

Comparison of egg quality of brown and white shell eggs produced by Iraqi local chicken breeds

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Abstract

This study was conducted to compare the egg quality of two Iraq chicken breeds. One produce white color shell and the other produce brown color shell. 120 Eggs from both the breeds were individually weighed to the nearest 0.01 g using an electronic digital balance. Length and width of egg, albumin weight, yolk weight, shell weight, yolk diameter, yolk height, yolk %, albumin % and shell % were individually recorded by using a digital caliper. It was found that except albumin percentage all the other parameters were significantly high in white shell eggs. It was concluded that the quality of the white shell egg was superior to brown shell eggs.

Keywords: egg quality; Iraqi local chicken; white color shell; brown color shell

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Introduction

The high nutritive value of the egg is well known and it is one of the most important food sources for human. Man did consume the eggs before learning how to raise poultry. The high nutritious value of the egg came from its content especially proteins (Stadelman and Cotterill, 1986). It is also a good source of lipids, vitamins and minerals which play a significant role in human's nutrition (Fisher, 1970).

Egg quality has important effects on rate of egg consumption and egg products. Egg quality is measured on the physical and chemical characteristics. Physical characteristics include egg length, egg width, shell thickness, shell strength and the inner characteristics: albumin traits, yolk traits, and meat and blood clots percentage. Chemical characteristics include egg's protein, amino acids, carbohydrates and minerals (sang et al., 1984). Iraqi local chicken breeds produce eggs with white and brown shell color (Al-Rawi and Amer, 1972) and many researchers pointed that egg quality characteristics is one of the important economic characteristics which can be increased by continuous selection (Al-Jebouri, 1970; Ali, 2010).

This study aimed to compare some of the egg quality characteristics of two Iraqi local chicken breeds i.e., white and brown shell egg producers.

Materials and Methods

120 eggs (60 brown and 60 white) were obtained from two layer breeder flocks at 47 weeks of age. Eggs were individually weighed to the nearest 0.01 g using an electronic digital balance. Length and width of egg, albumin weight, yolk weight, shell weight, yolk diameter, yolk height, yolk percentage, albumin percentage and shell percentage were individually recorded by using a digital caliper. Shape index was calculated by $(\text{width/length}) \times 100$ according to Singh and Panda (1987).

Statistical analysis

The egg quality of both the chickens was compared using student t-test.

Results and Discussion

As shown in Table 1, egg weight, yolk weight, albumin weight and shell weight were significantly high in chickens producing white shell eggs.

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These results agreed with those of Al-Obaidy and Al-Khafajy (2000), Ketelaere et al. (2002) and Zaman (2003) who found significant differences in egg weight being affected by genetic make up. The high yolk, albumin, shell weight may be associated with higher egg weight (Hafez et al., 1954).

Yolk height and diameter were significantly high in white egg shell (Table 2). These results are similar to those reported by Pandey et al. (1986) and Al-Shawi (2003) and did not agree with that of Al-Jebouri (1970).

Similarly, yolk percentage was significantly high in white shell eggs and albumin percentage was significantly low (Table 3). These findings did not agree with those of Zaman (2003). The findings of shell thickness agreed with the results of Amer et al. (1967)

and did not agree with those of Rose et al. (1986) Haque et al. (2001) Kamphues et al. (2001) Keterlaere et al. (2001).

In Table 4 egg length, egg width, egg shape index and shape total area were significantly high in white shell eggs. Egg length and width are partially depends upon other parameters like egg weight. The egg shape index of white shell egg is a result of higher egg length and width which is genetically controlled characteristics.

Conclusions

It was concluded from this study that the egg quality of the white shell eggs was superior to brown shell eggs.

Table 1: Comparison of egg weight, yolk weight and albumin weight of brown and white shell eggs produced by Iraqi local chicken breeds

Breed	Egg weight (gm)	Yolk weight (gm)	Albumin weight (gm)	Shell weight (gm)
White shell egg	66.29±0.16 ^a	19.16±0.24 ^a	39.00±0.41 ^a	8.19±0.11 ^a
Brown shell egg	60.58±0.11 ^b	15.91±0.22 ^b	37.52±0.46 ^b	7.12±0.10 ^b

Values in the same column with different superscripts are significantly different (P<0.01)

Table 2: Comparison of yolk height, yolk diameter and yolk index characteristics of brown and white shell eggs produced by Iraqi local chicken breeds

Breed	Yolk height (mm)	Yolk diameter (mm)	Yolk index
White shell egg	18.43±0.16 ^a	14.43±0.85 ^a	80.42±0.00 ^a
Brown shell egg	16.91±0.15 ^b	39.47±0.87 ^b	70.43±0.43 ^a

Values in the same column with different superscripts are significantly different (P<0.01)

Table 3: Comparison of yolk percentage, albumin percentage shell percentage and Shell thickness of brown and white shell eggs produced by Iraqi local chicken breeds

Breed	Yolk percentage	Albumin percentage	Shell percentage	Shell thickness (mm)
White shell egg	28.71±0.25 ^a	58.78±0.43 ^b	11.76±0.88 ^a	10.37±0.01 ^a
Brown shell egg	26.25±0.26 ^b	61.94±0.33 ^a	12.36±0.77 ^a	10.34±0.01 ^a

Values in the same column with different superscripts are significantly different (P<0.01)

Table 4: Comparison of egg length, egg width, egg shape index and total shell surface of of brown and white shell eggs produced by Iraqi local chicken breeds

Breed	Egg length (mm)	Egg width (mm)	Egg shape index	Shell total area (cm ²)
White egg shell egg	60.35±0.88 ^a	44.53±0.2 ^a	73.88±2.01 ^a	67.00±2.44 ^a
Brown egg shell	55.87±0.9 ^b	43.05±0.22 ^b	78.31±2.1 ^b	57.10±2.3 ^b

Values in the same column with different superscripts are significantly different (P<0.01)

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