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THE EFFECT OF ADDING DIFFERENT LEVELS OF RED PEPPER (*CAPSICUM FRUTASCANS*) POWDER IN SOME INTERNAL AND EXTERNAL QUALITY TRAITS FOR EGG OF BROWN JAPANESE QUAIL BIRD

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Abstract

This study was conducted in the poultry field belonging to Department of Animal Production, College of Agriculture, University of Tikrit for the period from 1/3/2014 to 3/5/2014 where the study aimed to show the effect of the adding red pepper powder at different levels to the diets of Brown Japanese Quail bird and its effect on internal and external qualitative traits of eggs. The results obtained were as follows: A percentage of adding 5% red pepper powder has excelled on the two groups (control and percentage of adding 2.5% red pepper powder in the traits of egg weight, the weight of shell, the weight of yolk , the height of yolk, the diameter of albumin, the thickness of shell, albumin index. While the group of adding 2.5% red pepper powder was significantly excelled on the control group in the traits of the height of albumin, albumin index and the percentage of the shell. From this study we conclude that all the additives of red pepper powder in its different percentages in the to the diets of Brown Japanese Quail bird led to significant excelling in many internal and external traits for the eggs qualitative components had a clear effect and economically appropriate and encourage the breeders to conduct experiments on the effect of this plant in the traits and physiological and immunological measurements in Quail birds or other birds.

Keywords: Red pepper powder, Brown Japanese Quail bird, qualitative traits for the egg.

Introduction

The main objective of breeding poultry is to provide high-value food sources and to benefit from poultry birds in converting many materials that not suitable for human consumption into high-value nutrients, such as eggs and chicken meat, which are important sources of many essential nutrient elements for Human Nutrition (Al-Shawi, 2003). The quality of the egg has an important effect on the eggs consumption and its products, the quality is measured based on the phenotypic traits and the chemical traits. A number of researchers considered the qualitative traits for the egg as important economic traits that can be improved through continuous selection (Ismail, 1997; Al-Tikriti, 2011). The attention of workers in the field of breeding poultry turned towards the use of many medicines and medical drugs to treat the diseases that accompanied the progress made in the poultry industry in the development of high-yielding strains on the one hand and in the field of nutrition from the other hand, to avoid the negative effects of those drugs, which often accumulate in the tissues of Poultry birds, which negatively effects On the health of consumers from meat for these poultry birds, the trend towards the use of medicinal plants or their extracts has begun to have physiological effects in the treating the diseases affecting humans, animals and birds (Hassan, 2011).The scientific name for red pepper (*Capsicum frutascans)*, commonly known as African red pepper and capsicum annual pepper, commercially known as Tapasco pepper, both of which are followed the Solanaceae family which is known by several names, including Sudanese red pepper or Hot sauce, which is different from the black pepper that is followed the Capsicum family. The original habitat for the red pepper plant is Central and South America. It was not known in Europe before the discovery of the American continent. Columbus took its seeds to Spain, where its cultivation spread in Europe since then, and red pepper is being successfully cultivated throughout the Arab world, especially Sudan, as cultivated in India and Japan. The chemical material, which is related to the pungent taste in red pepper is phenol called Capsicum, it also contains a compound 6,7-dihydrocpsaicin and the percentage of this substance varies according to the type of red pepper. Capsicum does not disappear with cooking or by adding basic or alkaline substance, Red pepper contains vitamin C with ratio of 0.1-0.5%, thiamine, red carotenoids, and fixed oils of 4-16%. It consists of Capsaicin, Dihydro Capsaicin, torcapacin, humodahidocapacin, ceprobin, carotene and steroids. It is also used as spices and for the treatment of indigestion. It is also considered an anti-irritant, which is made in the form of cream or ointment or in the form of plaster for the removal and treating rheumatism and to treating pain of lumbar vertebrae, and to treat migraines and nerve related to the bladder when not doing its function. It is a general tonic, Anti-gastric spasmodic and antiseptic for intestines, It is used in most herbal remedies and is used for promoting

of peripheral blood circulation, where it is taken orally. It relieves and calms digestive and colic problems and can use red peppers to treat muscle stiffness. It is used as an antibiotic to eliminate harmful bacteria and as a regulator for body heat (Ibrahim and Butrus, 2009).

Materials and Methods

This study was conducted in the field of poultry birds belonging to Department of Animal Production, College of Agriculture, University of Tikrit for the period from 1/3/2014 to 3/5/2014, In this study, A 90 female from Brown Japanese Quail bird were distributed on three treatments with three replicates per treatment. The birds were fed on diet with a protein content of 20% and dietary energy 2908 kcal/kg feed as shown in Table (1). This study aims to know the effect of using red pepper powder in the diet of Brown Japanese Quail bird with different scales and its effect on some of the qualitative traits for the internal and external product eggs.

The following treatments were used:

- First treatment T1: Control treatment (without adding red pepper powder to feed).
- First treatment T2: Add red pepper powder with ratio of 2.5 g / kg feed.
- First treatment T3: Add red pepper powder with ratio of 3 g / kg feed.

The following measurements were taken from 30 eggs per treatment: egg weight, yolk weight, and shell weight using a sensitive balance with one digit order. The diameter of the yolk, the diameter of the albumen, the height of the yolk and albumen, and the thickness of the shell by using vernier. The indices were calculated according to the following equations:

$$\text{Egg shape index} = \frac{\text{length of egg}}{\text{The diameter of the egg}}$$

$$\text{Albumen index} = \frac{\text{the height of the albumen}}{\text{the diameter of the albumen}}$$

$$\text{Yolk index} = \frac{\text{the height of the yolk}}{\text{the diameter of the yolk}}$$

The experiment was performed using the Complete Randomized Design (CRD). The data were analyzed using the statistical program SAS (2001). The average of each trait was compared using the Duncan (1955), with a significant level of 0.05 to determine the significance of the differences between the averages.

Table 1: Percentages and chemical composition for the diet of Brown Japanese Quail birds used in the experiment.

Feed materials	Percentage (%)
yellow corn	56
Wheat	3
Soybeans meal (44% crude protein)	29
Concentrated Proteins	5
Plant oil	2
limestone	4.7
Food salt	0.3
Total	100%
The calculated chemical analysis*	
Crude protein (%)	20
Dietary energy (kCal / kg)	2908
Phosphorus (%)	2.2
Calcium (%)	0.3
Lysine (%)	1.12
Methionine (%)	0.4
Methionine + Cysteine (%)	0.71

*The values of the chemical composition of feeds found in the diet composition were calculated according to the reports of the National Research Council of America (NRC, 1994)

Results and Discussion

The trait of egg weight is considered an important economic trait that is preferred by the consumer and is associated with large egg size where the weight of the egg in the Japanese Quail bird is different according to the type of bird and surrounding environmental conditions. The average weight of the egg reaches of 10 g, which is about 8% from the body weight of Japanese Quail female, while this percentage is different in both turkeys and chickens, which amounted of (1%, 3%), respectively (Sami, 2003; Al-Sheikli, 2011). Table (2) shows significant differences in trait of egg weight between the experiment treatments that add to it red hot pepper with ratio of (0, 2.5 and 5%), egg weight amounted of (11.41, 11.83, 13.14 g), respectively. Table (2) shows that the yolk weight amounted of (3.79, 3.73, 4.29 g) for both control treatment and the two treatments added to its diets the red pepper with ratio of (2.5, 5%), respectively. The results of the yolk weight trait agreed with the data obtained by (Latif, 2011) in his study on some of the qualitative traits for the eggs of Japanese Quail with brown feather color. This study agreed with (Al-Tikriti, 2016) in his study on some of the qualitative traits for the eggs of Japanese Quail that selected in Divergent. It also agreed with the data obtained by (Latif, 2016) in his study of the Japanese Quail bird, where it was found that the weight of the yolk amounted of (3.14 g). It is disagreed with the results of (Al-Budeiri, 2017) where it showed that the

weight of the yolk amounted of (5.63 g) in its study on some qualitative traits for the eggs of Japanese Quail bird. As for two traits of the weight of albumen and shell, the differences were significant between the study treatments where the value of their averages amounted of (5.87, 6.36, 7.10), (1.65, 1.74, 1.76 g) for both control treatment and the two treatments that added to its diets the red pepper with ratio of (2.5, 5%), respectively. This result differed with the data obtained by (Latif, 2011) in his study on some qualitative traits for the eggs of Japanese Quail bird, which did not find significant differences in the weight of albumen. These results were agreed with (Soliman *et al*., 2000; Abdul Sattar, 2016) where they found that the weight of the shell amounted of (1.74, 1.45 g), respectively, in their study on some qualitative traits for the eggs of Japanese Quail bird. These results differed with (Mignon and Minvielle, 2003; Avci *et al*., 2005; Al-Khailani, 2009) where they found that the weight of the eggshell for the Japanese Quail bird amounted of (0.88, 0.90, 0.80 g), respectively. The difference in the weight of the shell in the adding treatment of 5% from the red pepper powder to the diet may be due to the high weight of the egg and the presence of a highly significant Genetic and Phenotypic Correlation Coefficient between the two traits of the shell weight and egg weight (Al-Tikriti, 2011 and 2016). The average of shell thickness for the control treatment amounted of (0.17 mm), while its average similar in value in the two treatments added to it the red pepper (2.5, 5%) which amounted of (0.21). The results were close to the data obtained by (Hassan, 2013) in his study on the production performance of the Japanese Quail bird where the thickness of shell (0.25 mm).It also agreed with (Hamodi *et al*., 2014) found in their study on the Japanese Quail bird where the average thickness of the shell amounted of (0.18 mm) through the period of (10-25) weeks from life of the bird. The results of the study differed with (Al-Mashayikhi, 2017). The results of the study showed no significant differences in the thickness of the shell between the study treatments, which ranged between 0.29 and 0.30 mm for the period from 9-16 weeks in their studies on some qualitative traits of Japanese Quail bird.

Table 2: The averages and percentages to some weights of the qualitative traits for the eggs of Brown Japanese Quail bird (average ± standard error).

Trait	Control treatment	%2.5	%5
Egg weight (g)	0.21 ± 11.41b	0.42 ± 11.83ab	0.49 ± 13.14a
Weight of shell (grams)	0.02 ± 1.65b	0.09 ± 1.74 a	0.08 ± 1.76a
Weight of yolk (g)	0.38 ± 3.79a	0.10 ± 3.73ab	0.33 ± 4.29a
Weight of albumen (g)	0.50 ± 5.58b	0.35 ± 6.36ab	0.25 ± 7.10
The thickness of shell (mm)	0.006 ± 0.17b	0.011 ± 0.21a	0.007 ± 0.21a
Percentage of shell (%)	0.47 ± 14.46a	0.28 ± 14.71a	0.43 ± 13.39b
Percentage of yolk (%)	0.31 ± 33.22a	0.76 ± 31.53a	1.76 ± 32.65a
Percentage of albumen (%)	0.59 ± 51.45b	1.51 ± 53.76ab	1.46 ± 54.03a

The results showed significant superiority for the adding treatment (5%) of the red pepper powder in the traits of the yolk index, the height of yolk, the height of the albumen, the percentage of albumen, and arithmetically excelling to the albumen index when compared it with the control treatment, While the results did not show significant differences in the traits of the percentage for the yolk, the length of the egg, the diameter of the egg, the diameter of the albumen, and the egg shape index. These results agree with (Al-Douri, 2010) where a significant differences found in the trait of the height of the yolk between the study treatments when compared it with the control treatment in its study for some internal and external traits for the eggs of Japanese Quail bird with brown feather color. The results differed for the trait of the relative weight for the white with the results of (Al-Mashaykhai, 2017) where did not find a significant difference between the experiment treatments in her study on some qualitative traits of Japanese Quail bird. The results did not agree with (Al-Obeidi, 1999) where the results of his study did not show significant difference in the height of the albumen for locally breeding Japanese Quail bird for six months, where a total average for this trait amounted of (4.30 mm). This result differed with the data obtained by (Latif, 2011) in his study on some qualitative traits for the egg of Japanese Quail bird, where did not found significant differences in the traits of the yolk index. These results agree with (Al-Budeiri, 2017) in the trait of the yolk index, the height of yolk, the diameter of the albumen where found a significant difference between the adding treatments and the control treatment in the qualitative traits for the eggs of the Japanese Quail bird. The trait of yolk height did not agree with the results of (Attieh, 2006; Abdul Sattar, 2016), It also did not agree with the results of (Yunus, 2014), where did not show significant differences in the height of albumen and yolk in his study on the qualitative traits of Japanese Quail

bird. The results agreed with (Al-Tikriti, 2016) that the height of egg yolk in quail amounted of (9.58 mm), while the results differed with (Latif, 2016; Ahmad and Ibrahim, 2016) indicated that the height of the yolk amounted of (11.23, 11.46 mm), respectively in their study on the Japanese Quail bird. The reason for the variation in the two traits of the yolk and albumen index and is due to genetic factors, since the values of their genetic equivalents are considered from high values. This indicates that heredity plays an important role in the variation in the quality of albumen and yolk (Poggenpoel, 1986; Al-Douri, 2010). As for the traits of the yolk diameter, the adding treatment of (2.5%) red pepper has excelled while there were no differences between them and the adding treatment of (5%) red pepper, these results agree with (Al-Obeidi, 1999; Kata, 2011) and disagreed with (Abdul Sattar, 2016) in their study on the qualitative traits for the eggs of Japanese Quail bird. The results indicated in Table (3) showed that the egg shape index amounted of (76.24, 78.72, 78.67) for both control treatment and the two adding treatments with red pepper powder of (2.5 and 5%), respectively. These values show that it is indicative of the shape of egg ellipsoid (oval), These results agree with the results of (Rauf, 2012; Al-Tikriti, 2016) in their study on some qualitative traits for the eggs of Japanese Quail bird. It differed with (Al-Shaikhli, 2011), which did not find significant differences in the traits of egg shape index in his study on the Japanese Quail bird. The reason for the improvement in the qualitative traits for the adding treatments compared to the control treatment to the fact that red pepper contains some active substances that increase the estrogen because the latter increases the concentration of calcium in the blood and increase the number of receptors through Paracid changes in the kidney of the bird, which include increased effectiveness of adenylatecyclase, that based on the parathyroid hormone, which is responsible for the regulation of calcium and phosphorus in the blood and increases the production of the effective form of vitamin D. It is important to absorb calcium through the gastrointestinal tract and increase its blood plasma level, which is reflected in the composition of the eggshell (Al-Darraji, 2008). The reason is that the red pepper powder contains a quantity of vitamins, especially vitamin C, which leads to a significant decrease in the level of concentration of cholesterol in the serum as it inhibits the secretion of corticosteroids from the adrenal glands, which is reflected in increased thyroid activity in the secretion of thyroxine, which leads to increase the Metabolism of cholesterol, the rate of utilization and This benefit is shown in the qualitative traits for the egg, especially the yolk components (Al-Darraji, 1998). We conclude from this that the positive effects that showed the results of this experiment which shows the importance of red pepper plant and its benefits when added to the diets of Japanese Quail bird through the important studied productive traits in this study and open the horizons to the breeders in terms of thinking to introducing it in the diets in a few percentages and used in the experiment for the purpose of raising the economic yield resulting from education, on the other hand to encourage breeders to conduct experiments on the impact of this plant in the characteristics and measurements of other physiological and immune in the quail birds.

Table 3: The averages to some the qualitative traits for the eggs of Brown Japanese Quail bird (average ± standard error).

Trait	Control treatment	%2.5	5.0%
Egg length (mm)	0.59 ± 32.66a	0.64 ± 32.80a	0.81 ± 33.56a
Diameter of the egg (mm)	0.22 ± 24.90a	0.39 ± 25.82a	0.62 ± 26.40a
the height of Yolk (mm)	0.06 ± 9.17b	0.10±9.79a	0.26 ± 10.10a
Diameter of the yolk (mm)	0.19 ± 25.19a	0.66 ± 23.10b	0.60 ± 23.62ab
Height of albumen (mm)	0.05 ± 2.77b	0.34 ± 3.68a	0.18 ± 3.49ab
Diameter of albumen (mm)	0.23 ± 35.17a	0.69 ± 32.93a	1.96 ± 36.54a
Egg shape index	2.10 ± 76.24a	1.86 ± 78.72a	3.52 ± 78.67a
albumen index	0.001 ± 0.08b	0.010±0.11a	0.008 ± 0.09ab
yolk index	0.04 ± 0.36b	0.01 ± 0.42a	0.01 ± 0.43a

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