

**COMPARATIVE EVALUATION OF INDIGENOUS CHICKEN REARED UNDER DIFFERENT SYSTEMS FOR EGG QUALITY TRAITS**

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**ABSTRACT**

A study was conducted to evaluate the indigenous chicken (pertaining to Bangalore Division of Karnataka) reared under intensive and scavenging system for external and internal egg quality traits. The external egg quality traits considered were egg weight, shell colour and shape index. The internal egg quality traits include albumin index, yolk index, shell thickness and Haugh unit score. The frequency of eggs pertaining to different shell color were 23.22, 36.29 and 40.49 per cent for creamy, light brown and brown, respectively under intensive system and 16.90, 44.46 and 38.64 per cent for creamy, light brown and brown, respectively under scavenging system. The Mean values recorded were  $40.61 \pm 0.48$  and  $43.16 \pm 0.31$ g for egg weight;  $76.04 \pm 0.40$  and  $74.12 \pm 0.56$  for shape index, when birds were reared under intensive and scavenging system respectively. The average values of  $0.080 \pm 0.002$  and  $0.087 \pm 0.001$  for albumin index;  $0.41 \pm 0.007$  and  $0.42 \pm 0.004$  for yolk index;  $74.36 \pm 1.009$  and  $78.01 \pm 0.49$  for Haugh unit score;  $0.37 \pm 0.003$  and  $0.33 \pm 0.003$  for shell thickness, under Intensive and Scavenging system, respectively. The egg quality traits did not differ significantly between districts within the system of rearing. However significant ( $P \leq 0.05$ ) differences were observed for all the traits between the systems of rearing, except for egg weight, albumin index and albumin weight.

**KEY WORDS** : Egg Quality Traits, Indigenous Chicken, Intensive Rearing, Scavenging.

**INTRODUCTION**

The indigenous chicken, besides contributing substantially to national food security through good quality protein for rural folk also generates a marginal source of income for day to today expenses through sale of birds and eggs since they are capable of thriving on kitchen waste, left over human foods, broken grains and other crop residues. The information available in the literature on egg quality traits of native chicken reared under different systems of rearing is scanty, keeping this in view, a study was undertaken to evaluate indigenous chicken reared under different systems for egg quality traits.

**MATERIALS AND METHODS**

Twenty five eggs were collected from indigenous chicken reared under scavenging (from different villages pertaining to three districts of Bangalore division of Karnataka state viz., Chickaballapur, Bangalore Rural and Ramanagar) and the same number from intensive system (in the University Poultry farm, Bangalore -KVAFSU, Bidar), were subjected for evaluation. After recording the shell color, eggs were weighed individually to the accuracy of 0.01g. Egg length and width were measured using Vernier callipers to compute shape index.

The eggs were broken on the level surface to measure internal egg quality traits, height of the thick albumin at three points and yolk height were measured using Ames Tripod Stand micrometer. The width of the albumin and yolk were measured using Vernier callipers to compute albumin index

and yolk index and Haugh unit score were calculated using the formula, suggested by Haugh, (1937). The egg shells were washed to remove adhering albumin and their thickness was measured in mm, using screw guaze. The yolk and shell were separated and weighed; albumin weight was calculated by subtracting both yolk and shell weight from egg weight. Analysis of variance was done for all recorded parameters using the appropriate SPSS 20 statistical packages to find out the differences between the three genotypes between two systems of rearing.

## RESULTS AND DISCUSSION

### External egg quality traits

The mean values for various egg quality traits are depicted in the Table 1. The weight of an egg is directly proportional to weight of albumin, yolk and shell and it varies significantly between the strains of hen (Pandey *et al.*, 1986). The mean values of the egg weight in the present study did not differ significantly ( $P \leq 0.05$ ) between the systems of rearing and Bangalore Rural genotype had the highest egg weight and differs significantly under scavenging system.

The shape index remains non significant in both the systems. The shape indices in the present study were comparable with the reports of Arya *et al.* (2012) under scavenging system and Kaur *et al.* (2008) under intensive system. However, the present study results were lower than the reports of Singh *et al.* (2000) and Parmar *et al.* (2006).

The shell colour percentages for three districts recorded are shown in the Table 2. The shell color observed in indigenous chicken is predominantly light brown followed by brown and creamy under scavenging system. The results are supported by reports of Vij *et al.* (2005 and 2007), Tanta *et al.* (2005). The shell color is a qualitative trait specific to the breed and variations in color are expected in the indigenous chicken since population studied was of nondescript type. The shell colouration depends on the genetic makeup of the bird, breed, strain or variety of chicken.

### Internal egg quality traits

**Albumin quality :** The quality of albumin plays an important role in influencing over all egg quality. The results of this study under intensive system were in close agreement with findings of Kaur *et al.* (2008) and Shivekumar *et al.* (2008). Higher values than the present findings were reported by Kaur *et al.* (2008) under scavenging system. The average albumin weight had no significant difference among the districts as well as between the systems of rearing. The values in this study were in close agreement with the findings of Chatterjee *et al.* (2007). However, the results of the present study were lower than the values reported by Chatterjee *et al.* (2007), Kaur *et al.* (2008), Shivekumar *et al.* (2008) for various other breeds under intensive system of rearing. Singh *et al.* (2000), Parmar *et al.* (2006) and Yadav *et al.* (2009) also reported lower values under scavenging system. Haugh Unit Score is used to measure albumin quality, Present findings were in close agreement with the findings of Shivekumar *et al.* (2008) and Kaur *et al.* (2008) however, lower values than the present findings were recorded by Parmar *et al.* (2006), Shivekumar *et al.* (2008) and Kaur *et al.* (2008).

**Yolk quality :** The spherical nature of egg yolk is expressed as Yolk index, There was no statistical significance difference in yolk index under intensive system which may be attributed to uniform management and nutritional conditions whereas statistical significant difference under scavenging system was observed. The values of Yolk index in this study had no significant difference, this may be attributed to uniform managemental and nutritional conditions and significant difference was observed under scavenging system. The present values are in close proximity with the findings of Chatterjee *et al.* (2007) and Shivekumar *et al.* (2008). The yolk weight values recorded were significantly ( $P \leq 0.005$ ) different between the districts under intensive system and these results were comparable with the results obtained by Kaur *et al.* (2008) and Chatterjee *et al.* (2007). The recorded

Table-1. Egg quality traits under different rearing systems

Rearing System	Intensive system					Scavenging system				
	Chikkaballapur	Bangalore Rural	Ramanagar	Overall Mean±SE		Chikkaballapur	Bangalore Rural	Ramanagar	Overall Mean±SE	
Districts Trait										
Egg weight(g)	40.54±0.97 <sup>a</sup>	41.51±0.74 <sup>a</sup>	39.78±0.76 <sup>a</sup>	40.61±0.48 <sup>NS</sup>		40.68±0.59 <sup>a</sup>	43.22±0.59 <sup>a</sup>	39.83±0.43 <sup>a</sup>	41.16±0.31 <sup>NS</sup>	
Shape index	75.70±0.70 <sup>a</sup>	76.05±0.66 <sup>a</sup>	76.38±0.77 <sup>a</sup>	76.04±0.40 <sup>a</sup>		73.73±1.19 <sup>a</sup>	74.60±0.80 <sup>a</sup>	74.03±0.94 <sup>a</sup>	74.12±0.56 <sup>b</sup>	
Albumin index	0.084±0.003 <sup>a</sup>	0.09±0.002 <sup>a</sup>	0.083±0.005 <sup>a</sup>	0.080±0.002 <sup>NS</sup>		0.087±0.002 <sup>a</sup>	0.089±0.001 <sup>a</sup>	0.087±0.002 <sup>a</sup>	0.087±0.001 <sup>NS</sup>	
Haugh unit score	72.59±1.73 <sup>a</sup>	77.64±1.22 <sup>a</sup>	72.88±2.06 <sup>a</sup>	74.36±1.009 <sup>b</sup>		78.48±0.96 <sup>a</sup>	77.68±0.59 <sup>a</sup>	77.88±1.00 <sup>a</sup>	78.01±0.49 <sup>a</sup>	
Yolk index	0.45±0.008 <sup>a</sup>	0.46±0.003 <sup>a</sup>	0.46±0.005 <sup>a</sup>	0.45±0.0037 <sup>a</sup>		0.41±0.007 <sup>a</sup>	0.43±0.007 <sup>a</sup>	0.42±0.008 <sup>a</sup>	0.42±0.004 <sup>b</sup>	
Yolk weight(g)	11.28±0.29 <sup>b</sup>	12.08±0.24 <sup>a</sup>	10.96±0.20 <sup>b</sup>	11.44±0.15 <sup>b</sup>		13.22±0.22 <sup>b</sup>	13.88±0.24 <sup>a</sup>	12.85±1.97 <sup>b</sup>	13.31±0.13 <sup>a</sup>	
Shell weight(g)	5.36±0.15 <sup>a</sup>	5.44±0.067 <sup>a</sup>	5.20±0.10 <sup>a</sup>	5.33±0.066 <sup>b</sup>		5.60±0.07 <sup>a</sup>	5.64±0.12 <sup>a</sup>	5.52±0.10 <sup>a</sup>	5.58±0.05 <sup>a</sup>	
Albumin weight(g)	24.38±0.76 <sup>a</sup>	23.98±0.66 <sup>a</sup>	23.62±0.63 <sup>a</sup>	23.99±0.39 <sup>NS</sup>		24.86±0.60 <sup>a</sup>	23.70±0.64 <sup>a</sup>	24.22±0.49 <sup>a</sup>	24.26±0.33 <sup>NS</sup>	
Shell thickness (mm)	0.39±0.006 <sup>a</sup>	0.37±0.005 <sup>b</sup>	0.34±0.004 <sup>c</sup>	0.37±0.003 <sup>a</sup>		0.34±0.006 <sup>a</sup>	0.32±0.004 <sup>b</sup>	0.32±0.004 <sup>b</sup>	0.33±0.003 <sup>b</sup>	

The values within a row having the same super scripts do not differ significantly ( $P \leq 0.05$ ).

**Table-2. The shell colour percentages under different systems of rearing**

District	Intensive system			Scavenging system		
	Creamy	Light brown	Brown	Creamy	Light brown	Brown
Chikkaballapur	12.26	33.88	53.86	10.68	41.25	48.07
Bang.Rural	23.25	33.66	43.09	14.45	36.50	49.05
Ramanagar	34.12	41.35	24.53	25.55	55.62	18.83
Pooled over the Districts	23.22	36.29	40.49	16.90	44.46	38.64

values under scavenging system were lower than the reports of Chatterjee *et al.* (2007).

**Shell quality :** Results of this study were significantly different among districts as well as between the systems of rearing for shell thickness whereas, shell weight although differs significantly between the systems of rearing, remains non significant among district groups. These results were similar to those values reported by Chatterjee *et al.* (2007) for shell weight and Parmar *et al.* (2006) for shell thickness.

The egg quality traits did not differ significantly between districts irrespective of the system of rearing for egg weight, albumin index and albumin weight. This study indicates that the system of rearing had no effect on albumin quality and egg weight. Further these indigenous birds can be utilized to develop improved varieties for backyard rearing.

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