

THE EFFECT OF LENGTH OF STORAGE ON ALBUMEN THICKNESS AND ACIDITY OF DUCK EGG

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Abstract

Research about the effect of length of storage on thick albumen and acidity of duck egg, has been carried in Bandung, Indonesia. Using completely randomized design, with seven level of storage (fresh, five days, 10 days, 15 days, 20 days, 25 days and 30 days) and three replications; using 315 local duck eggs. Results indicated that until 30 days of storage, there is no significant differences of the duck egg regarding the thickness of albumen; even the albumen was thinner when the storage day progressed and also the pH of albumen was higher than the fresh egg.

Key words: duck egg, albumen, thick of albumen, acidity

INTRODUCTION

Duck eggs are excellent for general eating and baking purposes, even duck eggs typically have slightly higher cholesterol content than the average chicken egg. When eggs are eaten in moderation, the difference in cholesterol between duck and chicken eggs probably is insignificant for healthy people who get adequate exercise and eat sensibly. Market eggs must be cooled as soon after laying as is practical. The storage room should be kept at 7.2°C (45°F), with 80% relative humidity [1]. According to [6], eggs set for the first six days are called new eggs, those between days 6 to 13 are in between eggs, and eggs after day 13 are old eggs. Egg white viscosity differs in various areas of the egg. The height of the albumen is one of the principal characteristics used to judge interior egg quality. Height of 8 to 10 mm, are considered as indicators of superior interior quality. The quantity of thick albumen in the freshly laid egg is affected by genetics, duration of continuous production, and environmental factors. Egg quality and albumen quality deterioration in particular, can be slowed down significantly by maintaining egg temperature near the freezing point. Egg quality is affected by genetic, maternal and environmental effects [2]. According to Tarver and Choate (1964) as cited by [1], the egg that held at 7.2°C, over a 7-day period had significantly better quality when

compared with the egg that held at 13.8°C. Quality determines the acceptability of a product to potential purchasers. The quality of eggs and the preservation of this quality during storage is a function of their physical structure and chemical composition. Egg white (albumen) characteristics showing good egg quality are thick albumin fullness and albumin transparency. The pH of eggs may give some indication of quality. As carbon dioxide escapes from egg white, the pH increases from near neutral (pH 7.0) to as high as 9.5. This is accompanied by the development of watery whites [7]. Egg storage systems must meet also interior quality to the maintained, indicated by a good proportion of a thick white, a firm and good flavour of yolk and albumen. The grade of table eggs depends to a major degree on the firmness or gel structure of the albumen [5]. The egg with affirm albumen have greater quantities of ovomucin. Pickard et al, 1987, cited by [3], there are effects of high temperature and relative humidity on egg composition. The albumen weight in 20°C with 50% RH, are 37.5g. According to [3], that high ambient temperature has a negative effect on egg quality. High temperature is known to increase respiratory rate, which alters the acid-base balance. Eggs in a hot environment should be collected more often and cooled quickly in a properly equipped egg storage room, to maintain their internal quality. The aim of the research is to study the effect of storage time on albumen thickness and pH-albumen of local duck egg.

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MATERIAL AND METHODS

315 local duck eggs, was used in this research, using Completely Randomized Design (CRD). The eggs was taken randomly, in seven levels of storage time (fresh, five days, 10 days, 15 days, 20 days, 25 days and 30 days), with three replications. Each level contained 15 eggs.

RESULTS AND DISCUSSIONS

1. Effect of storage time to Albumen thickness of Duck egg (mm)

Albumen thickness or the height of the albumen is one of the principal characteristics used to judge interior egg quality. Height of 8 to 10 mm, are considered as indicators of superior interior quality. The quantity of thick albumen in the freshly laid egg is affected by genetics, duration of continuous production, and environmental factors. In the Table 1, we can see that the average of albumen thickness was decreased when the day of storage was prolonged. The average ambient temperature in Bandung Indonesia, are between 20°C to 25°C. This environmental factor, was increased the respiratory of the egg and effected the albumen thickness. As the storage time increased, the albumen will become thinner because of watery whites, from 8.62 mm (the fresh eggs) to 3.84 mm at the end of the storage (day 30).

Table 1. The effect of storage time on albumen thickness of Duck egg (mm)

Storage Time (days)	Albumen thickness average (mm)	Significance (0.05)
L-0 (day 0 - fresh)	8.62	a
L-1 (day 5)	7.20	b
L-2 (day 10)	6.36	c
L-3 (day 15)	5.50	d
L-4 (day 20)	4.84	e
L-5 (day 25)	4.42	e
L-6 (day 30)	3.84	f

Note: The same letter show no significant difference ($p < 0.05$)

2. The effect of storage time on pH-albumen of Duck egg

The effect of storage time on pH-albumen of Duck egg is showed in Table 2.

Table 2 The effect of storage time on pH-albumen of Duck egg

Storage Time (days)	pH-albumen average	Significance (0.05)
L-0 (day 0 – fresh)	8.30	a
L-1 (day 5)	9.26	b
L-2 (day 10)	9.28	b
L-3 (day 15)	9.36	b
L-4 (day 20)	9.46	c
L-5 (day 25)	9.48	c
L-6 (day 30)	9.60	d

Note: The same letter show no significant difference ($p < 0.05$)

From Table 2, shows that the pH-albumen average of fresh egg was 8.30 and higher as the storage time prolonged (9.60 for 30 days storage). Albumen characteristics are important indications of quality. The pH of eggs, especially the albumen; may give some indication of quality. As carbon dioxide escapes from egg white, the pH increases from near neutral (pH 7.0) to as high as 9.5, when the storage time increased.

CONCLUSIONS

1. Until 30 days of storage, there is no significant differences of the duck egg, regarding the thickness of albumen; even the albumen was thinner when the storage time progressed.

2. The pH-albumen was higher than the fresh eggs, when the storage time progressed.

REFERENCES

[1] Bell, D.D. and W. D. Weaver, 2002. Commercial chicken meat and egg production. 5th edition. Kluwer Academic Publishers. p. 1209 -1216
 [2] Cherry, P. and T. P. Morris, 2008. Domestic Duck Production. Science and Practice. CAB International, Oxfordshire, UK. p. 225.
 [3] Dagher, N. J. 2001. Poultry Production in Hot Climates. CAB International. Oxon. United Kingdom. p. 113
 [4] Holderread, D. 2001. Raising Duck. Storey Publishing. p. 9.
 [5] Leeson, S. and J. D. Summers, 2001. Nutrition of the Chicken. 4th edition. University Books, Ontario. p. 468.
 [6] Sonaiya E. B. and S. E. J. Swan, 2004. Small-scale Poultry Production. Technical Guide. Food and Agriculture Organization of The United Nations. Rome. p. 39,75.
 [7] Winter, A.R. and E. M.Funk. 1960. Poultry, Science and Practice. 5th edition. J. B. Lippincott Co. Chicago. p. 356.