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GENOTYPE EFFECTS ON EGG QUALITY PARAMETERS

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Abstract

This study was performed to compare morphological egg quality parameters in brown and white laying hen hybrids. Eggs (n=90 from Lohman Brown and n=90 from Lohman White at age of 42 weeks old) were obtained from a commercial poultry company raising laying hens in a multi-tier cage system. Egg quality parameters were analysed using one-way ANOVA considering statistical significance at P < 0.05. Except for shape and yolk indexes, other egg quality parameters did not differ by the hybrid (Table 1). Eggs from Lohman Brown had higher shape (77.74 vs. 74.53%) and yolk (4.19 vs. 3.97%) indexes than eggs from Lohman White. In summary, egg quality parameters for brown and white eggs are similar as long as hens are in the same age and are subjected to the same managerial production protocol.

Key words*: egg quality, genotype, conventional production.*

INTRODUCTION

Egg is one of the cheapest and most nutritious food sources for human consumption. Eggshell colour is mainly determined by the genotype. Consumer preference and marketing value for brown and white eggs vary by culture. Based on these farmers are thus eager to raise chickens that are suitable and lucrative for their regions. For instance, in France and UK brown eggs, whereas in Egypt and Japan white eggs are more preferable (Koizumi et al., 1993). There are no differences in taste as well as nutrient profile between white eggs and brown eggs. In market price differences are more related to the cost of egg production, being brown eggs are slightly more expensive than white eggs. This is absolutely not because brown eggs are superior to white eggs in terms of health related nutrient contents. In general brown chickens are heavier, consumes more feed, lay heavier eggs than white chickens (Bell, 1998a).

This experiment was conducted to compare physical characteristics and inner quality parameters of brown and white eggs.

MATERIALS AND METHODS

Eggs (n=90 from Lohman Brown and n=90 from Lohman White at age of 42 weeks old) were obtained from a commercial poultry company raising laying hens in a multi-tier cage system.

Egg quality parameters (Ergün et al., 1987) were:

Shape index (%) = (egg width, cm/egg length, cm)×100,

Shell strength (kg/cm^2) was determined by using machine with the spiral pressure system,

Shell thickness (mm×10^{-2}) was determined in 3 different parts by using a micrometer,

Albumen index (%) = (albumen height, mm/average of albumen length, mm and albumen width, mm)×100

Yolk index (%) = (yolk height, mm/yolk diameter, mm)×100,

Yolk colour was determined by using commercially available "yolk colour fan" according to the CIE standard colorimetric system (Yolk Colour Fan, the CIE standard

colorimetric system, F. Hoffman-La Roche Ltd., Basel, Switzerland), and

Haugh unit = 100×log (AH+ 7.57-1.7×$EW^{0.37}$), where AH = albumen height, mm and EW = egg weight, g.

Egg quality parameters were analysed using one-way ANOVA considering statistical significance at $P < 0.05$.

RESULTS AND DISCUSSIONS

Except for shape and yolk indexes, other egg quality parameters did not differ by the hybrid (Table 1). Eggs from Lohman Brown had higher shape (77.74 vs. 74.53%) and yolk (4.19 vs. 3.97%) indexes than eggs from Lohman White.

In comparison with white eggs, brown eggs were reported to have thinner shell thickness (0.01449 vs. 0.01535 inches), lower shell weight (8.7 vs. 9.4%), higher albumen weight (64.5 vs. 63.1%) and Haugh unit (85.1 vs. 81.9), and lower yolk (26.8 vs. 27.6%) (Bell, 1998b). Similiar inner quality parameters for brown and white eggs were also reported by Curtis et al. (1985).

These values are more related to egg weight than egg nutrient profile Curtis et al. (1986), which are affected by the the diet fed to chickens (Potts and Washburn, 1974).

Table 1. Comparison of egg quality parameters between Lohman Brown and Lohman White

Parameter	Brown egg	White egg	*P* > F
Egg weight, g	65.53±0.51	62.35±0.48	0.80
Eggshell weight, g	7.66±0.07	7.49±0.07	0.10
Eggshell weight, %	12.28±0.11	12.03±0.10	0.10
Eggshell stiffness, kg/cm^2	2.70±0.12	2.72±0.15	0.92
Eggshell thickness, mm	0.39±0.002	3.90±0.002	0.91
Shape index, %	77.74±0.24	74.53±0.25	0.0001
Yolk colour	10.36±0.09	10.17±0.08	0.13
Yolk index, %	4.19±0.03	3.97±0.02	0.0001
Albumen index, %	0.60±0.02	0.64±0.02	0.12
Haugh unit	70.10±0.89	71.95±0.93	0.18

CONCLUSIONS

In conclusion, egg quality parameters for brown and white eggs are similar as long as hens are in the same age and are subjected to the same nutritional and husbandry programmes.

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