

## **EFFECTS OF SOME HERBAL ADDITIVES ON PHYSIOLOGICAL AND PRODUCTIVE PERFORMANCE OF A LOCAL STRAIN of chicken under HOT CLIMATIC CONDITIONS**

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### **ABSTRACT**

A total of 108 pullets and 12 cocks of Bandrah strain at sexual maturity (24 wks old) were randomly chosen. Birds were divided allocated into three equal groups. The 1<sup>st</sup> group was fed a basal diet and used as a control while, the 2<sup>nd</sup> and 3<sup>th</sup> groups were fed basal diet supplemented with 2% black seeds or fresh garlic (as herbal additives), respectively. Treatments were conducted during summer season under 38°C at daylight and 30°C night from 24 to 36 weeks of age.

Results indicated that there were no significant differences in body weight gain due to supplementing studied herbal additives. Feed consumption was ( $P < 0.05$ ) increased and feed conversion was ( $P < 0.05$ ) improved by adding herbal additives. Supplementing the basal diet with garlic significantly increased egg production rate and egg mass while, black seeds supplementation was insignificantly increased the same parameters compared with control group. Besides, total protein as well as albumin and globulin, and  $T_3$  were increased significantly while, creatinine, GPT and GOT were not affected. Also, plasma glucose was decreased significantly by feeding diet supplemented with herbal additives. Moreover, herbal additives decreased significantly plasma, liver and egg total cholesterol and total lipids. The, relative weight of thymus and thyroid glands were increased significantly due to herbal additives. Furthermore, fertility, hatchability, hatched chick weight percentages and egg quality improved numerically comparing with un-supplemented control group. This study suggested that herbal additives could be used in laying hens diets to improve the productive performance, blood biochemical, egg quality and immune glands weight of laying hens without any harmful side effects on the human health.

### **INTRODUCTION**

Recently, there is a tendency to use of herbs, seeds, and edible plants as natural feed additives to avoid the residual cumulative effects of antibiotics or any other synthetic drugs in final product of poultry, which has a positive effect on the human health. Herbs have some medical properties and pharmacological activity that could help in improving productive, physiological, immunological performance or plasma biochemical parameters of poultry. The efficiency of herbal edible plants and some plant seeds as non-traditional feed additives, growth promotion (Abaza, 2001), natural tonic, restoratives, antibacterial and antiparasitic drugs (Khodary *et al.*, 1996) on improving the productive performance in poultry have been proven. Adding black seeds to poultry diets resulted in improving body weight (El-Kaiaty *et al.*, 2002) in laying hens, Zeweil, (1996) in growing and laying Japanese quails, Tollba and Hassan (2003) in broilers chicks, and better feed conversion (Abdo, 1998). *Nigella sativa* seeds had potent effect towards protection from decrease in hemoglobin and leukocyte counts and its inhibitor

against aflatoxin formation (Nair, *et al.*, 1991). Also, black seeds reduced the concentration of serum cholesterol and triglycerides (Mandour *et al.*, 1995), serum total lipids and liver cholesterol in broiler (Abdo, 1998), fat content, serum total lipids and serum cholesterol in ducks (Ghazalah and Ibrahim, 1996). Garlic could be used as growth promoter in broilers (Day and Samanto, 1993), as hypo-cholesterolemic and hypo-lipemic in White Leghorn (Sharma, 1979). Also, Adding garlic to poultry diets, resulted in improving body weight (Day and Samanto, 1993), better feed conversion (Abdo, 1998), increased egg production of IZA Brown and Fayoumi hens (Mohamed *et al.*, 2000). This work was performed to study the effects of some natural herbal additives (Black seeds and Garlic) on productive, physiological, immunological performance and improving egg quality of local strain, during hot summer season subsequently in hot environmental temperature.

## **MATERIALS AND METHODS**

This study was done at the Seds Poultry Breeding Research Station, Animal Production Institute, Agricultural Research Center, Ministry of Agriculture, Beni-Suef Governorate, Egypt from June to August (summer). A total of 90 pullets and 9 cocks of Bandrah strain at (30 wks old) were randomly chosen. The birds were allocated into three equal groups had nearly similar body weight, each containing (30) birds in three replicates (9 pullets and a cock each) in open system floor pens. The 1<sup>st</sup> group were fed a basal diet (Table 1) and served as control group, while the 2<sup>nd</sup> and 3<sup>rd</sup> groups were fed on the same diet supplemented with 2% black seeds (*Nigella sativa*) or fresh garlic cloves (*Allium Sativum*), respectively. Treatments were conducted during summer season with average temperature ranged between 38°C and 30°C from 24 to 36 weeks of age. The birds were kept under the same condition of management throughout the experimental period. Body weight, feed intake, feed conversion ratio, egg number and egg weight were recorded for each group. A total number of 60 eggs (laid on consecutive days) were taken from the experimental groups for egg quality measurements (shell weight %, yolk weight %, albumen weight %, yolk index and haugh unit according to Stadleman (1977) were determined. In August, 5 birds / group/ strain were taken and located individually then five eggs were collected to determine egg total lipids and total cholesterol. The same birds were slaughtered, lymphoid organs weighed and calculated as mg/100g body weight. Blood sample centrifuged, plasma separated and stored at – 20 °C until analyzed. Plasma total protein (g/dl) albumin (g/dl), glucose (mg/dl), T<sub>3</sub> (ng/dl), cholesterol (mg/dl), total lipids (mg/dl), creatinine (mg/dl), glutamic pyruvic transaminase (GPT) (U/L), glutamic oxaloacetic transaminase (GOT) (U/L), yolk and liver total cholesterol (mg/g) and total lipids (mg/g) were colorimetrically determined. The manufacture recommendations of commercial kits were used for all determinations. At the end of each season, the collected eggs from each treatment were set in an electric forced draft incubator then fertility and hatchability percents were calculated and the hatching chicks were

individually weighed. Data were subjected to statistical analysis using computerized analysis of variance and Duncan's multiple range test procedures (SAS, 1998). The percentage values were transferred to percentage angle using arcsine equation before subjected to statistical analysis.

**Table (1): Composition and calculated analysis of the basal diet fed to experimental birds.**

| Ingredients                       | %             |
|-----------------------------------|---------------|
| <b>Corn Yellow</b>                | 66.00         |
| Soybean meal 44 %                 | 23.00         |
| Wheat bran                        | 2.50          |
| Di-calcium phosphate              | 1.50          |
| Limestone meal                    | 6.20          |
| Salt (NaCl)                       | 0.40          |
| DI-Methionine                     | 0.10          |
| Vit. & Min. Mixture *             | 0.30          |
| <b>Total</b>                      | <b>100.00</b> |
| <b>Calculated analysis</b>        |               |
| Metabolizable energy (Kcal / Kg ) | 2747          |
| Crude protein %                   | 15.67         |

- Supplied per Kg of diet: Vit. A, 10 000 000 IU; Vit. D<sub>3</sub>, 2 000 000 IU; Vit. E, 10 mg; Vit. K<sub>3</sub>, 1 mg; Vit. B<sub>1</sub>, 1mg; Vit. B<sub>2</sub>, 5 mg; Vit. B<sub>6</sub>, 1.5 mg; Vit. B<sub>12</sub>, 10 mg; Niacin, 30mg; Pantothenic acid, 10mg; Folic acid, 1mg; Biotin, 50mcg; Choline chloride, 260mg; Copper, 4 mg; Iron, 30mg; Manganese, 60mg; Zinc, 50mg; Iodine, 1.3mg; Selenium, 0.1mg; Cobalt, 0.1mg;

## RESULTS AND DISCUSSION

### I - Productive performance:

#### 1- Body weight gain

It is evident from Table (2) that, body weight gain was approximately similar for all groups fed herbal additives or control. Abdo, (1998) with broilers, Ghazalah and Ibrahim (1996) with ducks, Taha (1997) with rabbits and El-Kaiaty *et al.*, (2002) with White Bovans laying hens, obtained the same results when added black seeds to the diets. Also, with garlic, El-Habbak *et al.*, (1989) in quails, Qureshi *et al.* (1983a) in Leghorn pullets and Konjufca *et al.*, (1995) with broiler, observed similar body weight results.

#### 2- Feed consumption and conversion:

Table (2) clearly shows that, birds consumed ( $P < 0.05$ ) more feed due to the use of garlic or black seeds than un-supplemented control group. These results confirm previous finding of El-Nawawy (1991) and Sharma *et al.*, (1979) reported that feeding garlic powder to adult White Leghorn hens at the rate of 3 % significantly increased feed consumption by 13 g /bird/day. Also, Mohamed *et al.*, (2000) attributed the ISA brown and Fayoumi hens consuming significantly more feed due to the use of garlic palatability of feed and for the strong smelling odour of garlic. On the other hand, feed consumption did not affect by dietary garlic of Leghorn pullets (Qureshi *et al.*).

(1983a) or by dietary black seeds of White Bovans pullets (El-Kaiaty *et al.*, 2002).

Data in the same Table pointed out that, birds fed studied herbal additives had a significant ( $P<0.05$ ) improvement in feed conversion compared with un-supplemented control birds. In general, significant ( $P<0.05$ ) improvement in feed conversion was obtained by feeding garlic compared to other treatments applied. These results confirm previous finding of El-Nawawy, (1991), Prasad and Pandey, (1995) and El-Ghamry *et al.*, (2002) when added 0.4% *Nigella sativa* or 2 %garlic to broiler diet and found significant effect on feed conversion. Further studies reported by El-Kaiaty *et al.*, (2002) when added black seeds or garlic to laying hens

### 3- Egg Production Traits:

It was observed that, birds fed diet supplemented with garlic laid significantly ( $P<0.05$ ) more and heavy eggs compared with un-supplemented control birds Table (2). In general, insignificant increases were noticed in egg production (mass, weight and production rate) of birds fed dietary black seeds. These Previous finding of Sharma *et al.*, (1979) reported that feeding 1% garlic powder to White Leghorn layer caused significant ( $P<0.05$ ) increase in percent hen housed egg production. Furthermore, Mohamed *et al.*, (2000) reported that ISA Brown and Fayoumi hens fed garlic laid significantly more eggs compared with control groups while Fayoumi hens responded better than ISA Brown hens which confirm our results. Concerning to egg weight, El-Habbak *et al.*, (1989) reported that adding 4 % garlic to quail diet caused a significant ( $P<0.05$ ) increase egg weight. On the contrary, El-Kaiaty *et al.*, (2002) observed no marked change in both egg number or egg production rate when black seeds or garlic were added to the diets of layer White Bovans hens. However, El-Habbak *et al.*, (1989) found a depression in egg production of Japanese quail when fed 0.5 or 1(g) garlic g/bird/day. This contradiction may be due to the difference in species or dose of garlic. The present results of feed consumption and conversion approved and explained the increasing of egg production.

**Table (2): Productive performance of laying hens fed tested herbal additives from 24 to 36 weeks of age (M±S.E.).**

| Items                          | Control                  | Black seed               | Garlic                   |
|--------------------------------|--------------------------|--------------------------|--------------------------|
| Body weight gain (g)           | 208.1±20.7 <sup>a</sup>  | 216.4±19.2 <sup>a</sup>  | 218.0±13.8 <sup>a</sup>  |
| Feed consumption Hens /day     | 87.06±0.38 <sup>b</sup>  | 91.70±0.36 <sup>a</sup>  | 92.76±0.62 <sup>a</sup>  |
| Feed conversion Hens /egg/ wks | 5.29±0.02 <sup>a</sup>   | 4.97±0.03 <sup>b</sup>   | 4.32±0.02 <sup>c</sup>   |
| Egg production rate/Wks        | 2.35±0.10 <sup>b</sup>   | 2.56±0.07 <sup>b</sup>   | 2.91±0.14 <sup>a</sup>   |
| Egg mass hens /wks             | 115.39±3.48 <sup>b</sup> | 129.10±3.75 <sup>b</sup> | 150.30±7.62 <sup>a</sup> |
| Egg weight (g)                 | 49.10±0.53 <sup>b</sup>  | 50.43±0.63 <sup>ab</sup> | 51.65±0.81 <sup>a</sup>  |

Means within a row having different superscript are significantly different ( $P<0.05$ )

## II -Blood biochemical parameters:

### 1 - Some blood parameters:

Data in Table (3) include, T<sub>3</sub> had significantly ( $P<0.05$ ) increased due to feeding diet supplemented with herbal additives compared with control

group. Similarly, Khodary *et al.*, (1996) reported that small doses of black seeds may stimulate the thyroid gland directly and/or through the pituitary gland and doses may inhibit the iodination of T<sub>3</sub> to T<sub>4</sub>. Feeding 1% *Nigella sativa* seeds increased the concentration of thyroxin (Mandour *et al.*, 1998). Also, El-Nawawy, (1991) reported that garlic stimulated growth due to of its like thyroid activity. Further studies reported by Abd El-Latif *et al.*, (2002) with Japanese quail found the same results when added black cumin to the diets.

Also, Total protein as well as Albumin and Globulin were significantly (P<0.05) affected by dietary treatment (Table3). Increasing globulin may be due to the immunostimulate as affected by feeding studied herbal additives. Likewise, Afifi, (2001) observed the same results when added 2 or 3% *Nigella sativa* in hot climatic condition, Abdo, (1998) and Tollba and Hassan (2003) when fed garlic or black cumin and Abd El-Latif *et al.*, (2002) when added black cumin to Japanese quail diet.

Manifest from Table (3) those, dietary herbal additives in either strains or seasons did not affect Creatinine GPT and GOT values significantly. Similarly, El-Habbak *et al.*, (1989) when claimed that no significant differences in SGOT or SGOT activities by feeding garlic or its extracts to Japanese quail. Furthermore, the same observations were noticed by Tollba and Hassan (2003) when fed garlic or black cumin to broiler diets and Abd El-Latif *et al.*, (2002) when added black cumin to Japanese quail diets and found that no significant change in creatinine GPT and GOT values.

**Table (3): plasma biochemical parameters of laying hens fed supplemented herbal additives (Mean ±S.E.).**

| Items                  | Control                  | Black seed               | Garlic                   |
|------------------------|--------------------------|--------------------------|--------------------------|
| T <sub>3</sub> (ng/dl) | 262.56±1.16 <sup>c</sup> | 298.54±4.38 <sup>a</sup> | 306.85±3.48 <sup>a</sup> |
| Total protein (mg/dl)  | 3.42±0.31 <sup>b</sup>   | 4.21±0.45 <sup>a</sup>   | 4.58±0.34 <sup>a</sup>   |
| Albumin (g/dl)         | 2.39±0.71 <sup>b</sup>   | 2.70±0.17 <sup>a</sup>   | 2.79±0.63 <sup>a</sup>   |
| Globulin (g/dl)        | 1.03±0.06 <sup>c</sup>   | 1.51±0.25 <sup>b</sup>   | 1.79±0.52 <sup>a</sup>   |
| Creatinine (mg/dl)     | 0.76±0.01 <sup>a</sup>   | 0.73±0.02 <sup>a</sup>   | 0.74±0.01 <sup>a</sup>   |
| GPT (U/L)              | 58.64±0.60 <sup>a</sup>  | 57.98±1.67 <sup>a</sup>  | 58.14±0.49 <sup>a</sup>  |
| GOT (U/L)              | 20.54±1.13 <sup>a</sup>  | 20.16±1.06 <sup>a</sup>  | 20.82±0.51 <sup>a</sup>  |
| Glucose (mg/dl)        | 255.37±5.60 <sup>a</sup> | 173.28±3.73 <sup>c</sup> | 167.36±5.60 <sup>c</sup> |

Means within a row having different superscript are significantly different (P<0.05)

As Table (3) show Glucose content was depressed significantly (P<0.05) by feeding herbal additives compared with un-fed control birds. Similarly, El-Kaiaty *et al.*, (2002) found a reduction (16 or 11%) in serum glucose by adding 2% black seeds or garlic. Farva *et al.*, (1986) gave garlic oil to streptozotocin-diabetic rats for two months decreased the raised blood sugar. A possible reason of this effect may be due to hexokinase present in garlic which was found to phosphorylate D-glucose, D-mannose, D-fructose, and D-glucosemine with preferential action on glucose (Bhat and Abiraman, 1979). Qureshi *et al.*, (1983a) observed reduction of 33-39% in glucose-6-phosphate dehydrogenase by adding garlic paste, solvent fractions or garlic oil to white Leghorn diets.

**2- Plasma Total cholesterol and Total lipids:**

Inspection of data in Table (4) shows that, a significant decrease ( $P<0.01$ ) in total cholesterol and total lipids was detected due to the feeding of studied herbal additives compared with un-supplemented control diet. The reduction was more profound in birds fed garlic. Generally, These findings are in agreement with Sharma *et al.*, (1979) and Qureshi *et al.*, (1983b) with White Leghorn layer hens, Mohamed *et al.*, (2000) with domestic fowl, El-Habbak *et al.*, (1989) with Japanese quail, Ghasalah and Ibrahim (1996) with ducks, Konjufca *et al.*, (1997) with broiler when fed garlic. Also, Sklan *et al.*, (1992) when reported that serum cholesterol or serum total lipids were reduced significantly by feeding garlic due to its content of sulfur compounds which responsible for inhibiting biosynthesis of cholesterol and lipids. Similar resulted were obtained with feeding black seeds by Khodary *et al.*, (1996); El-Kaiaty *et al.*, (2002) and Mandour *et al.*, (1998).

**Table (4): Blood, eggs and liver cholesterol and lipids of laying hens fed studied herbal additives (mean  $\pm$  S.E.).**

| Items                       | Control                         | Black seed                      | Garlic                          |
|-----------------------------|---------------------------------|---------------------------------|---------------------------------|
| Plasma cholesterol (mg/dl)  | 178.14 $\pm$ 5.69 <sup>a</sup>  | 141.34 $\pm$ 10.1 <sup>b</sup>  | 122.15 $\pm$ 11.6 <sup>c</sup>  |
| Egg cholesterol (mg/g)      | 16.71 $\pm$ 0.39 <sup>a</sup>   | 14.01 $\pm$ 0.26 <sup>b</sup>   | 13.08 $\pm$ 0.57 <sup>c</sup>   |
| Liver cholesterol (mg/g)    | 176.34 $\pm$ 5.97 <sup>a</sup>  | 123.83 $\pm$ 0.73 <sup>c</sup>  | 104.40 $\pm$ 5.54 <sup>d</sup>  |
| Plasma total lipids (mg/dl) | 1432.76 $\pm$ 11.6 <sup>a</sup> | 1358.96 $\pm$ 17.4 <sup>b</sup> | 1342.48 $\pm$ 24.3 <sup>b</sup> |
| Egg Total lipids (mg/g)     | 322.19 $\pm$ 23.1 <sup>a</sup>  | 276.24 $\pm$ 10.8 <sup>b</sup>  | 264.61 $\pm$ 4.87 <sup>c</sup>  |
| Liver Total lipids (mg/g)   | 323.47 $\pm$ 11.5 <sup>a</sup>  | 231.53 $\pm$ 6.04 <sup>c</sup>  | 207.06 $\pm$ 9.47 <sup>d</sup>  |

Means within a row having different superscript are significantly different ( $P<0.05$ ).

**3- Egg yolk Total cholesterol and Total lipids:**

Table (5) signify that egg yolk total cholesterol and total lipids were significantly ( $P<0.01$ ) decreased due to feeding diet included herbal additives, as well as their trend on plasma, comparing with un-supplemented control group. The declination was significantly ( $P<0.05$ ) greater in group fed garlic. These results are in confirm with those reported by Sharma *et al.*, (1979), Mohamed *et al.*, (2000) and El-Kaiaty *et al.*, (2002) with laying hens, and El-Habbak *et al.*, (1989) with Japanese quail. They reported that yolk cholesterol or serum total lipids were reduced significantly by feeding garlic. Also, with black seeds, El-Kaiaty *et al.*, (2002) with laying hens found similar results.

**4- Liver Total cholesterol and Total lipids:**

Table (4) shows liver total cholesterol and total lipids of birds fed herbal additives were significantly ( $P<0.01$ ) decreased, as well as their trend on egg yolk, compared with un-supplemented control birds. Total cholesterol and total lipids observations in liver followed the same pattern in plasma or in egg yolk. Similar results were obtained previously by Sharma *et al.*, (1976) with rabbit, Mohamed *et al.*, (2000) with laying hens, El-Habbak *et al.*, (1989) with Japanese quails, Konjufac *et al.*, (1997) with broilers and Ghazalah and Ibrahim (1996) with ducks when added garlic to diets. Also, with adding black seeds, El-Kaiaty *et al.*,(2002) with laying hens, Mandour *et al.*, (1998), Abdo,

(1998) with broiler and Ghasalah and Ibrahim (1996) with ducks observed similar results.

Accordingly, Qureshi *et al.*, (1983b) observed a significant decrease in hepatic 3-hydroxy-3-methylglutaryl-CoA reductase, cholesterol 7 $\alpha$ -hydroxylase, fatty acid synthetase, and representative pentose-phosphate pathway activities accompanied with feeding of garlic or its extracts to both layer or broiler pullets. Since these enzymatic activities reflect the control of overall lipids metabolism significant decrease in serum lipids (serum total cholesterol, low-density lipoprotein cholesterol and triglycerides) occurred. They added that, garlic or its extracts contain cholesterol-suppressive agents (alliin and allicin), and that the mechanism of their hypocholesterolemic action is at the level of the suppression of cholesterol biosynthesis. Also, Mandour *et al.*, (1998) suggested that feeding black seeds has non-toxic effect on liver and kidneys as confirmed by an improvement of enzymatic activities that decreased cholesterol and triglycerides. Moreover, Khodary *et al.*, (1996) and Edward (1976) attributed the decrease of cholesterol level by black seeds to its high unsaturated fatty acids contents which may be stimulate the cholesterol excretion into intestine where its oxidation to bile acids.

### III – Relative weight of some lymphoid organs:

As shown in Table (5), a significant ( $P < 0.05$ ) increase were detected in relative weight of thymus and thyroid glands due to feeding diets included either garlic or black seeds compared with un-supplemented control diets. However, insignificant increases were noticed in spleen weight of birds fed dietary treatments. Herbal additives may due to the immunostimulate as affect increase weight of thymus, thyroid glands and globulin value. These results are similar to those reported previously by El-Kaiaty *et al.*, (2002) when fed garlic or black seeds and Abdo, (1998) who found that weight of thymus gland increased significantly by feeding 3% garlic but had no effect on spleen weight. Khodary *et al.*, (1996) reported that small doses of black seeds may stimulate the thyroid gland directly and/or through the pituitary gland.

**Table (5): Relative weight of some lymphoid organs (mg/100g B.W.) of laying hens fed supplemented herbal additives (Mean  $\pm$  S.E.).**

| Items   | Control                       | Black seed                     | Garlic                         |
|---------|-------------------------------|--------------------------------|--------------------------------|
| Spleen  | 99.16 $\pm$ 4.92 <sup>a</sup> | 100.79 $\pm$ 10.8 <sup>a</sup> | 101.44 $\pm$ 18.6 <sup>a</sup> |
| Thymus  | 93.11 $\pm$ 7.66 <sup>b</sup> | 107.86 $\pm$ 16.8 <sup>a</sup> | 109.10 $\pm$ 14.5 <sup>a</sup> |
| Thyroid | 3.41 $\pm$ 0.16 <sup>b</sup>  | 4.85 $\pm$ 0.20 <sup>a</sup>   | 4.97 $\pm$ 0.16 <sup>a</sup>   |

Means within a row having different superscript are significantly different ( $P < 0.05$ ).

Also, El-Nawawy, (1991) reported that garlic stimulate growth because of its like thyroid activity.

### IV- Egg Quaity:

Table (6) data demonstrate that, egg quality (yolk index and haugh unit) or egg components (weights of shell, yolk and albumen) were not

affected by using of herbal additives. In this respect Alm Eldein (1999) who found no significantly change in yolk index, haugh unit or shell thickness of laying hens fed 5g garlic 3 or 6 days/week for two months. Also, Hassan (2000) found no significant in shell percentage when fed laying hens 2 % garlic or black seeds.

**Table (6): Egg quality of laying hens fed studied herbal additives (M±S.E.)**

| Items            | Control                 | Black seed              | Garlic                  |
|------------------|-------------------------|-------------------------|-------------------------|
| Albumin weight % | 54.77±0.76 <sup>a</sup> | 54.83±1.14 <sup>a</sup> | 54.32±0.45 <sup>a</sup> |
| Shell weight %   | 11.44±1.89 <sup>a</sup> | 11.11±0.71 <sup>a</sup> | 11.93±0.27 <sup>a</sup> |
| Yolk Weight %    | 33.79±1.21 <sup>a</sup> | 34.06±1.49 <sup>a</sup> | 33.75±0.72 <sup>a</sup> |
| H. U.            | 88.49±1.65 <sup>a</sup> | 88.90±3.09 <sup>a</sup> | 87.85±1.79 <sup>a</sup> |
| Yolk Index       | 39.19±0.69 <sup>a</sup> | 40.15±0.94 <sup>a</sup> | 39.86±0.61 <sup>a</sup> |

**VI–Fertility and hatchability percentage:**

Concerning fertility, hatchability and chick weight values, numerical improvements were detected due to feeding diets supplemented with tested herbal additives (Table 7). These results disagreed with reports showed that high levels of black seeds induced a decrease in egg fertility and hatchability percentages in laying hens (khodary *et al.*, 1996).

Results of this experiment suggested that, the addition of herbal additives (garlic or black seeds) to laying hens diets in order to improve productive, immunological and physiological performance during hot season. Also, it causes sharp decrease in total cholesterol and total lipids in plasma, liver and egg with no harmful side effect on the human health.

**Table (7): Fertility and hatchability percentage of laying hens fed studied herbal additives (M±S.E.).**

| Items            | Control                 | Black seed              | Garlic                   |
|------------------|-------------------------|-------------------------|--------------------------|
| Fertility (%)    | 75.10±5.13 <sup>a</sup> | 76.66±2.27 <sup>a</sup> | 77.27±8.61 <sup>a</sup>  |
| Hatchability (%) | 72.05±5.61 <sup>a</sup> | 74.88±2.40 <sup>a</sup> | 74.08±4.76 <sup>a</sup>  |
| Chick weight (g) | 31.97±1.14 <sup>a</sup> | 32.39±0.39 <sup>a</sup> | 31.73±0.74 <sup>aa</sup> |
| Chick weight (%) | 66.80±0.78 <sup>a</sup> | 65.45±0.64 <sup>a</sup> | 66.02±1.18 <sup>a</sup>  |



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### تأثير بعض إضافات الأعشاب الطبيعية على الصفات الفسيولوجية والإنتاجية لبعض السلالات المحلية تحت ظروف المناخ الحار وجدي زكريا علي - مصطفى محمد صبرى و محمد عبد العزيز عبد الجليل معهد بحوث الإنتاج الحيواني - وزارة الزراعة - الدقى - الجيزة - ج.م.ع.

أجريت هذه الدراسة لمعرفة تأثير بعض إضافات الأعشاب الطبيعية ( بذور حبة البركة ومجروش الثوم الطازج ) على بعض الصفات الإنتاجية والفسيولوجية للدجاج البياض خلال فصل الصيف حيث ارتفاع درجة الحرارة (٣٨م-٣٠م). تم استخدام عدد ١٠٨ دجاجة و١٢ ديك من سلالة البندرة في عمر النضج الجنسي (٢٤) أسبوع وزعت عشوائيا إلى ثلاثة مجموعات متساوية بكل منها ٤٠ طائر في أربعة مكررات كل منها (٩ دجاجات وديك) تم تربيتهم تحت ظروف متماثلة مع إضافة مجروش بذور حبة البركة ومجروش الثوم الطازج بمعدل ٢ % إلى عليقه المقارنة. استمرت التجربة لمدة ١٢ أسبوع في فصل الصيف ٢٤-٣٦ أسبوع من العمر (يونيو ويوليو وأغسطس).

أوضحت النتائج أن إضافات الأعشاب الطبيعية لم تؤثر معنويا على وزن الجسم المكتسب ولكن كان هناك استجابة معنوية للإضافات على العلف المأكل مع تحسن الكفاءة التحويلية معنويا . وكانت هناك زيادة معنوية في إنتاج البيض (معدل وكتلة) وكذلك زيادة البروتين الكلى ومستوى هرمون تراسي أيدوثيرونين (T<sub>3</sub>) Triiodothyronine في بلازما الدم مع إضافة مجروش الثوم فقط. كما أدت إضافات الأعشاب الطبيعية إلى زيادة معنوية في وزن كل من الغدة التيموثية وغدة الدرقية بينما وزن الطحال لم يتأثر. كما أدت إلى انخفاض معنوي في مستوى الكوليسترول والدهون الكلية في بلازما الدم وكذلك في الكبد وفي صفار البيض وكذلك تركيز الجلوكوز في بلازما الدم. بينما لم يتأثر معنويا كل من تركيز الكرياتين وإنزيمي GOT and GPT في بلازما الدم. وكانت هناك تحسن عددي فقط في كل من نسبة الخصوبة والتفريخ ووزن الكتاكيت وجودة البيض الناتج .

يستخلص من النتائج أنه ينصح باستخدام إضافات الأعشاب الطبيعية المختبرة (ويفضل مجروش الثوم) في علائق الدجاج البياض وخاصة في الأجواء الحارة لزيادة إنتاج البيض والعلف المأكل وتحسين معدل التحويل الغذائي وخصائص الدم وخفض مستوى الكوليسترول والدهون الكلية في كل من بلازما الدم والكبد وصفار البيض دون حدوث أي آثار جانبية على صحة الإنسان.