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Egg Quality characteristics of Peruvidai Chicken in Western Part of Tamil Nadu

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ABSTRACT: A study was carried out in western part of Tamil Nadu to identify the egg quality characteristics of Peruvidai chicken. A total of 40 *Peruvidai* chicken eggs were chosen on the basis of stratified random sampling technique. The external egg quality traits like egg weight (g), shape index and specific gravity were 45.84 ± 0.69, 77.41 ± 0.49 and 1.06 ± 0.01, respectively. Among the total eggs collected 57.5 per cent eggs were brown in colour, whereas 42.5 per cent eggs were pale brown in colour. The internal egg quality traits like albumen index, albumen weight (g), albumen per cent, Haugh unit, yolk index, yolk weight (g), yolk per cent, yolk colour score, eggshell weight (g), eggshell per cent and eggshell thickness (mm) were 0.09 ± 0.00, 25.79 ± 0.42, 56.21 ± 0.22, 86.66 ± 0.58, 0.37 ± 0.01, 14.57 ± 0.21, 31.80 ± 0.16 and 7.65 ± 0.13, 5.49 ± 0.10, 11.98 ± 0.12 and 0.34 ± 0.00, respectively. The results of this study confirmed that the egg quality parameter of Peruvidai chicken is in line with other native chicken breeds present in India.

Keywords: Peruvidai chicken, egg quality traits, albumen index, yolk index, eggshell thickness.

INTRODUCTION

Native chicken breeds are playing a major role in rural economy in most of the developing and underdeveloped countries. The most important positive character of native chicken is their hardiness and ability to tolerate harsh environmental conditions (Dessie *et al*., 2011). Among the native chicken breeds/ecotypes in India, the "*Peruvidai*" is very much popular among the farmers in western part of Tamil Nadu and there is a growing interest in rearing of these birds. The Peruvidai chicken is hardy in nature, have the ability to thrive under adverse conditions, known for their meat and egg quality with desirable taste and flavour along with the fighting quality of cocks (Kumaravel *et al*., 2021). As utilisation of native chicken in their current genetic merit and production environment is more profitable, this study was carried out in farmers' field with an aim to study the egg quality characteristics of *Peruvidai* chicken in western part of Tamil Nadu.

MATERIALS AND METHODS

The study was carried out in western part of Tamil Nadu *viz.*, Dharmapuri, Erode, Namakkal, Salem and Tiruppur districts from the farmers rearing Peruvidai chicken with a minimum of two years period. A total of 40 eggs, eight eggs from each district were collected from different farmers for egg quality analysis. The collected eggs were analyzed individually for their weight, shell colour, shape index, specific gravity, albumen index, Haugh unit, yolk index, yolk colour, shell thickness as follows. The individual weights of albumen, yolk and shell with membrane were recorded and expressed in per cent. The collected data were analysed using Snedecor and Cochran (1989) statistical methods.

Egg weight. Individual egg weight (g) was recorded with accuracy of 0.001 g using an electronic balance and from that, the mean egg weight was calculated.

Shape index. The length and width of the egg were measured by a vernier caliper (Mitutoyo) with 0.01 mm accuracy. The shape index was calculated using the following formula given by Shultz (1953).

$$\text{Shape index} = \frac{\text{Greatest width of the egg}}{\text{Greatest length of the egg}} \times 100$$

Specific gravity. By knowing egg weight (g) and egg volume (ml), the specific gravity was calculated using the following formula given by Bernier (1955).

$$\text{Specific gravity} = \frac{\text{Weight of the egg}}{\text{Volume of the egg}}$$

Albumen index. The eggs were broken and opened on a glass plate laid evenly on the table and the width of the thick albumen was measured in two places using the vernier caliper with 0.01 mm accuracy and their mean width was arrived. Height of the thick albumen was measured to 0.01 mm accuracy using "Ames tripod micrometer". Albumen index was calculated by using the following formula given by Heiman and Carver (1936).

$$\text{Albumen index} = \frac{\text{Maximum height of the thick albumen}}{\text{Mean width of the thick albumen}}$$

Haugh unit. Haugh unit was calculated by using the following formula given by (Haugh, 1937)

Haugh unit = 100 log ($H+7.57-1.7W^{0.37}$)

Where, H - Height of the thick albumen near the yolk and

W - Weight of the egg.

Yolk index. The yolk width was measured by using a vernier caliper with 0.01 mm accuracy and the yolk height was measured by using an "Ames tripod micrometer" with 0.01 mm accuracy. The yolk index was calculated by using the following formula given by Funk (1948).

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

Eggshell thickness. Shell thickness (mm) without membrane was measured at three places *viz.* equatorial region, narrow and broad ends by using digimaticmicrometer (Mitutoyo corporation - Model: MDC-25PX) with 0.001 mm accuracy and from that mean shell thickness was calculated.

Eggshell percentage. The shell of each egg after removing the shell membrane was dried in hot air oven and weighed in an electronic balance with an accuracy of 0.001 g and shell weight percentage was calculated by using the following formula.

$$\text{Eggshell percentage} = \frac{\text{Weight of the eggshell}}{\text{Weight of the egg}} \times 100$$

RESULTS AND DISCUSSION

The external and internal quality characteristics of Peruvidai chicken eggs were measured and results are furnished in Table 1.

The analysis of data revealed that the mean egg weight in Peruvidai chicken as 45.84 ± 0.69 g. The mean eggshell colour was brown (57.5 %) and pale brown (42.5 %). The mean values obtained for other external quality characteristics were 77.41 ± 0.49 and 1.06 ± 0.01 for shape index and specific gravity, respectively. The shell thickness and shell percentage was found to be 0.34 ± 0.00 mm and 11.98 ± 0.12 respectively.

Among the internal egg quality characteristics, the values for albumen index, albumen percentage, yolk index, yolk percentage, yolk colour and Haugh unit score were found to be 0.09 ± 0.00, 56.21 ± 0.22, 0.37 ± 0.01, 31.80 ± 0.16 7.65 ± 0.13 and 86.66 ± 0.58, respectively.

The earlier findings in egg weight (g) of Aseel chicken by Haunshi *et al.* (2011) (45.80 ± 0.49), Sarker *et al.* (2012) (40.69 ± 0.82), Rajkumar *et al.* (2014) (47.52), Ezhilvalavan *et al.* (2016) (48.27 ± 0.52), Rajkumar *et al.* (2017) (47.5 ± 0.7), Maurya and Yadav (2018) (43.61 ± 0.36) were correspondence with the current findings. The similar egg weights (g) were recorded by Vij *et al.* (2006) in Danki (46.16 ± 1.72) and Haunshi *et al.* (2019) in Ghagus (47.62) and Nicobari (46.16) chicken. Better egg weight (g) was recorded by Singh *et al*. (2016) in Hansli (52.60 ± 1.45), Gujuri (48.00 ± 1.15), Dumasil (58.00 ± 1.15), Kalua (54.20 ± 1.15), Khadia (53.50 ± 3.50), Dhabala (51.00 ± 1.00), Jhinjiria (54.34 ± 2.30), Khairi (52.81 ± 3.78), Kabri (52.76 ± 3.00) and Chitri (43.50 ± 2.50) chicken and Yadav *et al.* (2017) in Mewari hens (53). Lower egg weight (g) was recorded by Vij *et al.* (2006) in Kalasthi (42.91 ± 1.94) and Ghagus (40.25 ± 2.39) breeds, Haunshi *et al.* (2009) in Miri chicken (38.67), Vij *et al.* (2015) (36.53 ± 1.07), Rahman (2017) in backyard poultry (35 to 40) and Haunshi and Rajkumar (2020) in native chicken (35 to 45).

Vij *et al.* (2006) found the per cent light brown, brown and dark brown coloured eggshell as 8, 36, 42 in Danki, 58, 45, 58 in Kalasthi and 34, 19, 0 in Ghagus breeds, respectively whereas Banerjee (2012) found between cream and light brown coloured egg shell in naked neck chicken, frizzled chicken, muffed/bearded chicken, creeper chicken, crested chicken, rumpless chicken, feathered shank chicken and tinted bluish in fibromelanosis chicken. Similarly Sarker *et al.* (2012) observed light brown (77.78 %) and white (22.22 %) eggshell colour in Aseel chicken, whereas Vij *et al.* (2015) recorded 79 per cent light brown followed by 17 per cent cream white and 4 per cent brown shelled egg in Harringhata Black chicken. Likewise Ferdaus *et al.* (2016) also recorded light brown and white shelled egg at 75.56 and 23.44 per cent, respectively in indigenous dwarf chicken.

The shape index value observed in the present study was comparable with the findings of Haunshi *et al.* (2011), Rajkumar *et al.* (2014); Ezhilvalavan *et al.* (2016).

The albumen index recorded by Vij *et al.* (2006), Haunshi *et al.* (2011); Vij *et al*. (2015); Ezhilvalavan *et al.* (2016) was lower than the findings of the present study. The Haugh unit score found by Vij *et al.* (2006) in Ghagus, Haunshi *et al*. (2011) in Aseel and kadaknath, Rajkumar *et al*. (2014) in Aseel, Vij *et al.* (2015) in Harringhata Black and Ezhilvalavan *et al.* (2016) in Aseel was similar to the findings of the present study. However, Vij *et al.* (2006) observed

lower Haugh unit score in Danki and Kalasthi breeds of chicken.

The yolk index score recorded by Haunshi *et al*. (2011) is comparable with the findings of present study but Vij *et al*. (2015); Ezhilvalavan *et al.* (2016) observed better yolk index score, whereas Vij *et al*. (2006) recorded the yolk index score as 0.275 ± 0.013, 0.351 ± 0.020 and 0.389 ± 0.00 in Danki, Kalasthi and Ghagus breeds, respectively. The yolk colour observed by Vij *et al.* (2006) was deep yellow in Danki and Kalasthi breeds and yellow in Ghagus breed, Haunshi *et al*. (2011) in Aseel (7.43 ± 0.13) and Kadaknath (7.82 ± 0.14), Rajkumar *et al*. (2014) in Aseel (7.91 ± 0.10) and Ezhilvalavan *et al*. (2016) in Aseel (7.25 ± 0.22) were closer to the present findings.

Vij *et al*. (2006) recorded the shell thickness (mm) of 0.40, 0.34 and 0.35 in Danki, Kalasthi and Ghagus breeds, respectively whereas Rajkumar *et al*. (2014) recorded the mean shell thickness (mm) of 0.33 ± 0.002. The findings of earlier works were in correspondence with the current results.

Table 1: Quality characteristics of Peruvidai chicken eggs in western part of Tamil Nadu.

Egg quality traits		Mean ± S.E. (n=40)
External	Egg weight (g)	45.84 ± 0.69
	Shape index	77.41 ± 0.49
	Specific gravity	1.06 ± 0.01
	Shell colour (%)	
	Brown	57.5
	Pale brown	42.5
Internal	**Albumen**	
	Albumen index	0.09 ± 0.00
	Weight (g)	25.79 ± 0.42
	Percentage	56.21 ± 0.22
	Haugh unit	86.66 ± 0.58
	Yolk	
	Yolk index	0.37 ± 0.01
	Weight (g)	14.57 ± 0.21
	Percentage	31.80 ± 0.16
	Yolk colour	7.65 ± 0.13
	Shell	
	Weight (g)	5.49 ± 0.10
	Percentage	11.98 ± 0.12
	Shell thickness (mm)	0.34 ± 0.00

CONCLUSIONS

The present study revealed the *Peruvidai* chicken eggs external egg quality traits like egg weight (g), shape index and specific gravity as 45.84 ± 0.69, 77.41 ± 0.49 and 1.06 ± 0.01, respectively. Among the total eggs collected 57.5 per cent eggs were brown in colour, whereas 42.5 per cent eggs were pale brown in colour. The internal egg quality traits like albumen index, albumen weight (g), albumen per cent, Haugh unit, yolk index, yolk weight (g), yolk per cent, yolk colour score, eggshell weight (g), eggshell per cent and eggshell thickness (mm) were 0.09 ± 0.00, 25.79 ± 0.42, 56.21 ± 0.22, 86.66 ± 0.58, 0.37 ± 0.01, 14.57 ± 0.21, 31.80 ± 0.16 and 7.65 ± 0.13, 5.49 ± 0.10, 11.98 ± 0.12 and 0.34 ± 0.00, respectively. From the results of the above study, it may be concluded that the egg quality parameter of Peruvidai chicken is having closer similarity with other native chicken breeds present in India.

FUTURE SCOPE

Present study is the basic work on egg quality parameters of Peruvidai chicken. Further study on its nutritional quality including fatty acid composition will give in-depth knowledge on *Peruvidai* chicken egg.

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Conflict of Interest. None.

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