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EFFECTS OF USING SOME NATURAL FEED ADDITIVES ON PERFORMANCE OF GROWING Hy-Line W-36 MALE CHICKS.

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SUMMARY

The experimental work of the present study was carried out at the Poultry Research Station. Poultry Production Department. Faculty of Agriculture, Fayoum University. This experiment was conducted to study effect of using some natural feed additives (dried parsley or peppermint leaves) on performance of growing Hy-line W-36 male chicks with or without enzyme supplementation. The enzyme used in this study was kemzyme dry (KD). used at a rate of 1 kg/ tonne (0.1%) of complete feed. At 14 days of age. birds were divided into ten treatments (24 birds each). each treatment contained three replicates of eight birds each. The experimental treatments were as follows:

1- Control diet (free from dried parsley (Par.) or peppermint (Pep.) leaves, as shown in Table 1, (diet 1).

2- Diet 1 + 0.1 % kemzyme dry (KD). 3- Diet 1 + 0.25% Par. 4- Diet 1 + 0.25% Par. + 0.1% KD.

5- Diet 1 + 0.50% Par. 6- Diet 1 + 0.50% Par. + 0.1% KD. 7- Diet 1 + 0.25% Pep.

8- Diet 1 + 0.25% Pep. + 0.1% KD. 9- Diet 1 + 0.50% Pep. 10- Diet 1 + 0.50% Pep. + 0.1% KD.

Results obtained could be summarized in the following:

1. Live body weight (LBW) and live body weight gain (LBWG): No significant differences due to main and interactions effect of dietary treatments on LBW and LBWG at all ages studied, except, interaction effect of type of plant x enzyme addition. Males fed diet containing Pep. un-supplemented with enzyme had higher LBWG during the period from 43 to 70 days of age.

2. Feed intake (FI) and feed conversion ratio (FC): Males fed Pep. diet had significant higher FI during the periods from 43 to 70 and 14 to 70 days of age. Enzyme supplementation significant decrease FI during the same periods. Birds fed 0.25% Par.+ 0.1% KD had lower FI during the period 14 to 70 days. No significant differences due to main and interactions effect of dietary treatments on FC ratio. during the periods from 43 to 70 and 14 to 70 days of age

3. Blood constituents: The results showed a linear increase in ALT, while, decrease in total protein and globulin with increase level of plant addition. Experimental treatments significant affected AST, total protein and globulin.

4. Slaughter parameters%: No significant differences due to main and interactions effect of dietary treatments on all slaughter parameters.

5. Chemical composition of male meat: Experimental treatments insignificantly affected chemical composition of male meat except. ash%.

6- Economical efficiency (EEf): EEf values during the period from 14 to 70 days of age was improved of Hy-Line W-36 male chicks fed all experimental diets except those fed diets containing several Pep. 0.25 or 0.50 with enzyme as compared with those fed the control diet.

It can be concluded from this study that dried Par. or Pep. leaves in diets of Hy-line W-36 male chicks had no beneficial effect on the productive performance. But, its supplementation (without enzyme) had beneficial effect on economical efficiency. Hy-Line W-36 male chicks can be used to partial participate in solving the problem of low animal protein consumption.

Keywords: *parsley; peppermint; kemzyme dry; performance; Hy-Line W-36 male chicks.*

INTRODUCTION

During the last 50 years. poultry industries have established tremendous progress in genetic, nutrition. husbandry and health to supply marketplace with a high volume, low cost animal protein

(ElDeeb *et. al.*, 2007). Khachatourians (1998) estimated the human usage of antibiotics as 1.36 to 14.64 million kg/year, while antibiotics usage in farm livestock was between 7.36 and 11.18 million kg/year. In animal production since banning antibiotic growth promoters in animal feeds, there are a number of non-therapeutic alternatives to antibiotic growth promoters, including enzymes, organic acids, probiotics, prebiotics, herbs, immune stimulants and specific management practices (Awadein *et al.*, 2010).

Today's intensive animal agriculture industry must adapt to producing animal in a world without antibiotic growth promoters in response to consumer demands (Ferket, 2004). Also, assure that all products of livestock and poultry are Hazard Analysis and Critical Control Point (HACCP) certified (Maxwell, 2004 and ElDeeb *et. al.*, 2007). So, there is a tendency to use herbs and probiotics as natural feed additives to avoid the residual cumulative effect for either antibiotics or synthetic drugs in final products of poultry, which has a negative effect on the human health (Hernandez *et al.*, 2004; Hashemi *et al.*, 2008 and Al-Kirshi *et al.*, 2010).

Some of these herbs is parsley (*Petroselinium crispum*) was used medicinally prior to being consumed as a food; it contains two types of unusual components that provide unique health benefits. The 1^{st}, is volatile oil components including *myristicin, limonene, eugenol,* and *alpha-thujene*. The 2^{nd}, is flavonoids including *apiin, apigenin, crisoeriol,* and *luteolin*. Apiol is the effective component that represent approximately 21-80% of parsley essential oil (Tisserand and Balacs, 1995). Parsley (Par.) volatile oils particularly myristicin have been shown to inhibit tumor formation (particularly in the lungs) in animal studies. Myristicin has also been shown to activate the enzyme *glutathione-S-transferase*, the flavonoids in Par. especially luteolin have been shown to function as antioxidants. In addition, extracts from Par. have been used in animal studies to help increase the antioxidant capacity of the blood.

Parsley is an excellent source of vitamins A (β-carotene), C (both had good power as antioxidant), K and folic acid as well as several phenolic compounds and it is a good source of iron, manganese and calcium (Pattson *et al.*, 2004).

Another one, peppermint (*Mentha peperits*), the leaf (fresh or dried) is the culinary source of mint , also, odors of peppermint (Pep.) serve as central nervous system stimulants and is used to decrease fatigue. Its oils are used in various pharmaceutical, medicinal, perfume, and cosmetic products (Singh *et al.*, 2005). Moreover, Nickels (1996) mentioned that Pep. oil maintains the structural integrity of immune cells due to its strong antioxidant action which protects cell membrane from free radical oxidants, thereby resulting in an improved immune response. According to Mekay and Blumberg (2006), Pep. oil has a significant antitumor, antiviral, immunomodulating and chemopreventive potential. Iscan *et al.* (2002) reported that Pep. oil had also antimicrobial effect against wide range of bacteria which improves the general healthy conditions of animal that may be reflected in increased immune response.

In this respect, several investigators reported that supplementing the dietary herbs stimulate the growth performance of poultry (Demir *et al.*, 2003; Hernandez *et al.*, 2004; Bampidis *et al.*, 2005; Griggs and Jacob, 2005 and Cross *et al.*, 2007). Similarly, Ocak *et al.* (2008) found a high growth promoting efficacy in Pep. leaves. Barbour (2006) evaluated the impact of Pep. essential oils in the protection of the respiratory system of broilers against controlled challenges by *Mycoplasma gallisepticum* and/or avian influenza virus H_9N_2. However, Bahnas *et al.* (2008 and 2009) reported no significant differences in LBW, LBWG and FC of Japanese quail chicks fed different levels (0.25 and 0.50%) of dried Par. or Pep. leaves with or without enzyme supplementation, while, they found significant differences in FI. Moreover, Ragab *et al.* (2010) found that no significant treatment effect, levels and type of plants were detected on LBW and slaughter parameters% of Cobb broiler chicks fed different levels of jaw's mallow and parsley as dried leaves. They showed significant differences in slaughter parameters% (carcass weight after evisceration and dressing %) of Ross broiler chicks. They also, reported the treatments significantly affected moisture and ash% of Ross and Cobb broiler meat.

Enzymes are proteins that act as catalysts in metabolism, and are involved in almost every biochemical process in animals. Enzymes are added to animal feeds to supplement low enzyme production or to improve utilization of poorer quality feeds. There are many examples in the literature of enzymes being tested in a range of diets containing a variety of ingredients (El-Gendi, *et al.* (2000); Cowieson, 2005; Ragab (2007a, b) and Emam, 2010).

Poultry meat and eggs offer considerable potentials for bridging the protein gap, because high yielding exotic poultry adapt easily to the tropical environment and the technology of production is relatively simple with returns on investment appreciably high (Ekenyem and Madubuike, 2006). The incessant rise in feed cost and the resultant shortage in animal protein supply have encouraged the exploitation of locally, available and cheap animal and feed resources to forestall threat to the future of poultry production (Runjaic-Antic *et al.*, 2010 and Obuzor and Ntui, 2011). The average annual production of layer day old chicks was approximately 21 million in the years 2004 and 2005 (Hosny, 2006). So, there are abundant numbers of the chicken males over the breeding need, therefore these access numbers could be used in meat production (Urdaneta and Leeson, 2002).

Due to their widespread use and variety of potential health benefits, both Par. and Pep. were selected for this study. Therefore, the purpose of the present work was to study effect of using some natural feed additives (dried Par. or Pep. leaves) on performance of Hy-line W-36 male chicks with or without enzyme supplementation and the use Hy-Line W-36 male chicks to partially participate in solving the problem of low animal protein consumption.

MATERIALS AND METHODS

The experimental work of the present study was carried out at the Poultry Research Station, Poultry Production Department, Faculty of Agriculture, Fayoum University. Chemical analyses were performed in the laboratories of the same department according to the procedures outlined by A.O.A.C. (1990).

The enzyme used in this study was kemzyme dry (KD) which is manufactured by Kemin Company, Egypt, used at a rate of 1 kg/ tonne (0.1%) of complete feed. It is a multi-enzyme preparation that includes: alpha-amylase, protease, beta-glucanase, cellulase complex and lipase. The dried Par. and Pep. leaves (sun dry) used in the present study were obtained from the Egyptian Organic Agriculture Company, Fayoum Governorate, Egypt.

Chemical composition of dried parsley and peppermint leaves used in the present study (on air dried basis) are as follows:

Item	Dried parsley leaves	Dried peppermint leaves
Moisture %	10.98	11.03
Crude protein%	16.75	16.55
Ether extract %	0.160	0.300
Crude fiber%	6.310	9.670
Ash%	18.78	12.56
Nitrogen-free extract%	47.02	49.89
ME/Kcal */Kg	2712	2832

*Calculated according to Carpenter and Clegg (1956) by applying the equation: ME(Kcal/kg)=(35.3*CP%)+(79.5*EE%)+(40.6*NFE%)+199.*

A total number of 240 one-day old Hy-Line W-36 male chicks were used in this experiment and were initially fed a control diet (containing about 23% CP and 2900 Kcal ME/Kg) for 13 days. At 14 days of age, birds were divided into ten treatments (24 birds each), each treatment contained three replicates of eight birds each. Chicks were wing-banded and randomly allotted to the dietary treatments. Birds were raised in electrically heated batteries with raised mesh wire floors and had a free access to feed and water. Batteries were placed into a room provided with a continuous light and fans for ventilation. The birds were reared under similar environmental conditions, and were given the experimental diets from 14 days until 70 days of age.

The experimental treatments were as follows:

1- Control diet (free from dried parsley (Par.) or peppermint (Pep.) leaves, as shown in Table 1, (diet 1).

2- Diet 1 + 0.1 % kemzyme dry (KD). 3- Diet 1 + 0.25% Par. 4- Diet 1 + 0.25% Par. + 0.1% KD. 5- Diet 1 + 0.50% Par. 6- Diet 1 + 0.50% Par. +0.1% KD. 7- Diet 1 + 0.25% Pep.

8- Diet 1 + 0.25% Pep. + 0.1% KD. 9- Diet 1 + 0.50% Pep. 10- Diet 1 + 0.50% Pep. + 0.1% KD.

The experimental diets were supplemented with minerals and vitamins mixture and DL-methionine to cover the Hy-Line W-36 male chicks recommended requirements (Table1). Birds were individually weighed to the nearest gram at weekly intervals during the experimental period. At the same time, feed consumption was recorded and feed conversion (FC) (g feed/g gain) and live body weight gain (LBWG) were calculated. Crude protein conversion (CPC) and caloric conversion ratio (CCR) were also calculated (Ragab, 2001). Mortality was recorded daily (no mortality of birds were recorded during the study period). Composition and analysis of the experimental diets are presented in Table (1).

Table (1): Composition and analysis of the experimental diets.

Item	0-13 days of age	14-42 days of age	43-70 days of age
Yellow corn, ground	59.25	64.00	69.00
Soybean meal (44%CP)	29.90	24.30	18.70
Broiler concentrate (48%CP[1])	10.00	10.00	10.00
Sodium chloride	0.05	0.05	0.05
Vit. and Min. premix [2]	0.30	0.30	0.30
Dicalcium phosphate	0.40	0.50	0.50
Vegetable oil [3]	0.00	0.70	1.30
DL–Methionine	0.10	0.15	0.15
Total	100.0	100.0	100.0
Determined analysis%:			
Moisture	10.30	10.45	10.50
Crude protein(CP)	22.98	21.03	19.06
Ether extract (EE)	2.56	2.89	2.76
Crude fiber (CF)	3.25	3.26	3.10
Ash	5.21	5.05	6.58
Nitrogen free extract	55.70	57.32	58.01
Calculated analysis%: [4]			
CP	23.05	21.02	18.98
EE	2.99	3.83	4.57
CF	3.50	3.21	2.93
Calcium	1.21	1.21	1.20
Available phosphorus	0.64	0.64	0.63
Methionine	0.46	0.48	0.46
Methionine+Cystine	0.81	0.81	0.75
Lysine	1.24	1.10	0.96
ME, kcal./Kg	2900.3	2999.4	3096.0
Cost (£.E./ton) [5]	2175.4	2159.9	2113.3
Relative cost [6]	100.0	99.29	97.14

[1] *Broiler concentrate manufactured by Hybrid International Company and contains:- 48% CP, 2.2% CF, 4.5% EE, 8-10% calcium, 3% available phosphorus, 1.5% methionine, 2% methionine + cystine, 2.7% lysine, 2450 K cal ME/kg. Also, each 1 kg broiler concentrate contains 20000 IU Vit. A; 25000 IU Vit. D3; 150 mg Vit. E; 15 mg Vit. K3; 10 mg Vit. B1; 50 mg Vit. B2; 20 mg Vit. B6; 150µg Vit. B12; 100 mg pantothenic acid; 300 mg nicotinic acid; 10 mg folic acid; 500µg biotin; 5000 mg choline chloride; 150 mg Cu; 10 mg I; 600 mg Fe; 800 mg Mn; 500 mg Zn; 1.5mg Se; 2 mg Co; 1250 mg anti-oxidant (ethoxyquin).*

[2] *Each 3.0 Kg of the Vit. and Min. premix manufactured by Agri-Vet Company, Egypt and contains : Vit. A, 12000000 IU; Vit. D_3 2000000 IU; Vit. E, 10 g; Vit. K_3, 2.0 g; Vit. B1, 1.0 g; Vit. B2, 5 g; Vit. B6, 1.5 g; Vit. B12,10 mg; choline chloride, 250 g; biotin, 50 mg; folic acid, 1 g; nicotinic acid , 30 g; Ca pantothenate, 10 g; Zn, 50 g; Cu,10 g; Fe, 30 g; Co, 100 mg; Se, 100 mg; I, 1 g; Mn, 60 g and anti-oxidant, 10 g, and complete to 3.0 Kg by calcium carbonate.*

[3] *Mixture from 75% soybean oil and 25% sunflower oil.*

[4] *According to NRC, 1994.*

[5] *According to the local market price at the experimental time.*

[6] *Assuming the price of the control group equal 100.*

At the end of the experiment (70 days), a slaughter test was performed using four chicks around the average LBW of each treatment. Birds were individually weighed to the nearest gram, and slaughtered by severing the carotid artery and jugular veins (Islamic method). After four minutes of bleeding, each bird was dipped in a water bath for two minutes and feathers were removed by hand. After the removal of head, carcasses were manually eviscerated to determine some carcass traits, including dressing % (eviscerated carcass without head, neck and legs) and total giblets% (gizzard, liver, heart and spleen). The eviscerated weight included the front part with wing and hind part. The abdominal fat was removed by hand from parts around the viscera and gizzard, and weighed to the nearest gram. The bone of front and rear were separated and weighed to calculate meat percentage. The meat from each part was weighed and blended using a kitchen blender. Chemical analyses of representative samples of the experimental diets and carcass meat (including the skin) were carried out to determine percentages of dry matter (DM), crude protein (CP), ether extract (EE), crude fiber (CF) and ash contents according to the methods of A.O.A.C (1990). Nitrogen free extract (NFE) was calculated by difference.

At the end of the growing period, individual blood samples were taken from 4 birds. The blood samples were collected into dry clean centrifuge tubes and centrifuged at 3000 rpm for 20 min. The clear serum samples were carefully drawn and transferred to dry, clean, small glass bottles, and stored at–20Ċ in a deep freezer until the time of chemical determinations. Serum constituents were determined colorimetrically using commercial kits, as previously described (Ragab, 2007b).

To determine the economical efficiency for meat production, the amount of feed consumed during the entire experimental period was obtained and multiplied by the price of one Kg of each experimental diet which was estimated based upon local current prices at the experimental time. Statistical analysis of results was performed using the General Linear Models (GLM) procedure of the SPSS software (SPSS, 1999), according to the follow general model:

$Y_{ijkl}= \mu+T_i+L_j+E_k+TL_{ij}+TE_{ik}+LE_{jk}+TLE_{ijk}+e_{ijkl}$

Where: Y_{ijkl}: observed value. μ: overall mean. T_i: type of plant effect (i: parsley and peppermint).

L_j: level of plant addition effect (j: 0.00, 0.25 and 0.50%). E_k: enzyme supplementation effect (k: 0.00 and 0.10%). TL_{ij} interaction effect of type of plant by level of plant addition. TE_{ik} interaction effect of type of plant by enzyme supplementation. LE_{jk}: level of plant addition by enzyme supplementation effect.

TLE_{ijk} type of plant by level of plant addition by enzyme supplementation effect. e_{ijkl}: random error.

Treatment means indicating significant differences (P≤0.01 and P≤0.05) were tested using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Live body weight (LBW) and live body weight gain (LBWG):

Results presented in Table 2 show the effects of using dried parsley or peppermint leaves with or without enzyme supplementation on LBW and LBWG of Hy-line W-36 male chicks. The results indicated no significant differences due to main and interactions effect of dietary treatments on LBW and LBWG at all ages studied, except, interaction effect of type of plant x enzyme addition, males fed diet containing Pep. un-supplemented with enzyme had higher LBWG at 43 to 70 days of age (Table 2). Numerically, inclusion of 0.5% Pep. without enzyme supplementation had higher LBW at 42 and 70 days and LBWG during the periods from 14 to 42 days of age and overall period compared with those fed other treatments or the control diet, but differences were not significant (Table 2).

Probably, our trial was performed at the ideal conditions of experimentation, also the diets fed in different periods consisted of highly digestible ingredients so that bacterial growth in the intestine probably may have been limited which could affect the degree of growth promotion. Growth promoting agents may have more impact when the diet used is less digestible. In addition, it is known that well-nourished, healthy chicks do not respond to antibiotic supplements provided that they are housed under clean and disinfected conditions (Lee *et al.*, 2003). Or, the herbal additives dosage applied in current study has not been such a level that would cause a beneficial effect on productive traits, since there are reports of significant improved performance in broilers receiving diets supplemented with 1.5% (Al-Beitawi and El-Ghousein, 2008) which are considerably higher levels compared to levels used in our research.

In this respect, Al-Ankari *et al.* (2004) observed the beneficial influence of wild mint on broilers productive performance. Also, supplementing 4 g/kg Pep. increased LBW of broilers at 28 days of age, but final LBW at 42 days was not affected (Toghyani *et al.*, 2010). However, Ocak *e t al.* (2008) reported that broiler performance was not significantly affected by feeding different experimental diets supplemented with dry Pep. Moreover, Bahnas *et al.* (2008 and 2009) reported no significant differences in final LBW and LBWG of Japanese quail chicks fed different levels (0.25 and 0.50%) of Par. or Pep. as dried leaves with or without enzyme supplementation. Similar results were reported by Ragab *et al.* (2010).

Our results disagree with those of Ragab (2007a) who noted that quails fed control diet + fennel seeds + KD had higher values of LBW and LBWG as compared with the other treatments studied at 38 days of age, moreover, enzyme supplementation insignificantly affected LBW and LBWG at the same age (Ragab, 2007a,b). Similar to our results enzyme supplementation of broiler fed diets insignificantly affected LBWG during the grower, finisher and overall periods (Emam, 2010).

Table (2): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on live body weight (LBW,g) and live body weight gain (LBWG,g) of Hy-line W-36 male chicks.

Item			LBW, g (age, days)			LBWG, g (age period, days)		
			14	42	70	14-42	43-70	14-70
Type of plant (T):								
Parsley (Par.)			120.75	521.4	1188.4	400.6	666.9	1067.6
Peppermint (Pep.)			120.52	535.0	1199.4	414.4	664.4	1078.9
±SEM[1]			1.98	6.99	12.60	5.80	9.00	11.83
Level of plant addition (L)%:								
0.00			120.64	520.7	1179.9	400.0	669.4	1061.1
0.25			120.81	522.1	1176.9	401.3	654.6	1056.1
0.50			120.46	534.3	1210.9	413.8	676.6	1090.4
±SEM			2.02	6.99	12.71	5.81	8.88	11.93
Enzyme addition (En)%:								
0.00			120.52	530.3	1197.7	409.8	671.7	1077.9
0.10			120.76	521.0	1183.7	400.3	661.0	1062.9
±SEM			1.90	6.59	11.93	5.48	8.32	11.18
T × L%:								
Par.		0.25	121.12	515.7	1164.8	394.5	648.9	1043.7
		0.50	120.38	527.1	1212.0	406.7	684.9	1091.6
Pep.		0.25	120.50	528.5	1188.9	408.0	660.4	1068.4
		0.50	120.55	541.4	1209.8	420.9	668.4	1089.3
±SEM			2.80	9.88	17.76	8.20	12.71	16.73
T × En%:								
Par.		0.00	120.91	524.7	1185.1	403.8	660.5[ab]	1064.2
		0.10	120.60	518.1	1191.7	397.5	673.3[ab]	1071.1
Pep.		0.00	120.31	534.6	1219.2	414.3	684.6[a]	1098.9
		0.10	120.74	535.3	1179.5	414.6	644.2[b]	1058.8
±SEM			2.80	9.88	17.76	8.20	12.71	16.73
L% × En%:								
0.00		0.00	120.33	531.7	1179.8	411.4	668.5	1063.2
		0.10	120.95	509.7	1180.0	388.7	670.3	1059.0
0.25		0.00	120.64	520.7	1184.4	400.1	663.6	1063.7
		0.10	120.98	523.5	1169.3	402.5	645.4	1048.4
0.50		0.00	120.57	538.5	1220.0	418.0	681.5	1099.4
		0.10	120.36	530.0	1201.8	409.6	671.8	1081.5
±SEM			2.85	9.88	17.86	8.22	12.65	16.77
T × L% × En% (experimental treatments):								
Control		0.00	120.33	531.7	1179.8	411.4	668.5	1063.2
		0.10	120.95	509.7	1180.0	388.7	670.3	1059.0
Par.	0.25	0.00	121.29	515.1	1159.2	393.8	644.1	1038.0
		0.10	120.95	516.2	1170.4	395.3	653.6	1049.5
	0.50	0.00	120.52	534.2	1211.0	413.7	676.8	1090.5
		0.10	120.24	520.0	1212.9	399.8	692.9	1092.7
Pep.	0.25	0.00	120.00	526.4	1209.5	406.4	683.1	1089.5
		0.10	121.00	530.7	1168.3	409.7	637.7	1047.3
	0.50	0.00	120.62	542.8	1229.0	422.2	686.1	1108.3
		0.10	120.48	540.0	1190.7	419.5	650.7	1070.2
±SEM			4.07	14.04	25.34	11.65	17.57	23.77

[1] Pooled SEM

a, ...b values in the same column within the same item followed by different superscripts are significantly different (at $P \leq 0.05$ for a to b).

Feed intake (FI) and feed conversion ratio (FC):

Results presented in Table 3 show the effects of using dried Par. or Pep. leaves with or without enzyme supplementation on FI and FC of Hy-line W-36 male chicks.

Type of plant, level of plant addition, enzyme addition and interaction effect of type of plant x level of plant addition significantly ($P \leq 0.01$) affected FI during the periods from 43 to 70 and 14 to 70 days of age. Concerning type of plant, males fed Pep. diet had significant higher FI during the periods from 43 to 70 days and overall period.

Table (3): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on feed intake (FI, g) and feed conversion ratio (FC) of Hy-line W-36 male chicks.

Item			FI, g (age period, days)			FC (age period, days)		
			14-42	43-70	14-70	14-42	43-70	14-70
Type of plant (T):								
Parsley (Par.)			898.7	1838.9^{B}	2737.6^{B}	2.28	2.80	2.59
Peppermint (Pep.)			897.1	1869.0^{A}	2766.1^{A}	2.20	2.86	2.59
±SEM[1]			3.83	5.57	7.74	0.03	0.04	0.03
Level of plant addition (L)%:								
0.00			882.6	1853.6^{B}	2736.2^{B}	2.24	2.78	2.58
0.25			893.6	1829.8^{C}	2723.3^{B}	2.26	2.84	2.60
0.50			902.2	1878.3^{A}	2780.5^{A}	2.22	2.82	2.58
±SEM			4.73	6.67	9.81	0.03	0.04	0.29
Enzyme addition (En)%:								
0.00			901.1	1872.4^{A}	2773.5^{A}	2.24	2.82	2.59
0.10			884.5	1835.4^{B}	2719.8^{B}	2.24	2.82	2.58
±SEM			4.47	6.48	9.22	0.03	0.04	0.27
T × L%:								
Par.	0.25		896.6	1794.0^{B}	2690.4^{B}	2.31	2.82	2.60
	0.50		900.9	1883.9^{A}	2784.8^{A}	2.25	2.78	2.57
Pep.	0.25		890.7	1865.3^{A}	2756.0^{A}	2.22	2.86	2.60
	0.50		903.4	1872.7^{A}	2776.2^{A}	2.18	2.86	2.58
±SEM			5.42	7.83	10.95	0.05	0.06	0.04
T × En%:								
Par.	0.00		905.1^{A}	1835.9^{B}	2741.0^{B}	2.28	2.82	2.60
	0.10		892.4^{AB}	1842.0^{B}	2734.2^{B}	2.28	2.78	2.58
Pep.	0.00		886.0^{B}	1912.0^{A}	2798.0^{A}	2.18	2.83	2.57
	0.10		908.1^{A}	1826.1^{B}	2734.2^{B}	2.22	2.89	2.61
±SEM			5.42	7.83	10.95	0.05	0.06	0.04
L% × En%:								
0.00	0.00		912.1	1869.4^{AB}	2781.6	2.27	2.80	2.62
	0.10		853.1	1837.8^{B}	2690.9	2.21	2.77	2.55
0.25	0.00		889.4	1860.9^{AB}	2750.4	2.26	2.85	2.61
	0.10		897.8	1799.0^{C}	2696.3	2.26	2.83	2.59
0.50	0.00		901.7	1887.0^{A}	2788.6	2.19	2.80	2.56
	0.10		902.7	1869.6^{AB}	2772.3	2.24	2.84	2.59
±SEM			6.70	9.71	13.79	0.05	0.06	0.40
T × L% × En% (experimental treatments):								
Control		0.00	912.1^{abc}	1869.4	2781.6^{A}	2.27	2.80	2.62
		0.10	853.1^{d}	1837.8	2690.9^{B}	2.21	2.77	2.55
Par.	0.25	0.00	895.4^{abc}	1801.2	2696.6^{B}	2.31	2.86	2.62
		0.10	897.8^{abc}	1786.8	2684.1^{B}	2.30	2.78	2.59
	0.50	0.00	914.8^{ab}	1870.6	2785.4^{A}	2.25	2.79	2.58
		0.10	887.1^{bc}	1897.1	2784.2^{A}	2.25	2.77	2.57
Pep.	0.25	0.00	883.5^{c}	1920.7	2804.1^{A}	2.22	2.84	2.60
		0.10	897.9^{abc}	1810.0	2707.9^{B}	2.22	2.88	2.60
	0.50	0.00	888.6^{abc}	1903.3	2791.9^{A}	2.14	2.81	2.54
		0.10	918.3^{a}	1842.2	2760.5^{A}	2.22	2.90	2.62
±SEM			9.33	12.04	18.88	0.07	0.08	0.06

[1] *Pooled SEM., a, ...d, and A,... C, values in the same column within the same item followed by different superscripts are significantly different (at $P \leq 0.05$ for a to d ; $P \leq 0.01$ for A to C).*

Concerning level of plant addition, male chicks fed 0.25% had lower FI, while, those fed 0.50% had significant higher FI value during the periods from 43 to 70 days and overall period. Concerning the impact of KD addition, chicks fed diet supplemented with KD had significant lower FI during the periods from 43 to 70 and 14 to 70 days compared to those fed 0.0% enzyme (Table 3). On the other hand, enzyme addition decrease FI during all periods compared with those fed enzyme un-supplement diet (Table 3).

These results disagree with the findings of Ragab (2007a,b) and Emam (2007) who reported that quails fed control diet + 0.1% KD had higher FI during the period from 10 to 38 days of age. Also, El-Gendi *et al.* (2000) and (Emam, 2010) reported that broilers fed diets supplemented with KD had significantly the highest FI value. Hassan *et al.* (2004) observed that FI values significantly increased by feeding some medicinal and aromatic plants.

Also, the interaction between type of plant by enzyme supplementation significantly ($P \leq 0.01$) affected FI during all periods studied. Birds fed diet containing Pep.+ 0.1% KD had lower FI during the periods from 14 to 42 and 14 to 70 days of age, while, those fed diet containing Pep.+ 0.0% enzyme had higher FI value during the previous periods (Table 3).

The data of Table 3 indicated that feeding dried Par. or Pep. leaves at different levels with or without enzyme supplementation significantly ($P \leq 0.05$ and $P \leq 0.01$) affected FI value during the periods from 14 to 42 and 14 to 70 days of age. Birds fed control diet + 0.1% KD and 0.25% Par.+ 0.1% KD had lower FI during the periods from 14 to 42 and 14 to 70 days of age, respectively. However, males fed diet containing 0.5% Pep.+ 0.1% KD and 0.25% Pep.+ 0.0% KD had higher FI value during the periods from 14 to 42 and 14 to 70 days of age, respectively (Table 3).

The results indicated no significant differences due to main and interactions effect of dietary treatments on FC ratio (Table 3).

These results agree with the findings of Bahnas *et al.* (2008 and 2009) who reported no significant differences in FC ratio of Japanese quail chicks fed different levels (0.25 and 0.50%) of Par. or Pep. as dried leaves with or without enzyme supplementation, while, they showed significant differences in FI. Ocak *et al.* (2008) reported no differences in FI or FC ratio of broiler chicks fed different experimental diets supplemented with dry Pep. By contrast, Al-Kassie (2010) demonstrated that chicks fed all experimental diets containing different levels of dry Pep. had an improvement in performance traits as compared with those fed the control diet, however, the chicks fed with 0.50% Pep. performed better than those fed with 1.5% Pep. concerning LBWG and FC ratio. Abd El-Latif, *et al.* (2002) and Hassan, *et al.* (2004) indicated that the improvement in FC with feeding herbal products as feed additives could be attributed to their effect on improving the digestibility of dietary protein in the small gut.

Similar results were observed by Ragab (2007b) who found that quails fed diet supplementation with KD resulted insignificantly affected FC values during the period from 10 to 38 days.

Blood constituents:

Effects of using dried Par. or Pep. leaves with or without enzyme supplementation on calcium, cholesterol, triglycerides, aspartate aminotransferase (AST), alanine aminotransferase (ALT), total protein, albumin, globulin, albumin/globulin ratio and glucose of Hy-line W-36 male chicks are summarized in Tables 4 and 5. Concerning type of plant, it was significant only for AST (Table 4), males fed Pep. diet had lower AST, whereas, those fed Par. had higher AST at the end of the experimental period.

Level of plant addition was significant ($P \leq 0.05$ and $P \leq 0.01$) only for ALT, total protein and globulin (Tables 4 and 5), its clear that males fed diet containing 0.0% had lower ALT and higher total protein and globulin. The results showed a linear increase in ALT, while, decrease in total protein and globulin with increase level of plant addition. Numerically, a linear increase in triglycerides, albumin/globulin ratio and glucose, while, decrease in calcium and AST with increase level of plant addition when compared with those fed diet containing 0.0%, but the difference is not significant (Tables 4 and 5). These results disagree with those of Toghyani *et al.* (2010) who reported that blood biochemical parameters including serum protein, albumin, albumin to globulin ratios, triglyceride, total cholesterol, AST and ALT enzymes concentrations of broiler chicks fed different levels of Pep. were not statistically influenced.

Enzyme supplementation and interactions effect of type of plant x enzyme supplementation and level of plant addition x enzyme supplementation insignificantly affected some and other blood constituents (Tables 4 and 5).

In this connection, Ragab (2007b) reported that enzyme supplementation insignificantly affected serum constituents of Japanese quails except cholesterol contents, quails fed diet containing 0.1% KD had lower contents of serum cholesterol. However, El-Gendi *et al.* (2000) found that chicks fed diet supplemented with KD had the highest serum albumin and ALT values.

Table (4): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on some blood constituents of Hy-line W-36 male chicks.

Item			Calcium mmol/L	Cholesterol mmol/L	Triglycerides mmol/L	AST U/ml	ALT U/ml
Type of plant (T):							
Parsley (Par.)			4.18	4.06	1.09	58.50^{A}	27.13
Peppermint (Pep.)			4.01	3.89	1.10	40.88^{B}	27.13
±SEM[1]			0.61	0.18	0.07	2.41	1.93
Level of plant addition (L)%:							
0.00			4.81	3.68	1.00	57.00	16.75^{b}
0.25			4.69	4.03	1.03	52.00	26.25^{a}
0.50			3.50	3.92	1.16	47.38	28.00^{a}
±SEM			0.67	0.16	0.06	4.35	1.97
Enzyme addition (En)%:				Not significant (P≥ 0.05)			
T × L%:							
Par.	0.25		4.48	4.07	0.97	65.75^{a}	29.25
	0.50		3.88	4.04	1.21	51.25^{b}	25.00
Pep.	0.25		4.90	3.99	1.09	38.25^{c}	23.25
	0.50		3.12	3.80	1.11	43.50^{bc}	31.00
±SEM			0.87	0.25	0.10	3.41	2.73
T × En%:				Not significant (P≥ 0.05)			
L% × En%:				Not significant (P≥ 0.05)			
T × L% ×En% (experimental treatments):							
Control		0.00	4.04	3.64	1.02	57.00^{ABC}	17.50
		0.10	5.58	3.72	0.98	57.00^{ABC}	16.00
Par.	0.25	0.00	4.79	3.62	0.88	63.00^{AB}	27.50
		0.10	4.18	4.52	1.07	68.50^{A}	31.00
	0.50	0.00	2.86	4.25	1.27	54.00^{ABC}	26.00
		0.10	4.90	3.84	1.15	48.50^{BCD}	24.00
Pep.	0.25	0.00	5.33	3.94	1.10	35.00^{D}	21.00
		0.10	4.46	4.04	1.08	41.50^{CD}	25.50
	0.50	0.00	4.36	3.82	1.24	41.50^{CD}	34.50
		0.10	1.89	3.79	0.99	45.50^{CD}	27.50
±SEM			1.38	0.34	0.13	4.71	3.73

[1] *Pooled SEM*

a. ...c. and A.... D. values in the same column within the same item followed by different superscripts are significantly different (at P ≤ 0.05 for a to c ; P ≤0.01 for A to D).

Interaction due to type of plant x level of plant addition significantly (P≤0.05) affected AST, however, insignificant (P≥0.05) affected were observed in other blood constituents (Tables 4 and 5).

Interactions effect of type of plant x level of plant addition x enzyme supplementation (experimental treatments) significantly (P≤0.05 and P≤0.01) affected AST, total protein and globulin, however, insignificant affected were observed in other blood constituents (Tables 4 and 5). It clear that, male chicks fed 0.25% Par. + 0.1% KD had higher AST; whereas, those fed control diet + 0.1% KD had higher total protein and globulin. Male chicks fed 0.25% Pep.+ 0.0% KD had lower AST, total protein and globulin (Tables 4 and 5).

In this respect, Bahnas *et al.* (2008 and 2009) indicated that feeding different levels of Par. or Pep. with or without enzyme supplementation significantly affected calcium and cholesterol contents of Japanese quail chicks. Also, Hassan *et al.* (2004) found that supplemented herbs to broiler diets caused a significantly increase in serum glucose and cholesterol. Moreover, Abd El-Latif *et al.* (2002) indicated that adding herbs to Japanese quail diets enhanced plasma total protein as well as albumin and globulin at 6 wks of age.

Slaughter parameters%:

Results presented in Table 6 show effects of using dried Par. or Pep. leaves with or without enzyme supplementation on slaughter parameters of Hy-line W-36 male chicks. The results indicated no significant differences due to main and interactions effect of dietary treatments on all slaughter parameters. (Table 6).

Table (5): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on other blood constituents of Hy-line W-36 male chicks.

Item			Total protein g/L	Albumin g/L	Globulin g/L	Albumin/ Globulin ratio	Glucose mmol/L
Type of plant (T):			Not significant (P≥ 0.05)				
Level of plant addition (L)%:			Not significant (P≥ 0.05)				
0.00			46.65^A	19.31	27.34^A	0.72	19.19
0.25			34.95^B	21.17	13.77^B	1.71	19.41
0.50			31.40^B	20.33	11.07^B	2.15	20.92
±SEM			1.60	0.63	1.68	0.31	1.18
Enzyme addition (En)%:			Not significant (P≥ 0.05)				
T × L%:			Not significant (P≥ 0.05)				
T × En%:			Not significant (P≥ 0.05)				
L% × En%:			Not significant (P≥ 0.05)				
T × L% ×En% (experimental treatments):							
Control		0.00	46.15^AB	20.06	26.09^ab	0.78	20.53
		0.10	47.14^A	18.56	28.58^a	0.66	17.85
Par.	0.25	0.00	39.56^ABC	21.53	18.03^abc	1.33	19.19
		0.10	34.29^C	20.89	13.40^c	1.56	19.80
	0.50	0.00	30.33^C	19.56	10.77^c	1.88	21.57
		0.10	32.31^C	20.78	11.53^c	2.02	24.21
Pep.	0.25	0.00	29.34^C	20.96	8.38^c	2.54	19.23
		0.10	36.59^BC	21.32	15.28^bc	1.42	19.42
	0.50	0.00	32.64^C	21.28	11.36^c	1.89	18.14
		0.10	30.33^C	19.71	10.62^c	2.81	19.75
±SEM			2.92	1.40	3.30	0.65	2.49

[1] Pooled SEM

a, ...c, and A,... C, values in the same column within the same item followed by different superscripts are significantly different (at P ≤ 0.05 for a to c; P ≤0.01 for A to C).

Table (6): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on slaughter parameters% of Hy-line W-36 male chicks.

Item			LBW, g	Carcass weight before evisceration%	Total giblets%	Front meat%	Rear meat%	Dressing%
Type of plant (T):			Not significant (P≥ 0.05)					
Level of plant addition (L)%:			Not significant (P≥ 0.05)					
Enzyme addition (En)%:			Not significant (P≥ 0.05)					
T × L%:			Not significant (P≥ 0.05)					
T × En%:			Not significant (P≥ 0.05)					
L% × En%:			Not significant (P≥ 0.05)					
T × L% ×En% (experimental treatments):								
Control		0.00	1161.5	71.41	5.00	71.35	72.52	64.62
		0.10	1095.3	71.45	4.82	73.05	71.41	64.89
Par.	0.25	0.00	1119.8	71.14	5.19	72.10	70.48	64.28
		0.10	1086.9	72.47	5.09	71.39	68.11	65.64
	0.50	0.00	1156.4	71.65	4.84	75.52	70.85	62.37
		0.10	1176.1	71.47	5.59	71.33	69.53	64.48
Pep.	0.25	0.00	1151.5	71.58	5.20	67.22	65.68	64.48
		0.10	1124.3	71.31	5.27	70.92	71.18	65.16
	0.50	0.00	1169.8	70.52	4.58	71.89	71.76	63.80
		0.10	1198.6	70.33	5.04	71.75	69.04	63.99
±SEM			28.15	0.63	0.26	2.54	1.67	1.05

[1] Pooled SEM

Similar results were reported by Bahnas *et al.* (2008 and 2009) and Ragab *et al.* (2010). Also, Ocak *et al.* (2008) reported that the carcass weight and dressing% of broiler chicks were not significantly affected by different levels of dry Pep. Internal organ weights and carcass characteristics of broiler chicks fed different levels of dry Pep. were not significantly influenced (Toghyani *et al.*, 2010). By contrast, Al-Kassie (2010) shows that the chicks fed with 0.50 and 1% dry Pep. exhibit a significant increase in dressing% compared with the control group, he also reported that mean weight of heart and gizzard showed no significant difference. Moreover, Hassan *et al.* (2004) found that addition of medicinal and aromatic plants in broiler diets had significantly higher dressing% than those fed the control diet.

While, use of fennel seeds in growing Japanese quail diets varying in their protein content with or without KD supplementation showed insignificant effects on slaughter parameters of Japanese quails (Ragab, 2007a). Chicks fed diet supplemented with 0.10% KD ration had the highest average of absolute and proportional weights of eviscerated weight, giblets and total edible meat (El-Gendi *et al.*, 2000).

Chemical composition of male's meat:

Data presented in Table 7 showed that type of plant significantly affected moisture and fat% of males meat. The highest fat (the lowest moisture%) values were observed for males fed the diet containing Pep., while those fed diet containing Par. had lower fat% of meat. However, insignificant differences were observed in protein, ash and NFE percentages of meat.

Table (7): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on chemical composition of meat% of Hy-line W-36 male chicks.

Item			Moisture%	Protein%	Fat%	Ash%	NFE%
Type of plant (T):							
Parsley (Par.)			69.55^{A}	20.97	6.77^{B}	1.49	1.24
Peppermint (Pep.)			67.76^{B}	20.96	8.50^{A}	1.55	1.22
±SEM[1]			0.39	0.43	0.41	0.06	0.01
Level of plant addition (L)%:			Not significant (P≥ 0.05)				
Enzyme addition (En)%:			Not significant (P≥ 0.05)				
Carcass part :							
Front			68.88	21.37^{a}	6.82^{B}	1.64^{A}	1.22
Rear			68.95	19.95^{b}	8.51^{A}	1.44^{B}	1.23
±SEM			0.43	0.42	0.39	0.05	0.01
T × L%:							
Par.	0.25		68.70^{A}	21.87^{AB}	6.69	1.52	1.22
	0.50		70.40^{A}	20.06^{AB}	6.84	1.47	1.23
Pep.	0.25		69.45^{A}	19.83^{B}	7.97	1.52	1.22
	0.50		66.07^{B}	22.10^{A}	9.03	1.59	1.22
±SEM			0.55	0.61	0.58	0.08	0.01
T × En%:							
Par.		0.00	69.89^{A}	19.45^{B}	7.82^{B}	1.62^{a}	1.23
		0.10	69.21^{AB}	22.49^{A}	5.71^{C}	1.37^{b}	1.22
Pep.		0.00	67.60^{B}	22.22^{A}	7.47^{B}	1.49^{b}	1.22
		0.10	67.92^{B}	19.71^{B}	9.54^{A}	1.62^{a}	1.23
±SEM			0.55	0.61	0.58	0.08	0.01
T × L% ×En% (experimental treatments):							
Control		0.00	69.27	19.78	8.26	1.47^{abc}	1.23
		0.10	70.62	19.10	7.33	1.73^{a}	1.22
Par.	0.25	0.00	69.58	20.25	7.23	1.71^{ab}	1.22
		0.10	67.83	23.49	6.14	1.32^{c}	1.22
	0.50	0.00	70.20	18.64	8.41	1.52^{abc}	1.23
		0.10	70.60	21.48	5.28	1.42^{abc}	1.22
Pep.	0.25	0.00	70.34	20.71	6.39	1.35^{bc}	1.23
		0.10	68.57	18.96	9.57	1.68^{abc}	1.22
	0.50	0.00	64.87	23.74	8.55	1.62^{abc}	1.22
		0.10	67.26	20.46	9.51	1.55^{abc}	1.23
±SEM			0.76	0.80	0.82	0.12	0.01

[1] *Pooled SEM*

a, ...c, and A.... C, values in the same column within the same item followed by different superscripts are significantly different (at P ≤ 0.05 for a to c; P ≤0.01 for A to C).

Level of plant addition, enzyme supplementation and interaction effect of level of plant addition x enzyme supplementation insignificantly affected chemical composition of males meat (Table 7). Similar to our results Ragab (2007a) found that enzyme supplementation insignificantly affected chemical composition of Japanese quails meat. However, enzyme supplementation significantly affected moisture and EE%, quails fed 1.0% had lower moisture% and consequently higher EE%. Ragab (2007b).

Carcass part significantly influenced (P≤0.05 and P≤0.01) protein, fat and ash%, front part had higher protein and ash% (consequently lower fat %) than the rear part. However, the rear part had higher fat than front part (consequently lower protein and ash%, Table 7). Similar trend was observed by Emam (2007) who reported that carcass part significantly influenced moisture, fat and ash%, of Japanese quail chicks fed different levels of Par. or Pep. as dried leaves with or without enzyme supplementation.

Concerning interactions of type of plant x enzyme supplementation effect, higher moisture% (consequently lower protein%) values were observed for male chicks fed Par.+ 0.0% KD supplemented diet, whereas, those fed Par.+ 0.1% KD supplemented diet had higher protein% (consequently lower fat and ash%) and birds fed diet containing Pep.+ 0.1% KD had higher fat and ash% (Table 7).

Interaction effect of level of plant addition x enzyme supplementation insignificantly affected chemical composition of males meat, also, type of plant x level of plant addition x enzyme supplementation (experimental treatments) insignificantly affected chemical composition of males meat except, ash% (Table 7). In this respect, Bahnas *et al.* (2008 and 2009) demonstrated that Japanese quail chicks fed different levels of Par. or Pep. as dried leaves with or without enzyme supplementation significantly affected moisture, protein and fat percentages of meat. Also, similar results were reported by Ragab *et al.* (2010).

Economical efficiency (EEf):

One of the principal constraints for the development of the poultry industry in Egypt relates to feed resources and aspects of feed, which contribute, to poor feed conversion ratio (FCR). According to the previously reported (El-Anwer *et al.*, 2010; Emam, 2010; Namra *et al.*, 2010 and Tollba *et al.*, 2010) as shown in Table (8), it can be concluded the FCR for the local strains (average, 4.29 g feed/g gain) is much higher than that for Hy-line W-36 male chicks (average, 2.62 g feed/g gain) and the exotic modern broiler strains (average, 2.05 g feed/g gain). On the other hand, local strains are known to have slow growth rate and are insufficient in feed utilization as well as tendency to consume large amounts of feed. There were appreciable differences could be detected between the native strains and Hy-line W-36 male chicks in each of LBW and FI (average, 819.09g and 3364.19g at 12 weeks of age vs. 1179.8 and 2781.6g at 10 weeks of age, respectively) as shown in Table (8).

Table (8): Reported values of productive performance of local and broiler strains as compared with Hy-line W-36 male chicks.

Item	Type of chicks	Sex	Age week	Live weight, g	Feed intake, g	Feed conversion, g feed/g gain	References
Local strains	Silver Montazah	♂	12	873.04	3374.0	4.03	El-Anwer *et al.*, 2010
	Matrouh	♂	12	801.04	3043.60	4.00	
	Bandarah	♂	12	935.38	4340.14	4.64	Tollba *et al.*, 2010
	Fayoumi	♂ & ♀	12	666.90	2699.00	4.47	Namra *et al.*,2010
	Average		12	819.09	3364.19	4.29	
Broiler strains	Ross	♂ & ♀	6	2008.9	3727.8	2.02	Emam, 2010
	Cobb	♂ & ♀	6	2139.5	4119.9	2.08	Emam, 2010
	Average		6	2074.2	3923.9	2.05	
Hy-line W-36		♂	10	1179.8	2781.6	2.62	The present study

Therefore, Hy-line W-36 male chicks is worth approximately 100% (because, chicks at one day old has low or no price) more than the purchase price of local strains, also, FI much lower than local strains, this may not only reduce the diet price but also produce cheaper meat. Thus, for the above considerations, Hy-Line W-36 male chicks can be used to partially participate in solving the problem of low animal protein consumption.

Results in Table 9 show that EEf values during the period from 14 to 70 days was improved of chicks fed diets 9, 2, 5, 7, 4, 6 and 3 as compared with those fed the control diet. Chicks fed diet 9 had the best economical and relative efficiency values being 1.772 and 104.63%, respectively followed by chicks fed diet 2 (1.735 and 102.47%, respectively) then chicks fed diet 5 (1.733 and 102.34%, respectively) when compared with chicks fed control diet. Whereas, chicks fed diet 10 had the lowest corresponding values, being 1.669 and 98.55, respectively. The relative efficiency varied between 98.55% (diet 10) to 104.63% (diet 9) which is of minor importance relative to other factors of production. This again favors the use of

Par. or Pep. without enzyme than use of the Par. or Pep. with enzyme supplementation in feeding Hy-Line W-36 male chicks (Table 9).

On the other hand, results in Table (9) show that EEf values during the period from 14 to 70 days of age was improved of Hy-Line W-36 male chicks fed all experimental diets containing Par. or Pep. with or without enzyme as compared with those fed the control diet except, those fed diets 8 and 10. These results agree with those of Abd El-Latif *et al.* (2002) and Bahnas *et al.* (2009) who reported that the inclusion of herbal feed additives in Japanese quail diets resulted in the least feed cost/Kg gain and the highest percentage of economical efficiency as compared with the control diet. Also, Hassan *et al.* (2004) indicated that EEf value at 7 weeks of age improved in broilers fed diets supplemented with the herbal feed additives as compared with the un-supplemented one.

Generally, it can be concluded from this study that dried Par. or Pep. leaves in diets of Hy-line W-36 male chicks had no beneficial effect on the productive performance. But, its had beneficial effect on economical efficiency, this again favors the use of dried Par. or Pep. leaves without enzyme supplementation. And further researches were required to value other medicinal herbs and the foregoing herbs in diverse dosages in order to eliminate using antibiotic in poultry feed. We suggest that Hy-Line W-36 male chicks can be used to partial participate in solve the problem of low animal protein consumption.

Table (9): Effects of using dried parsley or peppermint leaves with or without enzyme supplementation on economical efficiency (EEf) of Hy-line W-36 male chicks.

Item	Control		Parsley%				Peppermint%			
			0.25		0.50		0.25		0.50	
	0.0En* D**1	0.1 En D2	0.0 En D3	0.1 En D4	0.0 En D5	0.1 En D6	0.0 En D7	0.1 En D8	0.0 En D9	0.1 En D10
a_1	0.9121	0.8531	0.8954	0.8978	0.9148	0.8871	0.8835	0.8979	0.8886	0.9183
b_1	215.99	218.99	216.99	219.99	217.99	220.99	216.99	219.99	217.99	220.99
$a_1 \times b_1 = c_1$	197.004	186.820	194.293	197.507	199.417	196.040	191.711	197.529	193.706	202.935
a_2	1.8694	1.8378	1.8012	1.7868	1.8706	1.8971	1.9207	1.81	1.9033	1.8422
b_2	211.33	214.33	212.33	215.33	213.33	216.33	212.33	215.33	213.33	216.33
$a_2 \times b_2 = c_2$	395.06	393.90	382.45	384.75	399.06	410.40	407.82	389.75	406.03	398.52
$(c_1+c_2)=c_{total}$	592.06	580.72	576.74	582.26	598.47	606.44	599.53	587.28	599.74	601.46
D	1.0632	1.059	1.038	1.0495	1.0905	1.0927	1.0895	1.0473	1.1083	1.0702
E	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0
$d \times e = f$	1594.8	1588.5	1557.0	1574.3	1635.8	1639.1	1634.3	1571.0	1662.5	1605.3
$f - c_{total} = g$	1002.74	1007.78	980.26	991.99	1037.28	1032.61	1034.72	983.67	1062.71	1003.84
g / c_{total}	1.694	1.735	1.700	1.704	1.733	1.703	1.726	1.675	1.772	1.669
R	100.00	102.47	100.36	100.60	102.34	100.54	101.90	98.90	104.63	98.55

* *Enzyme%.* ** *Diet.* a_1 *and* a_2 *…………… average feed intake (Kg/bird) during the periods from 14-42 and 43-70 days of age, respectively.*

b_1 *and* b_2 *…………… price / Kg feed (P.T.) during the periods from 14-42 and 43-70 days of age, respectively (based on average local market price of diets during the experimental time).*

c_1 *and* c_2 *……………feed cost (P.T.) during the periods from 14-42 and 43-70 days of age, respectively.*

Total feed cost (P.T.) = c_{total} *=* (c_1+c_2). *Average LBWG (Kg/ bird) d*

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تأثير استخدام بعض الإضافات الغذائية الطبيعية على الأداء الإنتاجي لديوك Hy-Line W-36 النامية.

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أجريت هذه التجربة في المزرعة التجريبية الخاصة بقسم الدواجن - كلية الزراعة - جامعة الفيوم. بغرض دراسة تأثير استخدام بعض الإضافات الغذائية الطبيعية (البقدونس أوالنعناع كـ أوراق جافة) علي الأداء الإنتاجي لذكور Hy-Line W-36 النامية. استخدم مخلوط الإنزيمات التجارية كيم زايم دراي بمعدل 1 كجم/طن (0.1%) قسمت الطيور علي عمر 14 يوم إلي 10 معاملات (24 طائر/معاملة) واحتوت كل معاملة علي 3 مكررات (8 طائر/مكرر) وكانت المعاملات التجربيه كما يلي:

1- عليقة كنترول خاليه من أورق البقدونس أو النعناع (عليقة1).

2- عليقة1+ 0.1 % كيم زايم.

3- عليقة 1+ 0.25 % أوراق بقدونس.

4- عليقة1 + 0.25 % أوراق بقدونس + 0.1 % كيم زايم

5- عليقة1 + 0.50 % أوراق بقدونس.

6-عليقة 1+ 0.50 % أوراق بقدونس+0.1 % كيم زايم.

7- عليقة1+ 0.25% أوراق نعناع.

8- عليقة 1+ 0.25% أوراق نعناع+0.1 % كيم زايم.

9- عليقة1+ 0.50 % أوراق نعناع.

10- عليقة 1+ 0.50 % أوراق نعناع +0.1 % كيم زايم.

وتتلخص النتائج المتحصل عليها فيما يلي:

1- وزن الجسم الحي ووزن الجسم المكتسب: لم يكن هناك تأثير معنوي لأي من المعاملات التجريبية علي وزن الجسم الحي، وزن الجسم المكتسب طوال فترات الدراسة فيما عدا التداخل بين نوع النبات والأنزيم المضاف، فكان أعلي وزن جسم مكتسب خلال الفترة من 43-70 يوم من العمر للذكور المغذاة علي عليقة مضاف إليها النعناع وبدون إضافة الأنزيم.

2- استهلاك الغذاء ومعدل تحويل الغذاء: استهلكت الديوك التي غذيت علي عليقة النعناع أعلي كمية غذاء خلال الفترة من 14-70 يوم من العمر- أدت إضافة الإنزيمات إلي خفض كمية الغذاء المستهلك طوال فترات الدراسة. استهلكت الطيور التي غذيت علي عليقة بها 0.25% بقدونس + الأنزيم أقل كمية غذاء خلال نفس الفترة. لم يكن هناك تأثير معنوي لأي من المعاملات التجريبية علي كفاءة تحول الغذاء.

3- مكونات الدم: تشير النتائج إلي أن هناك زيادة خطية في ALT، بينما أنخفض البروتين الكلي والجلوبيولين بزيادة معدل الإضافة. كان هناك تأثير للمعاملات التجريبية علي AST والبروتين الكلي والجلوبيولين.

4- صفات الذبيحة: لم يكن هناك تأثير معنوي لأي من المعاملات التجريبية علي صفات الذبيحة.

5-التحليل الكيماني للحم الذكور: لم يكن هناك تأثير معنوي لأي من المعاملات التجريبية علي التحليل الكيماني للحم الذكور فيما عدا نسبة الرماد.

6- الكفاءة الاقتصادية والنسبية: تحسنت الكفاءة الاقتصادية والنسبية لذكور Hy-Line W-36 المغذي علي جميع العلائق التجريبية المحتوية علي البقدونس أو النعناع بدون إضافة الأنزيم عند مقارنتها بالمغذاة علي عليقة الكنترول.

ومن هذه الدراسة يمكن استنتاج أن العلائق المحتوية علي الأوراق الجافة للبقدونس أو النعناع لم يكن لها تأثير مجدي علي الأداء الإنتاجي، بينما كان لجميع الإضافات تأثير مجدي علي الكفاءة الاقتصادية فيما عدا المغذاة علي عليقة تحتوي 0.25% أو 0.50 أوراق نعناع مع إضافة الأنزيم. يمكن استخدام ديوك Hy-Line W-36 لحل مشكلة نقص البروتين الحيواني جزئياً.