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EFFECT OF SOME FEED ADDITIVES ON PERFORMANCE OF LAYING JAPANESE QUAIL :
1- EFFECT OF MARGORAM LEAVES MEAL AS A FEED ADDITIVE IN LAYING JAPANESE QUAIL DIETS

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ABSTRACT

A total number of 180 Japanese quail (120 females and 60 males) at 4 weeks of age were used in an experiment lasted 22 weeks. Experimental Japanese quail (*Coturnix coturnix japonica*) were divided randomly into four equal experimental groups (30 females in each group). The first group was fed the basal diet as control,, while the other three groups were feed additive the Margoram leaves meal (MLM).Margoram leaves meal was added to the control diet at level of 0.5,1.0 or 1.5 g/kg diet, respectively.

The main objective of the present work was to present study was undertaken to establish the utilization of Margoram as medical herbal feed additives in laying Japanese quail diets and their effects on productive performance, nutrient digestibility and economic efficiency. The experimental diets were isocaloric (2900 kcal ME/kg), isonitrogenous (20% CP) and isofibrous.

Results obtained could be summarized as follows

The final live body weight and body weight change during the whole experimental period varied significantly ($P<0.05$) increased with increasing MLM levels. The highest live body weight and body weight gain were recorded by using 1.5 and followed by 1 g/kg, while those fed control diet recorded the lowest ones.

The level of 1g/kg MLM recorded the best values ($P<0.05$) of feed conversion ratio (g feed/g gain), while the control diet recorded the worst feed conversion ratio.

Age at sexual maturity and first egg weight recorded a non-significant difference among groups, while egg weight, egg number and egg mass during the whole experimental period recorded a significant difference ($P<0.05$) among groups.

It is worthy noting that feed intake (g/day) increased significantly ($P<0.05$) with increasing MLM levels, however 1.5 g/kg MLM recorded the highest one.

Feed conversion ratio (g feed /g egg mass) revealed significantly ($P<0.05$) increased with increasing of MLM level in diet, however 1.00 g/kg MLM recorded the best feed conversion ratio, while the control diet recorded the worst ones.

Hatchability percentage recorded a non-significant difference among groups.

Albumen, yolk index and egg shape percentage showed significant ($P<0.05$) increase among the experimental groups, while yolk % and shell thickness (mm) showed a non-significant decrease between groups.

Digestibility coefficients of OM, CP, CF, EE, NFE and the nutritive values expressed as DCP, TDN % and ME (kcal/kg) were significantly varied ($P<0.05$) among the different experimental groups.

Level of 1 g/kg MLM group showed the best net return as well as the highest value of economic efficiency among experimental groups.

From the nutritional and economical efficiency stand points of view, it could be concluded that, using dietary medical herbal such as Margoram leaves meal (*Origanum majorana*) at 1 g/kg of the diet could improved productive performance and economical efficiency of laying Japanese quail.

Keywords: Quail, Margoram leaves meal, productive performance, egg quality, digestibility and economical efficiency.

INTRODUCTION

Many attempts have been made by nutritionists for to improve the productive performance and feed utilization in order to reduce the cost of feeding by using dietary additives such as antibiotics, probiotics, enzymes and herbal medicinal plants.

Recently, many countries tended to prohibit the using of antibiotics as growth promoters because of their side effect on both birds and human health.

The recent studies have showed that medicinal plants can be used instead of chemical compounds in poultry diets as natural tonic, restoratives (Boulos, 1983), antibacterial and antiparasitic drugs (khodary *et al.*, 1996) to obtain the best performance parameters, immunity and the viability of birds (El- Hindawy *et at.*, 1996 and Osman, 1996).

Addition of herbal parts and plant seeds as natural feed additives improved productive performance of poultry (Abdel-Aal and Attia, 1993); Khodary *et al.*(1996),Gill (1999) and Abaza (2001).

Medicinal plants have been reported to have health benefit properties and their preventive and therapeutic use in poultry is expected to increase in the future and a numerically large group of economically important plants.

The natural feed additives as the medicinal plants such as Margoram (*Origanum majorana*) leaves meal are a numerically large group of economically important plants, the include various species, which are used in the treatment of various diseases in human. This plant not only serves for a medicinal purpose but also contain aromatic substances and essential oils that used in food industries for human. Marjoram is useful oil for several ailments impacting on the immune system.

The genus *Origanum* (*Lamiaceae*) is an annual, perennial and shrubby herb that is native to the Mediterranean, Euro-Siberian and Irano-Siberian regions. A total of 38 *Origanum* species are recognized in the world. Most of the *Origanum* species, over 75%, are concentrated in the East Mediterranean (Souad El-Gengaihi *et al.*, 2006)

Origanum was determined. Antioxidant and antibacterial activities of the isolated essential oils, the oils of oregano plants were strongly characterized by p-cymene (16.80%), gamma-terpinene (16.80%),thymol (8.40%), and carvacrol (1.10%), all essential oils possessed antioxidant activity(Hazzit *et al.*, 2006).

Origanum majorana is a potent antioxidant, significantly reduced number of gaps, ring chromosome and stickiness, and plays an important role in ameliorating liver and kidney functions and genotoxicity (El-Ashmawy 2005).

All essential oils exhibited a very strong antibacterial activity against the tested bacteria ($P<0.05$), analyses revealed that carvacrol (68.23%), 1,8-cineole (60.72%),fenchone (55.79%)and trans-anethole (85.63%) (Dadaliogl and Evrendilek, 2004)

The essential oil has proven powerful anti-infectious properties against bacteria, fungi and viruses. Additionally, it has a tonic action and

supposed to be *of immune system*. These properties are mainly due to the essential oils phenolic content, namely thymol and carvacrol 47-48 %, respectively.

Origanum majorana induced a significant decrease in serum activities of transaminases (AST & ALT), ALP, urea and creatinine and improved the liver and kidney. Volatile oil extract significantly reduced the rate of micronucleus and chromosomal fragments. Also significantly reduced number of gaps, ring chromosome and stickiness. It could be concluded that *O. majorana* plays an important role in ameliorating liver and kidney functions and genotoxicity.

The major Fatty acids of *Origanum* species were linolenic (56.3-57.0%; linoleic (21.5-21.7%), oleic (8.7-8.9%), palmitic (5.9-6.5%), stearic (2.1-2.4%) and 11-octadecenoic (0.6-0.8%), (Azcan *et al.*, 2004)

Margoram as a medicinal herbal there is a general agreement using natural feed additives as the medicinal plants improved performance and health and immunity of poultry.

Abd EL-Latif *et al.*(2003) who found that the Margoram addition to the diets of growing Japanese at levels 0.5 % diets improved of growth performance.

So, The main objective of the present work was to present study was undertaken to establish the utilization of Margoram (*Origanum majorana*) leaves meal as a feed additive (medical herbal) in laying Japanese quail diets and their effects on reproductive performance, nutrient digestibility and economic efficiency.

MATERIALS AND METHODS

The present experiment was carried out at Maryiout Experimental Research Station (South West of Alexandria), which belongs to the Desert Research Center. A total number of 180 Japanese quail (120 females and 60 males) at 4 weeks of age were used in an experiment lasted 22 weeks. Experimental Japanese quail (*Coturnix coturnix japonica*) were kept under similar managerial, hygienic and environmental conditions and were divided randomly into four equal experimental groups (30 females in each group).

Quail were kept in batteries, which were divided into separate cages, where two females were housed in each cage. The first group was fed the basal diet as control (0% MLM), while the other three groups were feed additive the Margoram leaves meal (MLM). Margoram leaves meal (*Origanum majorana*) was added to the control diet at level of 0.5, 1.0 or 1.5 g/kg, respectively.

The quail were housed in cages at 4 weeks till 22 weeks of age. The experimental diets (Table 1) were formulated according to N.R.C (1994) and were isonitrogenous (20% crude protein) and isocaloric (2900 kcal ME/kg). Feed and water were available *ad libitum*. Chemical analysis of the experimental diet and dried excreta were assayed using methods of A.O.A.C (1990).

Table(1). Composition and proximate chemical of basal diet.

Ingredients	%
Yellow corn	60.00
Soybean meal (44% CP)	5.38
Concentrate (52% CP)*	10.00
Corn gluten meal (60% CP)	10.00
Wheat bran	9.10
Dicalcium phosphate	0.50
Limestone ground	4.30
Vit. and min. premix**	0.30
L-lysine	0.20
DI- methionine	0.22
Total	**100**
Proximate chemical analysis %	
Crude protein	20.25
Crude fiber	3.37
Ether extract	3.81
Calculated values	
Metabolizable energy (kcal/kg)***	2900
Calcium %	2.51
Available phosphorus %	0.30
Methionine %	0.46
Lysine %	1.00
Methionine + Cystin %	0.70
Price /k diet L.E.****	1.350

*** Protein concentrate contained, 52 %Crude protein, 2.03% Crude fiber, 6.17% Ether extract, ME 2800 (kcal/kg), 1.50 % Methionine, 2.0% Methionine & Cystin, 3.0%Lysine 7.00% Calcium, 2.93 % Available Phosphorus 2.20 % Nacl.**

**** Each 3 kg Vitamins and minerals premix contains (per ton of feed), Vit. A 10000000 IU, Vit. D3 2000000 IU, Vit.E l0g, Vit.K3 1000 mg, Vit. B1 1000 mg, Vit. B2 5g, Vit. B6 1.5g, Vit. B12 10 mg, Pantothenic acid 10g, Niacin 30g, Folic acid 1g, Biotin 50 mg, Iron 30g, Manganese 70g, Choline chlorite 10g, Iodine 300 mg, Copper 4g, Zinc 50g and Selenium 100 mg.**

***** Calculated according to NRC of poultry (1994).**

******Calculated according to price of feed ingredients at the same time (2006) of the experiment. Price of one kg MLM=14.00 L.E.**

During the experimental period, individual live body weight and feed intake were determined biweekly. Feed conversion ratio (g feed intake / g egg mass) was calculated and the mortality was recorded every day.

Age at sexual maturity was determined at the first egg laying. Eggs were collected daily and weighed for each group, so egg number, egg mass were calculated during the experimental period. At 15 weeks of age, 20 eggs were randomly taken from each group and were used to evaluate egg quality; yolk weight and shell weight were recorded. Shell thickness (without membrane) was measured by micrometer, while albumen weight was calculated by subtracting yolk and shell weight from egg weight, Yolk, shell and albumen percentage were calculated as a percentage of egg weight.

Males were housed individually in cages (one quail per cage) and fed the same diets for females. At 15 weeks of age, males (40 males) were

transferred to female cages (two females and one male) for twenty minutes for five days, the eggs were then collected and incubated. Hatchability percentage was calculated for each group.

At the end of the experimental feeding period, digestion trials were conducted using 20 adult quail males (five quail from each treatment) to determine the digestibility coefficients and the nutritive values of the experimental diets as affected by MLM levels. Males were housed individually in metabolic cages.

The digestibility trials extended for 9 days of them 5 days as a preliminary period followed by 4 days as collection period. The individual live body weights were recorded during the main collection period to determine any loss or gain in the live body weights. During the main period, excreta were collected daily and weighed dried at 60°C bulked finally ground and stored for chemical analysis. The faecal nitrogen was determined according to Jakobsen *et al.*(1960). Urinary organic matter was calculated according to Abou-Raya and Galal (1971). Metabolizable energy was calculated according to Titus and Fritz (1971).

The digestion coefficients % of organic matter (OM), crude protein (CP), crude fiber (CF), ether extract (EE) and nitrogen free extract (NFE) of the experimental diets were estimated.

The nutritive values expressed as digestible crude protein (DCP), total digestible nutrients (TDN) and metabolizable energy (ME) were calculated.

Economical efficiency for egg production was calculated from the input / output analysis according to the costs of the experimental diets and selling price of one kg egg. The values of economical efficiency were calculated as the net revenue per unit of total costs.

Statistical analysis was carried out using General Linear Model (GLM) procedures by SAS program (1996) using simple one way analysis of variance according to this model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where:

Y_{ij} = Represented observation in j^{th} Margoram leaves meal.

μ = Overall mean.

T_i = Effect of j^{th} Margoram leaves meal level (j = 0,0.5,1.0,1.5 g).

e_{ij} = Random error.

Duncan's New Multiple Range Test (Duncan, 1955) separated differences among treatment means.

RESULTS AND DISCUSSION

Live body weight and body weight change

Data for live body weight and body weight change during the whole experimental period by quail females is summarized in table 2. The final live body weight and body weight change during the whole experimental period varied significantly ($P<0.05$) among the experimental groups.

It is worthy noting that live body weight was improved with increasing the MLM level in the diet, is gradually fed diets supplemented with MLM on

1.5 g/kg MLM recorded 2.23% higher than that of the control group, while 1.0 or 0.5 g/kg MLM resulted in 2.04 and 1.44 % higher than that of the control group, respectively.

Live body weight change during the whole experimental period, It is clear that Live body weight change during the whole experimental period was increased by increasing MLM levels in the experimental diets.

The supplementation with 0.5, 1.0 or 1.5 g/kg MLM level increased live body weight change by 2.27, 4.22 and 4.36 % more than that of the control group, respectively.

Table (2). The productive performance ($\bar{X}$±SE) of laying quail as affected by dietary Margoram leaves meal supplementation.

Items	Levels of margoram leaves meal (g/kg)				Sig
	Control (0)	0.5	1.00	1.50	
Initial live bod weight (g)	116.52±5.4l	117.06±5.07	115.95±5.01	116.22±5.51	ns
Final live body weight (g)	252.10±3.41^{b}	255.72±3.65^{ab}	257.25±4.61^{a}	257.71±4.21^{a}	*
Live body weight change (g)	135.58±1.06^{b}	138.66±1.91^{ab}	141.30±2.02^{a}	141.49±2.51^{a}	*
Age at sexual maturity/bird/day	49.23±0.16	49.11±0.17	49.00±0.22	49.00±0.27	ns
First egg weight (g).	11.60±0.19	11.62±0.11	11.65±0.15	11.65±0.18	ns
Egg weight (g)	11.51±0.12^{b}	11.55±0.l0^{ab}	11.64±0.12^{a}	11.62±0.15^{a}	*
Egg number/ bird/ day	0.60±0.03^{b}	0.65±0.05^{ab}	0.67±0.06^{a}	0.67±0.03^{a}	*
Egg mass (g)/ bird/day	6.91±0.15^{b}	7.51±0.21^{ab}	7.79±0.18^{a}	7.77±0.19^{a}	*
Feed intake (g)/ bird/day	29.01±0.36^{b}	29.55±0.32^{ab}	29.91±0.15^{a}	30.41±0.27^{a}	*
Feed conversion ratio	4.20±0.09^{a}	3.93±0.l0^{a}	3.78±0.07^{b}	3.91±0.12^{a}	*
Morality rate %	0.00	0.00	0.00	0.00	
Hatchability %	79.02±5.82	79.20±9.20	79.25±10.21	79.22±10.51	ns

^{a,b}: Means within a row with different superscripts are significantly different.
Sig.= Significance, *= (P< 0.05), n.s = not significant.

The increase in body weight change reflected may be due to the increase in feed intake and the improvement in nutrients digestibility of diets. This positive effect may be attributed to the biological function of medical plant components that have been essential for growth (Boulos, 1983; Bradley, 1992; Leung and Foster, 1996). Ibrahim *et al.* (1998) who reported that adding natural additives in broiler diets caused a significant increase in broiler performance. Bachman and Mashaly (1986) the improvement in the performance due to enhancement in thyroid activity.

Age at sexual maturity

Sexual maturity age ranged from 49.22 to 49.88 day, showing that MLM levels in laying quail diets did not affect this trait as shown in table (2).

Weight of first egg

Results of first egg weight were found to be statistically insignificant as shown in table 2. It is worthy noting that feeding quail on 1.0 and 1.5 g/kg of MLM recorded slight higher values compared to other experimental groups.

Egg weight

Egg weight during the whole experimental period differs significantly ($P<0.05$) among the experimental groups. It is worth noting that Supplementation of diet by 0.5, 1.0 or 1.5 g/kg of MLM recorded an increase in egg weight amounted to 0.35, 1.13 or 0.96 % compared to the control group, respectively.

Level of 0.5 g/kg MLM recorded the lowest egg weight (11.55 g), while Level of 1.00 g/kg recorded the highest egg weight (11.64g) compared to other treated groups of MLM level as shown in (Table 2), which may be attributed to the decrease in feed intake and attributed to the biological function of medical plant components. Khodary *et al.*(1996) stated the efficiency of herbal edible plants and some plant seeds as natural tonic, restoratives, antibacterial and anti-parasitic drugs in improving the productive performance in poultry.

Egg number and egg mass

Results in (Table 2) indicate that egg number and egg mass during the whole experimental period recorded significantly ($P<0.05$) among the experimental groups. It is worthy noting that egg number was higher in birds receiving 1.00 and 1.50 % MLM compared to other experimental groups, this may be due to the differences in sexual maturity and attributed to the biological function of medical plant components. It is clear that supplemented of diet by 0.5, 1.00 or 1.50 g/kg MLM increased egg number by 8.33, 11.67 or 11.67 % than that of the control group, respectively.

Egg mass recorded maximum values for 1.00 g/kg of MLM diet, while minimum values recoded by 0.50 g/kg MLM level.

It is worthy noting that feeding quail on 0.5, 1.0 or 1.5% MLM resulted in 8.68, 12.74 and 12.45 % higher in egg mass than that of the control group, respectively. However, the increase in egg mass with the 1 or 1.5 g/kg of MLM level was expected in view of the increase in egg number and vice versa with the 0.5 g/kg of MLM level.

Feed Intake and feed conversion Ratio

On the basis of the whole experimental period there was significantly ($P<0.05$) among the experimental groups for daily feed intake trait.

The experimental groups exhibited more feed intake compared to the control group. It is clear increasing MLM levels in the experimental diets increased that feed intake. The supplementation of with 0.5, 1.0 or 1.5 g/kg of MLM increased feed intake by 1.86, 3.10 and 4.83 % more than that of the control group, respectively.

This increase in feed intake may be due to improving the diet palatability. Natural feed additives had beneficial effect for stimulation and activity of digestive system by improving the diet palatability and enhancing

appetite of poultry, thus increasing the amount of feed consumed (Namur *et al.*, 1988).

The results of feed conversion ratio showed are significant increases in feed efficiency utilization by the MLM level in diet as compared to control group during the experimental period. Quail fed 1 g/kg MLM during the experimental period recorded the best feed conversion.

In gradually, the data indicated that the feed conversion ratio of the group fed diets supplemented with MLM was improved compared to those of the control group.

The improvement in feed conversion ratio of 1.0 g/kg MLM, may be due to its highest egg mass as compared to that of MLM levels. Such improvement may be attributed to the properties of these materials that could act not only as antibacterial, anti-protozoa and antifungal, also as antioxidants (Bradley, 1992; Leung and Foster, 1996).

Morality rate

No incidence of mortality occurred during the experimental period as well as no effects of MLM levels supplemented on the experimental diets. Eisenberg *et al.*(1993) indicated that herbal medicine is based on the premise that plants contain natural substances that can promote health and alleviate illness.

Hatchability

Results on hatchability percentage in the present study recorded a non-significant difference among groups (Table 2).

Egg quality traits

Data of egg quality indicate that relationship between levels of MLM and egg quality as shown in table (3).

Data on yolk percentage and shell thickness showed a non-significant difference among the experimental groups. On the other hand, egg weight, albumen, eggshell, yolk index, egg shape percentage were significantly varied (P<0.05) among the experimental groups.

Table (3). Egg quality ($\bar{X}$±SE) as affected by Margoram leaves meal in laying quail diets.

Items	Levels of margoram leaves meal (g/kg)				Sig
	Control (0)	0.5	1.00	1.50	
Egg weight (g)	11.45±0.07^{b}	11.56±0.09^{ab}	11.60±0.11^{a}	11.59±0.19^{a}	*
Yolk %	31.06±0.07	31.12±0.09	31.30±0.16	31.35±0.11	n.s
Albumen %	55.25±0.09^{a}	55.10±0.09^{a}	54.79±0.14^{ab}	54.58±0.10^{b}	*
Egg shell %	13.23±0.02^{b}	13.35±0.05^{ab}	13.81±0.07^{a}	14.01±0.90^{a}	*
yolk index %	48.74±1.20^{a}	48.94±1.30^{a}	47.55±1.25^{ab}	46.76±1.61^{b}	*
Egg shape %	78.18±0.04^{b}	78.55±0.03^{ab}	79.62±0.02^{a}	80.11±0.02^{a}	*
Shell thickness (mm)	0.240±0.04	0.241±0.05	0.242±0.06	0.245±0.04	n.s

^{a,b}: Means within a row with different superscripts are significantly different.
Sig.=Significance, *= (P< 0.05), n.s = not significant.

Digestibility and nutritive values of the experimental diets

Digestion coefficients of nutrients content as affected by the different levels of MLM are illustrated in (Table 4). Results indicate a significant

(P<0.05) differences among groups by the increasing of MLM in the experimental diets. It was clearly noted that the best value of CP digestibility was obtained for quail fed diets supplemented with the 1.5 g/kg MLM, followed by those fed 1.0 g/kg, while the lowest value was observed with those fed the control diet.

In general, there was a tendency for increase in the digestion coefficients of OM, CF, EE and NFE for the same of the experimental diets were accepted when compared with the control diet.

Table (4). Digestibility coefficients and nutritive values ($\bar{X}$±SE) of the experimental diets as affected by levels of Margoram leaves meal

Items	Levels of margoram leaves meal (g/kg)				Sig
	Control (0)	0.5	1.0	1.50	
Digestion coefficients%					
OM	79.05±1.52^{b}	79.84±1.22^{b}	80.02±1.60^{a}	80.75±1.41^{a}	*
CP	80.10±2.32^{b}	81.52±1.38^{ab}	82.79±1.45^{a}	83.96±1.60^{a}	*
CF	24.08±2.09^{b}	24.72±1.85^{b}	26.16±1.63^{ab}	27.60±1.41^{a}	*
EE	85.96±1.02^{b}	87.14±0.81^{ab}	87.94±0.72^{a}	88.79±0.85^{a}	*
NFE	86.02±1.10^{b}	88.29±0.40^{ab}	88.69±1.03^{a}	89.22±1.21^{a}	*
Nutritive values					
DCP%	16.22±0.24^{b}	16.51±0.12^{ab}	16.76±0.20^{a}	17.00±0.25^{a}	*
TDN%	65.27±1.21^{b}	66.75±1.01^{ab}	67.32±1.33^{a}	67.93±1.62^{a}	*
ME (kcal/kg)	2746±30.21^{b}	2808±29.11^{ab}	2831±30.17^{a}	2856±35.80^{a}	*

^{a,b}: Means within the same row showing different letters are significantly different. Sig.=Significance, *=(P<0.05).

Similar trend was observed for the nutritive values of the tested diets in terms of digestible crude protein (DCP%), total digestible nutrients (TDN%) and ME (kcal/kg), which differed significantly (P<0.05) increased with increasing MLM up to 1.50 g/kg level.

In generally, the results showed that improvement of digestibility coefficients of nutrients and nutritive values significantly (P<0.05) increased with increasing MLM level. It is of great importance to note that the results of the digestion trial were coincided generally with the positive response in productive performance and feed utilization of quail birds, comparative to the control diet.

These results were in agreement with Abd EL-Latif *et al*,(2003) who indicated that, addition of medicinal herbal had a significant effect on improving digestibilities coefficient of nutrients.

Adding herbal medicinal plants to the diet increased (P<0.05) both T3 and T4 plasma concentration, the consistency of body gain and feed intake trends and thyroid activity asserted the biological role for herbal medicinal plants in activities metabolic functions and biosynthesis of hormones (Abd El-Latif *et al.*, 2002). El-Husseiny *et al.*(2000) reported that increased thyroxin concentration, significant positive effect on the values of CP, EE, CF, NFE digestibility and metabolizable energy.

Economical evaluation.

The present results indicated that the diet containing 1g/kg Margoram leaves meal (MLM) as a feed additive was highest Net revenue and economic efficiency compared to the other experimental groups as shown in table (5) and fig.(1) this may be related to increase improvement of feed conversion ratio. It was noticed that the control diet gave the lowest Net revenue and economic efficiency.

The best relative economic efficiency was detected with 1 g/kg MLM being 110.14% followed by those fed 0.5 g/kg MLM, respectively when compared with the control group.

Table (5): Economical evaluation of quail as affected by dietary MLM.

Item	Control	Levels of MLM (g/kg)		
		0.50	1.00	1.50
Feed conversion ratio	4.20	3.93	3.78	3.91
Cost of kg feed (L.E)	1.350	1.357	1.364	1.371
Feed cost of kg egg (L.E)	5.670	5.333	5.156	5.361
Selling price of one kg egg (L.E)	15.00	15.00	15.00	15.00
Net revenue (L.E)	9.330	9.667	9.844	9.639
Economic efficiency	164.55	181.27	190.92	179.80
Relative economic efficiency	100	110.16	107.83	101.55

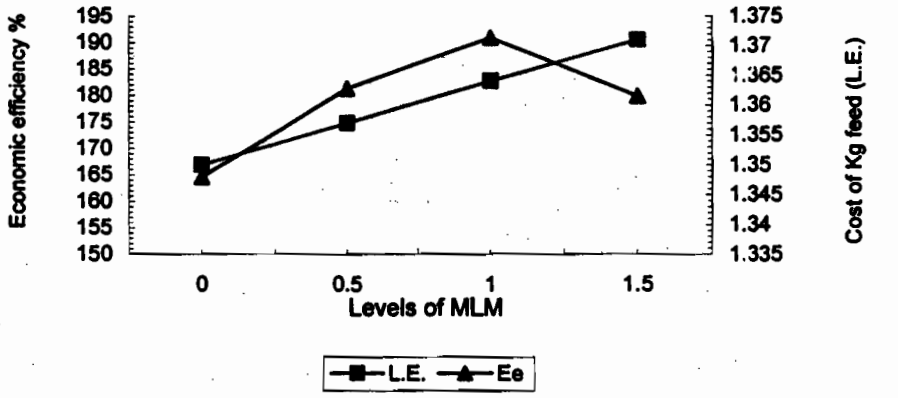

Fig.(1) Economic efficiency (Ee) and cost of Kg feed (L.E) of differnt levels of MLM by laying quail

CONCLUSION

It could be concluded that used of feed additives such as Margoram leaves meal (medicinal herbs) for laying Japanese quail diets at a level of 1g/kg diet improved the productive performance and economical efficiency.

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تأثير بعض الإضافات الغذائية على أداء السمان الياباني البياض:
١- تأثير مسحوق أوراق البردقوش كإضافات غذائية في علائق السمان الياباني البياض

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استخدم في هذا البحث عدد ١٨٠ سمان ياباني عمر ٤ أسابيع وحتى عمر ٢٢ أسبوع . حيث استهدفت التجربة دراسة تأثير مسحوق أوراق البردقوش كإضافات غذائية في علائق السمان الياباني البياض . قسمت الإناث (١٢٠ أنثى) إلى أربع مجموعات تجريبية متساوية. اشتملت كل مجموعة على ٣٠ أنثى سمان (١٥ مكررات بكل منها ٢ سمان). بينما قسمت الذكور (٦٠ ذكر) إلى أربع مجاميع متساوية فردية (كل ذكر فردى). غذيت الطيور حتى حد الشبع على نسب متدرجة من مسحوق اوراق البردقوش ٠ ، ٠,٥ ، ١,٠ و١,٥٠ جم/ كيلو جرام عليقة. العلائق المستخدمة متشابهة في نسبة البروتين الخام ٢٠% والطاقة الممثلة ٢٩٠٠ كيلو كالورى /كيلوجرام. عند عمر ١٥ أسبوع نقلت الذكور للإناث بنسبة تناسلية ٢ أنثى : ١ ذكر لمدة ٢٠ دقيقة لتقدير نسبة الفقس.

ويمكن إيجاز أهم النتائج في النقاط التالية:

- سجلت المعاملة المغذاة على ١,٥ جم /كجم من مسحوق اوراق البردقوش تحسنا معنويا (عند المستوى ٥ %) في كل من وزن الجسم و والتغير فى وزن الجسم مقارنة بباقي المعاملات ، بينما سجلت مجموعة المقارنة اكثر القيم انخفاضا.
- لم يسجّل العمر عند النضج الجنسي و وزن البيضة الأولى فروقا معنوية ، بينما سجل وزن وعدد وكتلة البيض اختلاف معنويا (عند مستوى ٥%) بين المجموعات أثناء الفترة التجريبيّة.
- لوحظ زيادة معدل استهلاك الغذاء خلال فترة التجربة زيادة معنوية (عند مستوى ٥%) وذلك بإضافة مسحوق اوراق البردقوش في العليقه ، وقد سجلت المعاملة المغذاة على ١,٥ جم /كجم أعلى تلك القيم ، بينما سجلت مجموعة المقارنة اقل القيم خلال الفترة التجريبية.
- حققت المعاملة التي غذيت على ١,٠٠ جم /كجم من مسحوق اوراق البردقوش افضل معدل تحويل غذائي خلال فترة التجربة مقارنة بباقي المعاملات.
- سجّلت النسبة المئويّة للبياض ودليل الصفار انخفاض معنويا (عند مستوى ٥ %) بينما سجلت النسبة المئوية للصفار وسمك قشرة البيضة زيادة غير معنوية بزيادة مستويات الإضافة لمسحوق اوراق البردقوش.
- حدث تغير معنوي (عند مستوى ٥ %) فى شكل البيضة وذلك بزيادة نسبة مسحوق اوراق البردقوش فى العليقة.
- أظهرت معاملات الهضم الظاهرية للمادة العضوية و البروتين الخام والأليياف الخام و مستخلص الأثير والمستخلص الخالي من النتروجين ارتفاعا معنويا (عند مستوى٥%) بإضافة مسحوق اوراق البردقوش في العليقة. حيث حققت المعاملة التي غذيت على ١,٥٠ جم/كجم افضل معاملات هضم وقيم غذائية مقارنة بباقي المعاملات.
- تحقق أعلى عائد اقتصادي للمعاملة المغذاة على ١,٠٠ جم /كجم من مسحوق اوراق البردقوش خلال فترة التجربة مقارنة بباقي المجموعات ، بينما سجلت مجموعة المقارنة اقل القيم.

يمكن التوصية من الوجهة الغذائية والاقتصادية إلى امكانية استخدام مسحوق اوراق البردقوش في العليقة (كإضافات طبية عشبية) بمستوى ١ جم/كجم في علائق السمان البياض حيث سجل افضل معدل أداء إنتاج وأعلى كفاءة اقتصادية.