg antibiotics improve weights, feed conversion and increased digestibility coefficients. OCM diets supplemented with 300 mg rosemary extract improved feed conversion, increase in TAC values and recorded the highest value of relative economic efficiency of feed. The numbers of microflora of cecum did not differ among experimental groups, demonstrating the safety of dietary treatments to poultry and human populations. It may be concluded that adding herbs extracts may enhance the utilization of olive cake meal without any deleterious effects on ducks performance.

Keywords: Olive cake meal – antibiotics –rosemary extract and ducks.

INTRODUCTION

Residuals from the extraction of olive oil which contains a mixture of skins, pulp, woody endocarp and seeds called crude olive cake , it could be of particular interest due to its high level of energy (6.8% oil), and important composition of unsaturated fatty acids which could influence the accumulation of fatty acid in the body and impact the quality of poultry meat (El hachemi *et al.,* 2007). Using olive cake mea was limited by their poor contents of some nutrients such as protein, vitamins ,high fibers, low digestibility, or low palatability (Isabel *et al.,* 2001), which increases their susceptibility to intestinal disorders and infections, resulting in poultry diarrhea ; so feed additives like phenolic compounds and plant extracts can be useful to reduce toxic effects observed with feed spoiled with mycotoxins (Dvorska *et al*., 2007). The abilities of some phytogenic compounds for increasing the permeability of bacterial cell membranes and kill bacterial species have promising it as anti-microbial properties (Westendarp,2005) which may replace antibiotics that used as feed additives in livestock diets since 1949 (Jukes, 1973). Rosemary (*Rosmarinus officinalis* L.) is an aromatic plant with medicinal properties and because it seems to be a preservative due to its antioxidative characteristics, and its use in the pharmaceutical, food and cosmetic industries.

plant extracts may be included in poultry diets as natural and bioactive supplements. Which alternatives to antimicrobial growth promoters in animal diets (Mitsch *et al*., 2004). So that, it was necessary conducting a study to assess the potential of feeding olive cake as substitute for yellow corn in duck diets supplemented by various feed additives like antibiotic and rosemary leaves extract.

MATERIALS AND METHODS

Site and the aim of study: The experimental work was carried out South Sinai Experimental Research Station (Ras-Suder City) which belongs to the desert research center. The main objective was to study the effect of some nutritional treatments of olive cake meal on ducks performance under south Sinai conditions by supplementing diets with antibiotic and herbs extract as growth promoters.

Experimental procedure: Three hundred and sixty at 7days old Muscovey ducklings were individually weighed and randomly distributed into 12 treatment groups, each in three replicates (10 birds /replicate). The experimental treatments were arranged in a one way design by using four levels of olive cake meal (0, 10, 20 and 30 %) and the same levels were supplemented with 300 mg. of Colistin sulfate+tylosin or 300 mg. of Rosemary extract. Feed and water were offered *ad libitum*, basal diets were formulated (Tables 1 and 2) to be iso-caloric and iso-nitrogenous to meet the nutrients requirements of Muscovey ducklings performance guide supplement and NRC (1994). Chemical analysis of the experimental diets and feaces were assayed using methods of A.O.A.C. (1990).

Preparation of the Rosemary extract: 100 g of fine dried *Rosmarinus officinalis* leaves extracted with 500 mL ethanol at room temperature; filtered, evaporated, and dried in a vacuum at 40 °C with a rotary evaporator after 48 hours. Filtration, the organic solvents were evaporated under reduced pressure and temperature. The dried extracts were

stored at +4 °C until used (Kordali *et al.,* 2009).

Tannins and polyphenol: 3g of the powdered sample was boiled in 50ml distilled water for 3minutes on a hot plate; filtered and a portion of the filtrate diluted with sterile distilled water in a ratio of 1:4 and 3 drop of 10% ferric chloride solution was added. A blue or green color indicates the presence of tannins; on the other hand , 2ml of extract was added to 2 ml of ferric chloride solution ($FeCl_3$), a deep bluish green solution is formed with presence of phenols (Zhu and Filippich 1992).

Essential oils: in 500ml conical flask that had 200ml of distilled water**;** 50g of the powdered leave were weighed and poured into the flask and kept for 12 hours with constant agitation at 30 minutes intervals; then the extract was filtered by using Whatman No.1 filter paper; concentrated *in vaccuo* and semi-solid extract obtained was stored in a refrigerator, 2.0ml of extract solution was shaken with 0.1 ml dilute sodium hydroxide and a small quantity of dilute HCl. And using Ultra High Performance Chromatography-DAD analysis (UPLC-DAD) according to Dahiru *et al*. (2006).

Growth performance: Live body weight (LBW) and feed intake (FI) were recorded while, body weight gain (BWG) and feed conversion ratio (g feed/g gain) were calculated.

Digestibility Trail: 48 ducks (four for each treatment) were used to determine the digestion coefficients of the experimental diets. Birds were individually housed in metabolic cages. In that, the trials extended for 9 days; 5 days as a preliminary period followed by 4 days as collection period. During the main period, excreta were collected daily and weighed, dried at 60 C**º**, bulked, finally ground and stored for chemical analysis.

Carcass traits: 3 birds / treatment were randomly taken and slaughtered to obtain carcass characteristics.

Blood serum: samples were evaluated for different biochemical parameters like Total protein (g/dl), Albumin (g/dl), Globulin (g/dl), Triglycerides (g/L), Cholesterols (g/L), and Total antioxidant capacity (TAC, U/mL) by using spectrophotometer. The WBCs , RBCs and lymphocytes were counted by using Rayto RT-7600 Auto Blood Hematology Analyzer.

Economic efficiency: The Economic efficiency (EE) was calculated according to the equation EE= ((A-B)/B) x100, where A the selling cost of the obtained gain and B is the cost of this gain.

Statistical analysis: statistical analysis of SAS (2002) and Duncan's New Multiple Range test (Duncan, 1955) were used in one-way analysis and the model used was: $Y_{ijk} = U + T_i + e_{ik}$., Where: Y_{ik} = Observation, U = the overall mean , T_i = experimental treatments (i=1, 2, 3and 4), e_{ik} = Random error.

RESULTS

Chemical composition of OCM and active components of rosemary extract.

Table 3 showed that OCM contains 8.57 %CP, 18.50 %CF, 9.00 %EE, 7.50% Ash, 56.43%NFE,13.80 Tannins g. /kg DM and 10.50 g. Polyphenols /kg DM. These values are nearly similar to those reported by Abd El-Galil *et al*. (2017) who indicated that CP% content was 9.24 %, values for CF, EE, NFE and ash were 18.45, 9.71, 42.58 and 7.54%, respectively; while, Kim and Miller (2005) found that olive cake meal contains high level of tannins (12.05 %) which lowered the intestinal uptake and

transport of simple sugars, amino acids and minerals.

Table 4 showed that active components of essential oil in rosemary extract were 7.20% rosemarinic acid , 5.00% carnosic acid , 25.00 %ursolic acid **,** 25.43% 1,8 cineole, 12.87%Limonene, 11.18 % β - pinene , 3.72 %comphene, 2.96% p-cymene and 3.89% β-caryophyllene, these active components have antimicrobial activity and antioxidant properties (Abd El-Latif *et al*.,2013) , antioxidative property is due to the presence of rosemarinic acid (Franciosini *et al*., 2016) and rosmarole(Shokrollahi *et al*., 2015 and Mathlouthi *et al*., 2015). Rosemarinic acid is very well absorbed from gastrointestinal tract (Al-Kassie *et al*., 2011) which reflect a positive influence on immunity , some blood parameters, egg quality properties, egg development and egg production performance of poultry (Gerzilov *et al*., 2015).

Effect of growth promoters on duckling's performance:

Date in Tables 5 refer to the differences between three experimental groups ; it was clear that the highest significant values were being for ducklings fed basal diet with rosemary extract in compared with antibiotic and control. Supplementing ducklings diet with rosemary extract had the highest (P<0.05) body weight and gain with improved feed conversion; moreover, there were (P<0.05) improved in digestibility coefficients of CF, CP and EE; however, there were insignificant effect of the three treatment on carcass traits. The highest (P<0.05) values of albumin, globulin, TAC, lymphocytes and lowest (P<0.05) value of triglycerides. *Rosmarinus officinalis* extract can improved feed palatability, increased secretion of digestive enzymes, play as an antibiotic or bactericidal specially E. coli and Clostridiae and influenced the growth of Lactobacilla; additionally , its antioxidant effects by its high content of phenolic and rosmaric acid (Betul *et al*.,2018). Improve the food quality of animal by enhancing the oxidative stability of lipids in meat by feeding plant extracts (Jang *et al*., 2008).

Effect of Olive cake meal levels on duckling's performance

As can be seen in Table 6 increasing OCM levels in duckling diets showed (P<0.05) decrease in body weights, gain , feed intakes and conversions, there were (P<0.05) decrease in digestibility coefficients, carcass% and Abdominal fat% but there were insignificant effect on blood parameters. Attia *et al.* (2001) reported that body weight gain of broiler chicks recorded no significant increase after feeding diets containing 16%OCM. Al- Shanti (2003) found that chicks fed diets incorporated with 10% OCM significant increase body weight gain , decrease feed consumption with an improvement in FCR . On the other hand, Abd El-Galil *et al*. (2017) summarized that substitution of growing local hen's diet by 8% OCM increased weight gain by 6.36 % higher than that of the control treatment, but when used 12% OCM decrease body weight gain, feed intake, digestibility of nutrients **.** It was clear that, the presence of tannins, which may decrease palatability of feed and reduction in feed intake consequently, body weight decreased; these results supported with Gonzalez- Alvarado *et al*.(2007) who reported that tannins can inhibit digestive enzymes and altering permeability of the gut wall so reduced digestibility of protein and carbohydrate.

Effect of Olive cake meal diets supplemented with antibiotics:

Regarding to data presented in Table 7; duckling diets contained OCM and supplemented with300 mg. antibiotics shower similar trends of OCM treatments without addition but regarding to data in Table 6 it was clear that supplementation with antibiotics increased weights, improve feed conversion and increased digestibility coefficients compared with diets with OCM presented in table 6. It is worthy to note that the experimental diets were adjusted to be nearly of isonitrogenous and isoenergetic values; accordingly any differences in the digestibility values could be due to the quality of the tested material (OCM) which incorporated to the control diet. Improving feed intake and feed conversion ratio by feeding tylosin was due to alter the intestinal microbiota (Yan *et al*., 2011). Colistin incorporates a bitter taste to the feed and leading to a reduction in dietary intake (Bosi *et al*., 2011). An increase in the relative mass of lactobacilli in the intestinal tract in comparable with decreasing enterogenic bacteria reflect the improvement in performance (Collier *et al.,* 2003). A thinner intestinal wall was due to using antibiotics as feed additives which reduced influx and accumulation of inflammatory cells (Larsson *et al*., 2006). So that the reduction in catabolism of muscle tissue , reduced the number of enterococci in the cecum and of *Escherichia coli* both in the ileum and in the cecum ; improving the appetite were recorded by adding colistin (Gruys *et al*., 2006).

Effect of Olive cake meal supplemented with rosemary extract:

Data in Table 8 reflected that supplemented OCM diets with 300 mg rosemary extract represent feed conversion values were approximately equal, insignificant differences between OCM levels (10, 20 and 30%) in abdominal fat%, also; there were ($P<0.05$) increase in TAC values with increasing OCM levels supplemented with 300mg rosemary extract**.** Herbal extracts had the ability to reduce the numbers of *Escherichia coli* **(**Arshad *et al*., 2008), *Clostridium perfringens* (Allen *et al*., 1997) and *Eimeria tenella* (Christaki *et al*., 2004) in poultry digestive tract; also, enhancing the oxidative stability of lipids in poultry meat (Jang *et al.,* 2008) and by protecting meat from food spoilage organisms (Karagoz Emiroglu *et al.,* 2010). Rosmarinic acid , had shown to improve ileal digestibility of nutrients in broilers (Hernandez *et al.,* 2004).

Economic evaluation of ducklings:

Data presented in Table 9 showed that supplemented ducklings diets with antibiotic and rosemary extract improved economic efficiency % of feed and relative economic efficiency of feed (127 and 157%) compared to the basal group. Increasing olive cake meal levels in duckling diets reduced economic efficiency % of feed and relative economic efficiency of feed compared to the basal group. However; supplemented OCM diets 0,10 and 20% with 300 mg. antibiotics recorded similar values of economic efficiency % of feed and relative economic efficiency of feed but highest value of relative economic efficiency of feed(102%) were recorded by group fed 30%OCM supplemented with antibiotic. It was clear that highest value of relative economic efficiency of feed (105 and 107%) were obtained by groups fed diets contained 20 and 30% of

OCM supplemented with 300 mg. rosemary extract.

Abd El-Galil *et al*. (2017) results indicated that the inclusion of 12% OCM in the diet recorded the lowest feed price that was due to the low price of OCM followed by 8 and4 % OCM, respectively. On the other hand, 8% OCM recorded the best economical return, compared to the other levels of OCM. This improvement related to the lowest feed conversion ratio of this group, as well as the constant market price of kg meat. Therefore, these ingredients are available locally at relatively low prices; alternative feed ingredients may offer more options for poultry nutritionists to formulate diets and to reduce the cost of poultry production we must do efforts to substitute maize in poultry feeds (Bamgbose *et al.*, 2004).

Cecum microflora:

The effects of dietary treatments on ducks caecal microbiota (Table 9). The numbers of aerobic, lactic acid-producing, and coliform bacteria did not differ (P >0.05) among experimental groups, demonstrating the safety of dietary treatments to poultry and human populations. In healthy chickens, the caecal microbiota plays an important role in nutrient assimilation and in the prevention of pathogenic bacteria colonization (Apajalahti, 2005). This is important because these pathogens can spread to humans through the consumption of meat that has been contaminated during slaughter. In poultry, in addition, prophylactic antibiotics are widely used to improve growth performance (Allen and Stanton, 2014), but this practice can result in the development of a reservoir of antibiotic resistant bacteria, which can affect public health (Zhou *et al*., 2012). Feed composition and ingredients were the major reason affect the abundance of pathogens bacteria; *Clostridium perfringens* and *Escherichia coli* which may reduce bird growth and liveability and human pathogens; however; *Salmonella enterica*, may lead to carcass condemnation and reduced income (Lee , 2003). Knarreborg *et al*.,(2002) observed similar changes in the numbers of lactobacilli and *E.coli* with antibiotics. Lactobacilli appear to react to a variety of antibiotics, as their abundance was shown to decrease also with sub-therapeutic levels of avilamycin and salinomycin; when an antibiotic is included in feed the overall dynamics of gastrointestinal microbial community change and, depending on the relative tolerance of different bacterial species to the antibiotic, their relative abundance may change unexpectedly. Plant extracts can reduce the counts of pathogenic bacteria and improved the total counts of *Lactobacillus* within the jejunal digesta. (Wei *et al*., 2017); presence and activity of lactobacilli which produce lactic acid and so reduce colonic pH reflect a stimulation of gut immunity and maturation, enhancing immune protection, and reducing gastrointestinal inflammatory responses (Putaala *et al*., 2010).This effect may be due to the effect of tylosin on macrophages, which in turn control the subsequent immune response by producing cytokines (Szymanska-Czerwinska *et al*., 2009); so, tylosin is capable of altering the proliferative capacity of immune cells (Baba *et al*., 1998).

CONCLUSION

It may be concluded that using Rosemary extract as feed additives in Ducks diet gave the best results of all treatment and may enhance the utilization of olive cake meal without any deleterious effects on ducks performance.

Table (1): Composition of the experimental grower diets (7-35 days)

Ingredients (%)	Grower diets (7-35 days)			
	Basal diet	**10% OCM**	**20% OCM**	**30% OCM**
Olive cake meal	0.00	10.00	20.00	30.00
Yellow corn	55.00	51.00	44.00	32.00
Soybean meal (44%)	24.50	26.50	22.80	22.10
Corn gluten (60%)	5.00	5.00	6.80	8.00
Wheat bran	8.80	0.80	0.00	0.00
Vegetable oil	2.30	2.30	2.00	3.50
Limestone	1.50	1.50	1.50	1.50
Dicalcium phosphate	2.00	2.00	2.00	2.00
NaCl	0.30	0.30	0.30	0.30
Vit& Min Premix*	0.30	0.30	0.30	0.30
DL- Methionine	0.15	0.15	0.15	0.15
L-Lysine-HCl	0.15	0.15	0.15	0.15
Total	100	100	100	100
Calculated analysis**				
ME, K cal/kg	2900	2920	2920	2920
Crude protein (%)	20.00	20	20	20
Crude fiber (%)	4.10	4.20	4.30	4.40
Calcium (%)	1.10	1.10	1.08	1.08
Av. P (%)	0.52	0.50	0.50	0.50
Lys. (%)	1.10	0.99	0.90	0.90
Meth.(%)	0.53	0.51	0.50	0.50
Meth. & Cys. (%)	0.88	0.83	0.80	0.80
Price /Ton (LE)	5100	5157	4802	4776
Determined analysis%				
CP	20.02	20.00	20.00	20.02
CF	3.84	3.90	4.06	4.10
EE	3.74	3.81	3.87	3.94
Ash	6.15	6.21	6.35	6.38
NFE	66.25	66.08	65.72	65.56

* Each3 kg Vitamins and minerals contain: Vit. A120000IU, Vit.D_3 22000 IU, Vit.E100 mg, Vit.K_3 20 mg, Vit. B_1 10 mg, Vit. B_2 50mg, Vit.B_6 15 mg, Vit.B_{12} 100 µg, Pantothenic acide 100 mg, Niacin 300 mg,Folicacid10 mg,Biotin500µg, iron300mg,Manganese 600 mg, Choline chloride 500 mg, Iodine 10 mg, Copper 100 mg, Seleneium 1 mg, and Zinc 500 mg. **According to NRC (1994)

Table (2): Composition of the experimental finisher diets (35 -70days)

Ingredients (%)	Finisher diets (35-70 days)			
	Basal diet	**10% OCM**	**20% OCM**	**30% OCM**
Olive cake meal	0.00	10.00	20.00	30.00
Yellow corn	62.00	58.20	46.20	34.60
Soybean meal (44%)	19.00	20.40	20.40	20.00
Corn gluten (60%)	5.00	5.00	5.00	6.00
Wheat bran	7.20	0.00	0.00	0.00
Vegetable oil	2.40	2.00	4.00	5.00
Limestone	1.50	1.50	1.50	1.50
Dicalcium phosphate	2.00	2.00	2.00	2.00
NaCl	0.30	0.30	0.30	0.30
Vit& Min Premix*	0.30	0.30	0.30	0.30
DL- Methionine	0.15	0.15	0.15	0.15
L-Lysine-HCl	0.15	0.15	0.15	0.15
Total	100	100	100	100
Calculated analysis**				
ME, K cal/kg	3000	3000	3000	3000
Crude protein (%)	18.00	18.00	18.00	18.00
Crude fiber (%)	3.70	3.88	4.06	4.24
Calcium (%)	1.10	1.08	1.08	1.08
Av. P (%)	0.51	0.50	0.50	0.50
Lys. (%)	0.96	0.90	0.90	0.90
Meth.(%)	0.51	0.50	0.50	0.50
Meth. & Cys. (%)	0.85	0.80	0.80	0.80
Price /Ton (LE)	5000	4921	4889	4772
Determined analysis%				
CP	18.07	18.00	18.00	18.00
CF	3.65	3.83	4.01	4.19
EE	4.09	4.20	4.38	4.50
Ash	5.38	5.45	5.52	5.60
NFE	68.81	68.52	65.09	67.71

* Each3 kg Vitamins and minerals contain: Vit. A120000IU, Vit.D_3 22000 IU, Vit.E100 mg, Vit.K_3 20 mg, Vit. B_1 10 mg, Vit. B_2 50mg, Vit.B_6 15 mg, Vit.B_{12} 100 µg, Pantothenic acide 100 mg, Niacin 300 mg,Folicacid10 mg,Biotin500µg, iron300mg,Manganese 600 mg, Choline chloride 500 mg, Iodine 10 mg, Copper 100 mg, Seleneium 1 mg, and Zinc 500 mg. **According to NRC (1994)

Table (3): Chemical composition (% DM) of crude olive cakes meal.

Items	CP%	CF%	EE%	Ash%	NFE%	ME (kcal/kg)	Tannins g./kg DM	Polyphenols g./kg DM
OCM	8.57	18.50	9.00	7.50	56.43	2460	13.80	10.50

Table (4): Active components of essential oil in rosemary extract.

Items	%
Appearance: Yellow-Brown to off white powder.	
Active components of essential oil :	
Rosemarinic acid	7.20
Carnosic acid	5.00
Ursolic acid	25.00
1,8 cineole	25.43
Limonene	12.87
β - pinene	11.18
comphene	3.72
p-cymene	2.96
β-caryophyllene	3.89

Table (5): Effect of growth promoters on duckling's performance, digestibility, carcass traits and blood parameters.

Traits	Growth promoters			±SEM
	Basal diet	300mg. antibiotics	300mg. rosemary extract	
Initial weight (7days)	69.00	69.00	69.00	0.01
Final weight (70days)	3550^{c}	3790^{b}	4160^{a}	50.00
Gain (7-70days)	3481^{c}	3721^{b}	4091^{a}	76.00
Feed intake kg.	10000^{a}	8952^{b}	8590^{c}	80.00
Feed conversion	2.87^{a}	2.41^{b}	2.01^{c}	0.01
Digestibility coefficients				
CF	36.00^{c}	37.20^{b}	48.72^{a}	0.50
CP	74.44^{c}	76.50^{b}	80.13^{a}	0.70
EE	65.33^{c}	68.10^{b}	75.56^{a}	1.00
Carcass traits				
Carcass	71.10	71.85	72.00	0.45
Edible giblets	4.42	4.50	4.57	0.11
Abdominal fat	3.50	3.40	3.36	0.10
Blood parameters				
Total protein (g/dl)	5.30	5.30	5.50	0.10
Albumin (g/dl)	2.50^{b}	2.52^{b}	3.04^{a}	0.30
Globulin (g/dl)	2.89^{b}	2.87^{b}	3.20^{a}	0.10
Triglycerides (g/L)	454^{a}	450^{a}	253^{b}	20.00
Cholesterol (mg/dl)	185	184	180	10.00
*TAC (U/mL)	0.29^{b}	0.30^{b}	0.36^{a}	0.20
*WBC ($X10^{9}$/L)	10.12	10.05	10.00	0.01
Lymphocytes	85.20^{b}	85.80^{b}	90.24^{a}	1.60
*RBC ($\times10^{12}$/L)	1.96	2.00	2.10	0.08

a,b,… Means within the same row showing different letters are significantly ($P<0.05$) different.

* WBC = white blood cells RBC= red blood cells, TAC = total antioxidative capacity U/mL.

Table (6): Effect of Olive cake meal levels on duckling's performance, digestibility, carcass traits and blood parameters.

Traits	Olive cake meal				±SEM
	0%	10%	20%	30%	
Initial weight (7days)	69.00	68.00	67.00	69.00	0.01
Final weight (70days)	3550[a]	3535[a]	3370[b]	3310[b]	49.00
Gain (7-70days)	3481	3467	3303	3241	87.00
Feed intake kg.	10000[b]	10100[b]	10220[a]	10300[a]	65.00
Feed conversion	2.87 [b]	2.91 [b]	3.09 [a]	3.18 [a]	0.01
Digestibility coefficients					
CF	36.00[a]	36.04[a]	33.00[b]	29.00[c]	1.00
CP	74.44[a]	74.00[a]	70.54[b]	67.48[c]	0.74
EE	65.33[a]	65.02[a]	62.60[b]	60.23[c]	0.20
Carcass traits					
Carcass	71.10 [a]	69.00 [b]	64.30 [c]	61.20 [d]	4.20
Edible giblets	5.42	5.20	5.00	5.00	0.10
Abdominal fat	3.50 [a]	3.10 [b]	2.90 [b]	2.80 [c]	0.01
Blood parameters					
Total protein (g/dl)	5.30	5.20	5.00	4.85	0.30
Albumin (g/dl)	2.50	2.50	2.40	2.35	0.10
Globulin (g/dl)	2.89	2.76	2.70	2.64	0.10
Triglycerides (g/L)	454	450	446	440	16.00
Cholesterol (mg/dl)	185	182	178	175	12.00
*TAC (U/mL)	0.29	0.29	0.28	0.27	0.01
*WBC ($X10^9$/L)	10.12	10.09	10.07	10.05	0.01
Lymphocytes	85.20	85.00	84.85	84.80	0.20
*RBC ($\times10^{12}$/L)	1.96	1.94	1.90	1.90	0.01

a,b,… Means within the same row showing different letters are significantly ($P<0.05$) different.
* WBC = white blood cells RBC= red blood cells, TAC = total antioxidative capacity U/mL.

Table (7): Effect of Olive cake meal supplemented with 300 mg antibiotics on duckling's performance, digestibility, carcass traits and blood parameters

Traits	Olive cake meal+300 mg. antibiotics				±SEM
	0%	10%	20%	30%	
Initial weight (7days)	69.00	69.00	67.00	68.00	0.01
Final weight (70days)	3790[a]	3740[a]	3600[b]	3530[c]	25.00
Gain (7-70days)	3721[a]	3671[a]	3533[b]	3462[c]	56.00
Feed intake kg.	8952 [a]	8850 [a]	8810 [a]	8700 [b]	30.00
Feed conversion	2.41	2.41	2.49	2.51	0.01
Digestibility coefficients					
CF	37.20[a]	37.00[a]	34.50[b]	31.00[c]	1.50
CP	76.50[a]	76.00[a]	72.60[b]	69.00[c]	0.80
EE	68.10[a]	66.00[a]	64.30[c]	61.00[d]	1.00
Carcass traits					
Carcass	71.85 [a]	70.00 [b]	66.00 [c]	62.00 [d]	7.00
Edible giblets	4.50	5.30	5.10	5.00	0.01
Abdominal fat	3.40 [a]	2.90 [b]	2.85 [b]	2.80 [b]	0.11
Blood parameters					
Total protein (g/dl)	5.30	5.10	5.00	5.00	0.10
Albumin (g/dl)	2.52	2.53	2.60	2.60	0.10
Globulin (g/dl)	2.87	2.74	2.70	2.68	0.10
Triglycerides (g/L)	450	448	445	440	3.00
Cholesterol (mg/dl)	184	180	176	173	2.11
*TAC (U/mL)	0.30	0.30	0.29	0.27	0.01
*WBC ($X10^9$/L)	10.05	10.06	10.05	10.02	0.01
Lymphocytes	85.80	85.40	85.00	85.00	0.30
*RBC ($\times10^{12}$/L)	2.00	1.96	1.94	1.93	0.01

a,b,… Means within the same row showing different letters are significantly (P<0.05) different.
* WBC = white blood cells RBC= red blood cells, TAC = total antioxidative capacity U/mL.

Table (8): Effect of Olive cake meal supplemented with 300 mg rosemary extract on duckling's performance, digestibility, carcass traits and blood parameters

Traits	Olive cake meal+300mg rosemary extract				±SEM
	0%	10%	20%	30%	
Initial weight(7days)	69.00	68.00	67.00	68.00	0.01
Final weight (70days)	4160 [a]	4010[b]	4000[b]	3930[c]	50.00
Gain (7-70days)	4091[a]	3942[b]	3933[b]	3862[c]	36.00
Feed intake kg.	8590 [a]	8300 [b]	8280 [b]	8200 [b]	10.00
Feed conversion	2.10	2.11	2.11	2.12	0.01
Digestibility coefficients					
CF	48.72[a]	48.00[a]	45.60[b]	42.00[c]	3.00
CP	80.13[a]	80.30[a]	76.90[b]	71.40[c]	1.76
EE	75.56[a]	73.40[b]	71.60[c]	68.50[d]	2.00
Carcass traits					
Carcass	72.00 [a]	70.50 [b]	67.00 [c]	63.00 [d]	5.00
Edible giblets	4.57	5.40	5.20	5.10	0.02
Abdominal fat	3.36 [a]	2.80 [b]	2.76 [b]	2.70 [b]	0.20
Blood parameters					
Total protein (g/dl)	5.50	5.30	5.20	5.20	0.10
Albumin (g/dl)	3.04	3.05	3.13	3.11	0.01
Globulin (g/dl)	3.20	3.07	3.03	3.01	0.01
Triglycerides (g/L)	253 [a]	240 [b]	235 [b]	230 [c]	4.00
Cholesterol (mg/dl)	180	176	171	169	12.00
TAC (U/mL)*	0.36 [b]	0.38 [b]	0.40 [a]	0.43 [a]	0.01
*WBC ($X10^9$/L)	10.00	10.01	10.00	10.00	0.01
Lymphocytes	90.24	89.84	89.50	89.00	0.20
*RBC ($\times10^{12}$/L)	2.10	2.05	2.03	2.02	0.01

a,b,… Means within the same row showing different letters are significantly (P<0.05) different.

* WBC = white blood cells RBC= red blood cells, TAC = total antioxidative capacity U/mL.

Olive cake meal – antibiotics –rosemary extract and ducks.

Table (9): Effect of Olive cake meal levels and experimental growth promoters on Economic evaluation of ducklings

Traits	Feed intake kg.	Cost of Kg feed (LE)	Total cost of intakes	Body weight gain kg.	Market price of one Kg meat (LE.)	Selling price (LE)	Net return (LE).*	Economic efficiency % (Ee) of feed **	Relative economic efficiency of feed***
Additives growth promoters									
Basal diet	10.00	5.05	50.50	3.48	35.00	121.80	71.30	1.41	100
Basal diet +300mg antibiotics	8.95	5.22	46.72	3.72	35.00	130.20	83.48	1.79	127
Basal diet +300mg rosemary extract	8.59	5.17	44.41	4.09	35.00	143.09	98.68	2.22	157
Olive cake meal									
0%	10.00	5.05	50.50	3.48	35.00	121.80	71.30	1.41	100
10%	10.10	5.04	50.90	3.47	35.00	121.45	70.55	1.39	98.58
20%	10.22	4.85	49.57	3.30	35.00	115.50	65.93	1.33	94.33
30%	10.30	4.77	49.13	3.24	35.00	113.40	64.27	1.31	92.91
Olive cake meal+ 300 mg antibiotics									
0%	8.95	5.22	46.72	3.72	35.00	130.20	83.48	1.79	100
10%	8.85	5.21	46.11	3.67	35.00	128.45	82.34	1.79	100
20%	8.81	5.02	44.23	3.53	35.00	123.55	79.32	1.79	100
30%	8.70	4.94	42.98	3.46	35.00	121.10	78.12	1.82	102
Olive cake meal+ 300mg rosemary extract									
0%	8.59	5.17	44.41	4.09	35.00	143.09	98.68	2.22	100
10%	8.3	5.16	42.83	3.94	35.00	137.90	95.07	2.22	100
20%	8.28	4.97	41.15	3.93	35.00	137.55	96.40	2.34	105
30%	8.2	4.89	40.10	3.86	35.00	135.10	95.00	2.37	107

*Net return = Selling price (LE) - Total cost of intakes

**Economic efficiency %= Net return/ Total cost of intakes

***Relative economical efficiency% of the control, assuming that relative EE of the control = 100.

Table (10): Cecum microflora (log10 CFU) at 70 days of age of ducklings fed diets containing various levels of olive cake meal levels and experimental growth promoters.

Traits	Aerobic bacteria (total bacteria)	Lactic acid producing bacteria	Coliforms bacteria	Lactobacillus bacteria	E. coli
Basal diet	8.45	7.78	8.14	7.76	7.73
300gm antibiotics	8.30	7.90	8.10	7.94	7.60
300gm rose extract	8.10	8.00	7.85	8.00	7.40
±SEM	0.30	0.22	0.29	0.30	0.33
Olive cake meal					
0%	8.45	7.78	8.14	7.76	7.73
10%	8.46	7.76	8.18	7.75	7.81
20%	8.48	7. 73	8.26	7.68	7.90
30%	8.52	7.62	8.33	7.60	7.98
±SEM	0.03	0.14	0.19	0.16	0.25
Olive cake meal+ 300 mg antibiotics					
0%	8.37	7.84	8.10	7.85	7.66
10%	8.38	7.83	8.14	7.84	7.71
20%	8.39	7.82	8.18	7.81	7.75
30%	8.42	7.76	8.22	7.77	7.79
±SEM	0.05	0.08	0.12	0.07	0.11
Olive cake meal+ 300mg rosemary extract					
0%	8.27	7.89	8.00	7.88	7.56
10%	8.28	7.88	8.02	7.87	7.61
20%	8.29	7.86	8.06	7.84	7.65
30%	8.31	7.81	8.09	7.80	7.69
±SEM	0.04	0.08	0.16	0.04	0.10

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الملخص العربي
تأثير بعض المعاملات الغذائية لكسب تفلة الزيتون على اداء البط تحت ظروف منطقة جنوب سيناء

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تهدف الدراسة الحالية الي دراسة تاثيراستخدام مستويات مختلفة من كسب تفلة الزيتون بدون او مع اضافة المضادات الحيوية أو مستخلص اوراق نبات اكليل الجبل الى علائق البط المسكوفي ، حيث استخدم عدد 360 كتكوت بط مسكوفي عمر 7 ايام قسمت الي 12 مجموعة تجريبية تضمنت اربعة مستويات من كسب تفلة الزيتون وهي0,10, 20,30 % بدون اي اضافات، اربعة مستويات التفلة السابقة مع تدعيمها ب 300 مجم من المضادات الحيوية(الكوليستين+ التيلوزين) / كجم , اربعة مستويات التفلة السابقة مع تدعيمها ب 300 مجم من مستخلص اوراق نبات اكليل الجبل / كجم .أظهرت النتائج أن:
-ادت زيادة مستوى كسب تفلة الزيتون فى علائق البط الى انخفاض الوزن الحي ، الماكول ، معدل التحويل الغذائي، معاملات الهضم مع عدم وجود اي تاثيرات على قياسات الدم.
-ادى تدعيم علائق البط المحتوية على كسب تفلة الزيتون ب 300 مجم من المضادات الحيوية الى زيادة فى الوزن الحي ، تحسن معدل التحويل الغذائي و زيادة معاملات الهضم.
-ادى تدعيم علائق البط المحتوية على كسب تفلة الزيتون ب 300 مجم من مستخلص اوراق اكليل الجبل الى زيادة فى الوزن الحي ، تحسن معدل التحويل الغذائي و زيادة قيم القدرة المضادة للاكسدة بالدم مع تسجيل اعلى قيمة قيمة للكفاءة الاقتصادية والكفاءة الاقتصادية النسبية.
- لم يظهر اي اختلافات في اعداد ميكروفلورا الاعور بين المجاميع التجريبية مما يدل على سلامة المعاملات المستخدمة على صحة الطيور والمستهلك للحومها.
وبصفة عامة: انه يمكن استنتاج ان استخدام مسخلص اوراق اكليل الجبل يمكن ان يعزز الاستفادة من كسب تفلة الزيتون حتى مستوى 30% بدون اي اثار سلبية على اداء البط .