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EFFECT OF GARLIC OIL IN SOME QUALITATIVE CHARACTERISTICS OF LAYING HENS EGGS

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ABSTRACT
This study was carried out in the field of poultry of the Department of animal resource / collage of Agriculture / University of Baghdad during the period 22.10.2009 until 22.04.2010, in order to study the effect of different levels of addition of garlic oil in the diets of laying hens, and how that affects the qualities quality of laying hens eggs. 64 laying hens laying strain Lohmann brown at age of 20 weeks were used, weighed individually and were distributed randomly at the age of 22 weeks to ten treatment with two replicate per treatment (8 hens / replicate), the first treatment (control diet) are free of garlic oil, while the second, third and fourth contained 0.2, 0.4 and 0.6% of the garlic oil respectively. The results showed generally superiority transactions Increment to the treatment of the comparison in some of the attributes of quality of eggs produced during most periods of productivity, especially in the egg Shell thickness, Hu unit, and relative yolk weight. Conclude from this research that the addition of garlic oil in the diets of laying hens has led to the improvement of some characteristics of quality of producer eggs and thus can enter these oils in the diets of chicken eggs for improving the quality characteristics of the egg.

KEYWORDS: Garlic oil, layings, producer egg, quantitative characteristic.

INTRODUCTION

The recent studies are directed at the present time towards the organization of food and the use of seed oils and medicinal plants has given the World Health Organization (WHO, 1997) in international conferences great importance to the food drugs as one of the modern foundations to avoid too much side effects of medication As a result of development in the poultry industry, Require find ways to support health and prevent chicken including raising the level of immune system of chickens for resistance of various diseases in addition to the fact that nutrition is a basis worker and specific to the success of poultry projects and they constitute more than 75% of the total cost of the process productivity by raising the level of immune system and thus production and improve the qualities of quality of the produced eggs.

Cook, 1991 indicate comprehensively the role of nutrition in raising the immune response of the chicken and improve the performance production and quality through the identification of dietary needs depending on their impact on the immunity. When became a clear relationship between nutrition and influence on immune increased the importance of studies that rely on the food needs which has standard role in building the body's immune (Cook, 1996) and this was an incentive for researchers to use derivatives of plants (Arab Organization for Agricultural Development, 1988) and others have turned to the use of medicinal plants, which proved to have the ability to improve productivity, quality, immune and physiological traits of poultry such as black seeds (Hashim, 2002) and other plants. Including garlic (*Allium Sativum*), which is wide spread crops in the world and for medical food, plants or extracts contain effective compounds. (Block, 2001). It is known as containing articles of antimicrobial, antifungal, and antitoxins (2001, Atukoral), as well as its role medical grass to prevent many infectious diseases and treatment or non- infectious diseases, especially heart disease and cancer and stimulate cell immune (Kyo and his group, 2001) And became the focus of attention in the last two decades in the effect of garlic in the hypolipidemic, hypochesterol in humans and animals through its effects in lowering of plasma triglycerides and plasma cholesterol and egg yolk cholesterol and raise the concentration of serum total protein (Mualrow and Ackermar, 2001).

In this era with the increase of pharmaceutical treatments for heart and blood vessels disease believed by many that the simple modification of food or food additives May be more natural and more receptive to deliver the benefits of these additions (Jehengir, 2004). The research in the use of garlic oil as a means to improving the quality characteristics of laying hens eggs.

MATERIALS & METHODS

This study was conducted in the field of poultry of the Department of animal resources at the college of Agriculture / University of Baghdad for the period from October 22, 2009 until April 22, 2010 for six months, during which the addition of different levels of garlic oil to the diets of experimental hens to study the impact on the qualities quality of the eggs of laying hens. 64 laying hens were used strain of Lohmann brown at age ofb20 weeks (at the beginning of sexual maturity) were obtained from a private field in al taji north of Baghdad, and the birds had received care management and veterinary services. Were housed in steel clip cages, and at the age of 22 weeks (beginning of the experiment) the chicken weighted individually and then distributed randomly for four treatments (two duplicate per treatment) contains eight hens per duplicate and during the first two weeks (between

20 and 22 weeks) hen were adapted in the cages. Hens Feed during these two weeks on the diet contains all the nutrients required and as recommended by the manufacturer for this species (Table 1). This diet was considered a compared diet to the proposed treatments in this study included the following treatments the first compared diet -free of garlic oil, second, third and fourth contained garlic oil 0.2, 0.4 and 0.6% respectively. All diets were symmetrical in their content of energy and protein, all the conditions were Provided for breeding of laying hens in the Hall include lighting (16 h light: 8 h darkness / day) and ventilation , optimal temperature, not to fall below 17 c° during the day and throughout the duration of the experiment, and humidity ranged between 50-60%. The egg production proportion Calculated (%) Hen Day Production, egg weight (g), the amount of food intake (g / hen / day), food conversion ratio (g food / g of egg). Data were analyzed statistically by use complete random design (CRD), significance between averages were compared by use of Duncan polynomial test (Duncan, 1955) and use the program SAS (SAS 1996) in statistical analysis.

TABLE 1. Components and chemical composition (%) of laying hens diets used during the period of study

Components	treatment			
	first (1)	second (2)	third (3)	forth(4)
yellow corn	45	45	44.6	44.4
wheat	22	22	22	22
Soya bean (44%0)protein	17	17	17	17
concentrated protein	8	8	8	8
garlic oil	0	0.2	0.4	0.6
lime stone	7.7	7.7	7.7	7.7
food salt	0.3	0.3	0.3	0.3
chemical composition				
crude protein	17.56	17.55	17.53	17.51
metabolized energy	2745	2755	2767	2778
fibers%	3.18	3.18	3.18	3.18
calcium%	3.76	3.76	3.76	3.76
lysine%	0.81	0.80	0.80	0.80
methionin + cystin%	0.64	0.64	0.64	0.64
available phosphorous %s	0.62	0.62	0.62	0.62

Chemical analysis of diet composition as in NRC (1994)

Table (2) Effect of addition of different levels of garlic oil to laying hens diet on some quality characteristics of egg during production period.

	Diets							
studied	30-34 week				42-46 week			
characters	first	second	third	forth	first	second	third	forth
egg weight	61.22c	61.43 b	62.18 a	62.12 a	61.79c	62.54 b	62.63 a	63.01a
shell thickness	0.38	0.38	0.39	0.39	0.37	0.37	0.37	0.38
shell weight	6.29a	6.34a	6.41a	6.39a	6.26b	6.43a	6.50a	6.53a
yolk weight	16.37ab	16.46a	16.61a	16.68a	16.56b	16.75a	16.77a	16.73a
yolk height	18.51b	18.54b	18.66a	18.73a	18.56b	18.64a	18.69a	18.74a
yolk diameter	39.93b	40.07ab	40.10a	40.12a	40.69b	40.88a	41.03a	41.9a
yolk index	0.45b	0.46ab	0.47a	0.47a	0.45b	0.45b	0.47a	0.47a
albumin weight	38.56b	38.63ab	39.16a	39.05a	38.97b	39.36a	39.36a	39.75a
albumin height	8.11	8.23	8.18	8.22	7.16	7.20	7.17	7.19
Hu unit	86.84c	88.51b	90.05a	90.32a	79.62c	82.13b	83.91a	84.4a

Different letters indicted to presence of significant differences between treatments

*presence of significance (P<0.05)

N.S =non significance differences between means in same column

RESULTS AND DISCUSSION

Table (2) indicate to Absence of significant differences between the various treatment in the character of the shell thickness during the periods of production, As the all treatments including the treatment of the comparison given a good shell thickness also found that the treatment comparison did not differ significantly from other treatments all of them are achieved symmetric statistically in shell thickness. This may be due containing of these oils as fat soluble vitamins, including vitamin D and that increases obtained when the addition of these oils to laying hens the diet as it increases absorption of vitamins . Balevi and Coskun (2000). Which plays a important role in the metabolism of calcium and phosphorus which is

important in the formation of eggshells. Moreover, perhaps due to the direct and indirect effect of oils in increasing the secretion of sex hormones important in the activity of the ovary (Liu *et al*., 2005) including estrogen hormone which liberated stock calcium in the bone medulla into the blood to provide necessary uterine calcium form the manufacture of eggshell (Al-Fayyad and Naji, 1989). These results are agreeing with the researchers Basmac *et al*. (2003) and AL-Sultan (2005) who concluded that the addition of flaxseed oil and fish oil did not have any negative effect on the shell thickness .As for the weight of the shell, experiment results have shown in Table (2) non significant differences between the treatments of trial for the period (34week) of the experiment. But during the second period (46 week) has significant differences between the treatments of garlic oil added and used in the study and made the treatment 2, 3 and 4 the highest averages for the shell weight, at the same time there was no significant differences between the addition treatments of the garlic oil during the productive age of the hens. Perhaps due to the difference of the average of eggs weights of different treatments during this productivity period. (Table 2). Either as the yolk weight notice from the data shown in Table (2) the presence of significant difference between treatments in the rate of the yolk weight for weeks of the experiment, the treatment 3 and 4 showed significant superiority ($P < 0.05$) during the first production period (34) weeks, treatment 2 and comparative treatment record lower values for this attribute. As in the age (46) weeks, the treatments 2, 3 and 4 show significant superiority in all different ratios compared to the comparison treatment for this attribute during the period of the same productivity. The results of statistical analysis table (2) the existence of significant differences between the various treatments for the recipe the increase of yolk during the first production period (34) as recorded treatments 1 and 2 lower values for this attribute, the second term productivity (46) the treatments 2, 3 and 4 has significant surpassed to the comparison treatment.

Either for yolk diameter listed data in the Table (2) not indicate to significant differences between all of the treatments in the average of yolk diameter during the first period (30-34 week) in this attribute. Either during the second productivity periods (42-46 week) there where a significant differences between the treatments as treatment 1 (comparison) recorded lower averages of diameter of the yolk when the treatment 2, 3 and 4 recorded the highest averages of diameter, which did not differ significantly among them. As for the yolk index, table (2) explain the statistical analysis of the data of yolk index for various treatment eggs, it was noted that there were significant differences ($P < 0.05$) between the various treatments, for this attribute during all the periods of the production. The birds of the treatments 3 and 4 which contained garlic oil 0.4% and 0.6% in their diet achieved higher averages for this attribute during the productivity periods as a whole, while the treatment 2 and comparison treatment are less averages, as to the albumin weight

evident in the table (2) the two treatments 3 and 4 significantly superiority($P < 0.05$) compared with other treatment, as it the two treatments gave highest albumin weight during the first period productivity (30-34 weeks) did not show significant difference between them and the treatment 2. The reason for this may be due to the small size and weight of the comparison treatment produced egg during this productivity period (2), during the second productivity periods of the experience treatment 2, 3 and 4 which have added with the garlic oil has continued progress of the significant superiority with progressive of hens age. This means the possibility of adding garlic oil in the diets of laying hens without negative impact on albumin white of egg, while the albumin height of egg that noticed from the results of statistical analysis are in Table (2) shown no significant differences between all the treatments during all the productivity periods, as treatment that have added garlic oil overtook mathematically on the treatment of comparison. The Hu unit is shown in Table (2) data on the Hu unit of the eggs of different experimental treatments, as it noticed the significant differences ($P < 0.05$) among treatments during the first production period (30– 34 week) and surpassed significantly ($P < 0.05$) treatments 3 and 4 that contain 0.4% and 0.6% of garlic oil respectively on the treatment 2 and comparison treatment , treatment 3,4 Continued superiority, followed by treatment 2 (0.2% garlic oil) came in second during the second productivity periods (42-46 week), first treatment has lagged significantly behind the treatments that have added garlic oil, which reported a lower values for this attribute. The variation of these results during the productive periods of this attribute in this study may be due to the reason that the Hu unit based on two measurements albumin weight and albumin height, (Table 2).

REFERENCES

Al-Fayyad, Hamdi and Saad Abdul-Hussein Abdul Aziz Naji. (1989) Poultry products technology. First edition - the Directorate of Higher Education Press. Baghdad - Iraq.

Arab Organization for Agricultural Development. (1988) Medicinal and aromatic plants and toxic substances in the Arab world - Khartoum.

Hashim, Mohamed Assayed mohamed. (2002) Effect of black bean on the immune response to immunization against the disease coccidiosis in chickens Municipal. Poultry Middle East and North Africa 34-32: 165.

Al-Sultan, S.I. (2005) Effect of dietary fish oil on production traits and lipid composition of laying hens. I*nternational Journal of Poult. Sci*. 4 (8): 585-588.

Atukoral, D.P. (2001) Down your cholesterol with garlic www.copy right 2001. The Associated news papers of Ceylon ttd.

Balevi, T. and Coskun, B. (2000) Effect of some dietary oils on performance and fatty acid composition of eggs in laying. Revn. Mul. Vet. 151, 8 – 9, 847 – 854.

Basmac Oglu, H.; Cabuc, M. Unal, K., Ozkan, S. and Xalc, H. (2003) Effect of dietary fish oil and flax seed on cholesterol and fatty acid composition of egg yolk and

blood parameters of laying hens. South Africa Journal of Animal Sci. 33 (4):162-174.

Block, E. (2001) Garlic. Copy Right 2001, by American media mini. May. (Internet).

Cook, M.E. (1991) Nutrition and immune response of domestic fowl. Critical reviews in poultry biology, 3: 167-184. cited in ((poultry immunology)) eds by division , T.F., morrise , T.R. and payne , L .N first Ed. Oxford , U.K .P .321.

Cook, M.E. (1996). Diet induced immunosuppression in poultry immunology 1st. Ed .p: 318.

Duncan, B.D. (1955). Multiple range and multiple f -test Biometrics, 11:1-42.

Jehangir N. D., E.N. David and D.F. Andrew, (2004) Omega -3 fatty acids and cardiovascular disease MJ; 328:30-35.

Kyo, E., N. Vda, S. Kasuga and Y. ltakua . (2001) Immunomodulatory effect of aged garlic extract. j. nutr . 131 (35) : 75 -95. (Pub med).

Liu, MJ., Z. Wang, RN Wong, and QY. Wu, (2005) Diosgenin induced cell cycle arrest and a apoptosis in human leukemia K562 cells with the disruption of Ca2t homeostasis. Cancer Chemotherapy Pharm. 55 (1): 79-90.

Mualrow, G. and R. Ackerman. (2001) Duration for the hypocholesterdemic effect of garlic supplements. Arch intern med 161 (20): 2505-2506.

National Research Council (NRC). (1994) Nutrient requirement of poultry. 9th rev. ed. National academy press, Washington, DC.

SAS, Institute, (1996). SAS users guide: statistics version 6th ed., SAS institute inc ., Cary ,ne. WHO. (1997) Antibiotics use in food –producing animal must .