
EFFECT OF SPECIES ON EGG QUALITIES OF POULTRY BIRDS

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ABSTRACT

The effect of species on eggs qualities of poultry birds was investigated. Fifteen eggs each of village chicken, commercial chicken, ducks and turkey eggs were sourced within Kabba town. External qualities of eggs determined were; egg weight, shell weight, % shell, egg shape and shell thickness and internal qualities determined were; yolk weight, albumen weight, % yolk, % albumen, yolk - albumen ratio, albumen height and haught unit using standard procedures and methods. Turkey eggs showed the highest mean weight (84.30g), while village chicken showed the lowest mean egg weight of 55.37g. The shell weight was highest for turkey (10.12g), this was similar to duck (9.55g), while local chicken had the least shell weight (6.48g). Commercial chicken had the least % egg shell. Turkey and duck shell thickness was significantly higher than that of village and commercial chicken. Turkey had the highest egg shape value while the local chicken had the least. The Yolk and albumen weight were highest for turkey and least for local chicken. The proportion of yolk was highest for duck (32.18%) and lowest for local (24.27%). Albumen Percent was highest for exotic chicken (49.88%) but least for duck (44.55%). Haugh unit was highest for turkey and least for local chicken. It was concluded that species had effect on both external and internal qualities of eggs. However, the egg qualities mean values were majorly higher for turkey and duck. It was recommended that turkey and duck eggs can be widely consume like the common chicken eggs.

Key words: Effect, Species, External quality, Internal quality and Poultry eggs.

INTRODUCTION

Livestock has been contributing indispensable role in human nutrition and agriculture since a long time ago. According to FAO (2019), in developing countries around forty percent of total agricultural outputs come from livestock sector supporting at least 1.3 billion people throughout the world. Poultry" is a term used for any kind of domesticated bird, captive-raised for its utility. Poultry is defined as domestic fowls, including chickens, turkeys, geese, guinea fowl, squabs (young pigeons), ducks, Japanese quail and common pheasant are raised for the production of meat or eggs and the word is also used for the flesh of these birds used as food (Connolly *et al.*, 2022).

Physical egg quality parameters, such as shell and vitelline membrane strength, shell color, Haugh unit, yolk color, and dry egg mass, can affect consumer perceptions, as well as industry product specifications and the uniformity of both table eggs and broken-out egg products (Berkhoff *et al.*, 2020). Egg quality is composed of those characteristics of an egg that affect its acceptability by consumers; it is therefore important that attention is paid to the quality of individual species for better selection among available species. Hence the need to study the variation in egg quality of different species of laying birds.

MATERIALS AND METHODS

The research was carried out in Kabba College of Agriculture Laboratory. Fifteen eggs each of village chicken, commercial chicken, duck and turkey eggs were sourced within Kabba town. The following external qualities of eggs were determined; egg weight, shell weight, % shell, egg shape and shell thickness, while the internal qualities determined includes; yolk weight, albumen weight, % yolk, % albumen, yolk - albumen ratio, albumen height and haught unit. Egg weight of the different species was weighed accurately to nearest 0.01 g using an electronic balance. The shell thickness of eggs was determined by draining out the egg content and the shells wiped with tissue paper and kept upside down to drain out and dried, the shell thickness was measured with a Vernier Caliper. Three measurements were taken, one at one pole, other poles and the third in the middle of the egg. The shell thickness of each egg was determined by the arithmetic mean of the measurements. After weighing of eggs, the eggs were broken out onto a balanced flat glass tray to assess the internal quality parameters namely; egg weight, yolk weight, albumen weight, % albumen, % yolk, albumen height,

yolk - albumen ratio and haugh unit (HU). Yolk weight were measured separately using digital weighing scale. Percentages of egg components (yolk, albumen, and shell) as a ratio to egg weight were determined using the equation: Egg components percentages (%) = (component weight (g) × 100)/ egg weight (g). Yolk-albumen ratio was computed as: yolk weight (g) / albumen weight (g). Haugh unit was determined according to Haugh (1937) as follows; $HU = 100 \log (H - 1.7W^{0.37} + 7.57)$ (3)

Where, H = height of thick albumen in mm and W = weight of egg in gram.

Statistical Analyses

Data obtained were subjected to analysis of variance (SAS, 2000) and where significant differences occurred means were separated using Duncan Multiple range test of the same package.

RESULTS AND DISCUSSION

Effect of Species on External Egg Qualities of Poultry Birds

Table 1 shows the Results of effect of species on external qualities of poultry eggs. Turkey eggs showed the highest mean weight (84.30g), followed by duck egg (72.20g), commercial chicken (63.51g) while village chicken showed the lowest mean egg weight of 55.37g. Variation in egg weight may be as a result of differences in weight of the individual birds, this aligned with the observation of Alkan, *et al.* (2010), who reported that the weights of egg depend on the weight of the birds. The shell weight was significantly highest for turkey (10.12g), this was similar to duck (9.55g), while local chicken had the least shell weight (6.48g) which is similar to the commercial chicken (7.49g). This observation is similar to the observation of Wijedasa *et al.* (2020). Commercial chicken had the least % egg shell (10.41g), which was similar to commercial chicken (11.98g).while duck has the highest shell % (13.22%) which is similar to that of turkey (12.00%). Turkey and duck shell thickness was significantly higher than that of village and commercial chicken. Turkey had the highest egg shape value while the local chicken had the least (14.45cm) which was similar to that of commercial chicken (14.68cm)

Table 1: Effect of Species on External Egg Qualities of Poultry Birds

Parameters	Local Chicken	Commercial chicken	Duck	Turkey
Egg weight (g)	55.37 ^d	63.51 ^c	72.20 ^b	84.30 ^a
Shell weight (g)	6.48 ^b	7.49 ^b	9.55 ^a	10.12 ^a
shell (%)	10.41 ^b	11.98 ^{ab}	13.22 ^a	12.00 ^a
Shell thickness (mm)	0.33 ^b	0.34 ^b	0.36 ^a	0.40 ^a
Egg shape (cm)	14.45 ^b	14.68 ^b	15.66 ^b	16.79 ^a

Effect of Species on Internal Egg Qualities of Poultry Birds

Table 2 presents the effect of species on internal egg qualities of poultry birds. The Yolk weight was highest for turkey (24.50g) followed by duck (23.24 g), exotic chicken (17.75g), and lowest for local chicken (13.20g). Albumen weight was highest for turkey (39.00g) followed by duck (32.17g), exotic chicken (31.68g), and lowest for local chicken (26.37g). The variation observed in yolk and albumen weight amidst the eggs may also depend on the size of the individual egg (Nangsuay *et al.*, 2013). The proportion of yolk was highest for duck (32.18%) followed by turkey (29.06%), exotic (27.94%), and lowest for local (24.27%). Albumen Percent was highest for exotic chicken (49.88%) followed by local chicken (48.50%), turkey (46.23%) and duck (44.55%). The values obtained in each of the observed parameters is in tandem with Orville *et al.* (2020). The variation obtained may be due to breed effect (Lordelo *et al.*, 2020). Yolk-albumen ratio was highest for duck (0.72) followed by turkey (0.63), exotic chicken (0.56), and lowest for local chicken (0.49).

The Albumen height was highest for turkey (5.48mm) followed by duck (5.46 mm), exotic chicken (4.18 mm), and lowest for local chicken (3.36 mm). likewise, the Haugh unit was highest for turkey (69.28) followed by duck (66.14), exotic chicken (52.26), and lowest for local chicken (44.20). The variation noted may be as a result of hen's age. Silversides and Scott (2001) reported that the Haugh unit is also affected by hen age as albumen quality declines with bird age.

Table 2 : Effect of Species on Internal Egg quality of Poultry Birds

Parameters	Local chicken	Exotic chicken	Duck	Turkey
Yolk weight (g)	13.20 ^c	17.75 ^b	23.24 ^a	24.50 ^a
Albumen weight (g)	26.37 ^c	31.68 ^b	32.17 ^b	39.00 ^a
% yolk	24.27 ^c	27.94 ^{bc}	32.18 ^a	29.06 ^{bc}
% Albumen	48.50 ^a	49.88 ^a	44.55 ^b	46.23 ^a
Yolk-Albumen ratio	0.49 ^b	0.56 ^b	0.72 ^a	0.63 ^a
Albumen height (mm)	3.36 ^b	4.18 ^b	5.46 ^a	5.48 ^a
Haught unit	44.20 ^b	52.26 ^b	66.14 ^a	69.28 ^a

CONCLUSION AND RECOMMENDATION

It was concluded that species had effect on both external and internal qualities of eggs. However, the egg qualities mean values were majorly higher for turkey and duck. It was recommended that turkey and duck eggs can be widely consume like the common chicken eggs.

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