Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan
ISSN 2303-2227 eISSN 2615-594X
Accredited by National Journal Accreditation No. 105/E/KPT/2022

Vol. 12 No. 1 January 2024, Page: 34-38
DOI: https://doi.org/10.29244/jipthp.12.1.34-38
Available online at https://journal.ipb.ac.id/index.php/ipthp/index

Internal Quality of Layer Eggs from Traditional Market Majene

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(Received 14-11-2023; Revised 21-12-2023; Accepted 25-01-2024)

ABSTRACT

Layer egg is a source of animal protein and food products of animal which popular among the public, and become integral part of consumers' needs. The high of competitive industry in various countries has caused the quality of the exterior and interior become one of the important assessment indicators. However, there are problems that arise in the process of marketing layer eggs is the quality of egg less attention. Egg quality needs to be maintained; thus, the content remains intact and fresh. This study aimed to determine the quality of Layer eggs from the traditional market Majene.The samples used were 90 layer eggs from traditional market Majene. Sample was was carried out using purposive sampling method with the condition that this location is a place where layer eggs are sold to final consumers such as local people can buy directly without any intermediaries. Parameters based on physical quality include egg weight, albumen index, yolk index and haugh unit value. The data obtained was analyzed qualitative descriptively based on laboratory test results. The results showed that egg weight, albumen index, yolk index and haugh value of eggs from traditional market Majene have good quality and safe for consume based on SNI 2008.

Keywords: Layer Eggs, Egg Quality, Traditional Market Majene

ABSTRAK

Telur ayam ras merupakan sumber protein hewani dan termasuk produk pangan asal ternak yang populer dikalangan masyarakat, dan menjadi kebutuhan yang tidak terpisahkan bagi konsumen. Tingginya daya saing dalam industri telur ayam ras diberbagai negara menyebabkan kualitas eksterior dan kualitas interior menjadi salah satu indikator penilaian yang penting. Namun terdapat masalah yang muncul dalam proses pemasaran telur ayam ras ke konsumen akhir yaitu kualitas yang kurang diperhatikan. Kualitas telur perlu dipertahankan agar kandungan yang terdapat pada telur tetap utuh dan terjaga. Penelitian ini bertujuan untuk mengetahui kualitas telur ayam ras yang berasal dari pasar tradisional Majene. Sampel yang digunakan sebanyak 90 butir telur ayam ras dari pasar tradisional Majene. Metode pengambilan sampel dengan menggunakan purposive sampling dimana kriteria penjualan telur merupakan pusat jual beli telur yang konsumen akhir langsung membelinya tanpa adanya perantara. Parameter yang dilihat berdasarkan kualitas fisik meliputi berat telur, indeks putih telur, indeks kuning telur dan nilai haugh unit. Data yang diperoleh dinalisis secara deskriptif berdasarkan hasil pengujian di laboratorium. Hasil penelitian menunjukkan bahwa berat telur, indeks putih telur, indeks kuning telur dan nilai haugh unit telur ayam ras yang dari pasar tradisional Majene mempunyai kualitas yang dapat dikategorikan baik dan berdasarkan SNI aman untuk dikonsumsi.

Kata Kunci: Telur Ayam Ras, Kualitas Telur, Pasar Tradisional Majene

INTRODUCTION

Public awareness of the need for animal protein increases as the population increases. Layer eggs are a food product derived from animals that can be easily obtained at affordable prices and have complete nutrition, thus they are popular among the public. Food quality is an essential aspect in meeting animal protein needs. Apart from consumers needing good quality food, they also need food that is safe to consume. Thus, the laying chickens industry competes to provide good quality eggs. Egg quality is one of the factors which quality safety must be guaranteed in the marketing process since it is related to acceptance by final consumers.

Egg quality is an indicator that can be seen and assessed to compare the quality of eggs whether they are good for consumption or not. The high protein contained in an egg means that it is effortless for the egg to experience a decline in egg quality during storage (Ningtiyas 2023) Eggs easily crack and break and even lose weight due to environmental temperature. The causes of egg damage include poor egg storage methods and places which cause microbial contamination which can result in damage to the texture of albumen and yolk. Chicken eggs stored in an open space usually only last approximately 10-14 days, after that time, the eggs will experience damage due to evaporation of the water content in the egg through the pores of the shell which results in a reduction in the content and the weight of the egg, and dilution occurs (Cornelia 2014). Eggs circulating in the market will experience a decline in quality every day. The longer the storage life of the eggs, the more the external quality and internal quality of the eggs deteriorate. Retailers usually sell eggs that have been stored for more than 7 days.

Therefore, to be able to see the quality of eggs originating from the traditional market Majene, this can be done by looking at egg quality indicators including measuring egg weight, albumen index value, yolk index value, and haugh unit value (Jazil 2013; Purwaningsih 2016). The aim of this research is to see how much the quality of layer eggs in the traditional market Majene decreases during the marketing process to the final consumer. Thus, efforts can be made to reduce or minimize damage or reduction in quality that could be detrimental to consumers.

MATERIAL AND METHODS

Material

The materials used in this study were layer eggs originating from the traditional market Majene, Sigmat Digital PVC Pro 150 mm Vernier Caliper, Electronic Compact Scale (600g/0.01g), Petridish 90 x15 mm Norma x and yolk filter.

Methods

The samples used were 90 layer eggs from traditional market Majene. Sampling method was carried out using purposive sampling method with the condition that this location is a place where layer eggs are sold to final consumers such as local people can buy directly without any intermediaries (Suharyanto 2016). Egg samples were taken randomly and then taken to the integrated laboratory of Department of Animal Science, West Sulawesi University, to analyze the quality of the eggs in terms of physical criteria including egg weight (g), albumen index, yolk index, and haugh unit value (SNI 2008).

Egg weight (SNI 2008)

Egg weight data was obtained by measuring the weight of each egg sample using a digital scale, then the length and width also measured using a caliper.

Yolk index (SNI 2008)

Yolk index data was gained by measuring the height and diameter of the yolk, then measuring it using a caliper and calculating the index value.

Albumen index (SNI 2008)

Albumen index data was acquired by measuring the height and diameter of the albumen then measuring using a caliper and calculating index value.

Haugh unit (SNI 2008)

The Haugh Unit value is calculated using the following formula:

$$HU=100\times\log(H+7.57-1.7W^{0.37})$$

Note:
H = albumen height
W = egg weight

Data collected from each variable was analyzed qualitative descriptively based on test results at the Integrated Laboratory of the Faculty of Animal Science and Fisheries in tabular form and calculated with the help of the Microsoft Excel 2013 program.

RESULT AND DISCUSSION

Egg Weight

Egg weight is one of the indicators used to measure egg quality because it is the main marker used for marketing and selling eggs (Prasetya 2015). Consumer demand for egg weight criteria varies, generally consumers tend to choose eggs that weigh more. The average weight of consumed chicken eggs based on SNI (2008) is categorized into 3 classes, namely the small category is less than 50 g, the medium category is within the value of 50-60 g, and the large category is more than 60 g. The results of the research confirm that the average weight of layer eggs originating from the traditional market Majene (Table 1) is 60 g, which is included in the medium category. Influencing factors of eggs weight include the chicken's age, environmental temperature, type of chicken, nutritional content in the feed, body weight of the chicken and when the eggs are produced (Sodak 2011). Egg weight can be affected by the age of the chicken, as the chicken gets older the size of the eggs produced will become larger and will decrease as the chicken ages (John-Jaja 2016; Salamon and Kent 2014). There is a relationship between egg weight and storage time, the longer the storage process, the greater the reduction in egg weight (Djaleani 2019), which will also reduce egg quality

Table1. Average value of internal quality of layer eggs

Variables	Average	SNI (2008)
Egg Weight (g/piece)	60.00 ± 3.84	Large = > 60 g, medium = 51–60 g, small = < 50 g
Yolk Height (mm)	14.67 ± 0.89	
Yolk Diameter (mm)	44.63 ± 2.88	
Yolk Index	0.33 ± 0.03	quality I 0.458- 0.521, quality II 0.394 - 0.457, quality III 0.330 - 0.393
Albumen Height (mm)	4.18 ± 1.17	
Albumen Diameter (mm)	97.02 ± 18.87	
Albumen Index	0.05 ± 0.02	0.050 - 0.174
Haught Unit	60.79 ± 11.69	AA = > 72 ; A = 60−72 ; B = 31−60

Note: Data source of University of West Sulawesi Integrated Lab, 2023

(Dirgahayu 2016). Pytel (2018) stated that the quality of layer eggs in each traditional market has different quality for each seller which can be caused by environmental temperature, conditions in the market, and distance between egg distribution. When the egg is left in the open air after leaving the cloaca, the egg will only last for approximately 2 weeks, after more than 2 weeks the egg will experience damage caused by the evaporation of the water content contained in the egg through the pores of the shell which results in reduced egg content, egg weight and dilution occurs (Cornelia 2014). The weight loss occurs is due to the evaporation of water that occurs in albumen, as well as the evaporation of gases such as ammonia, nitrogen and hydrogen sulfide. This is in line with the opinion of Alfianor (2023) that eggs originating from traditional markets can experience weight loss due to evaporation of water and gas in the eggs, then egg age and storage environment affect as well. However, Haryono (2000) found that eggs circulating in the market for approximately 7 days still presented good quality. Then Nova (2012) stated that there was a decrease in egg weight on the 15th day of storage, which was 3.09%.

Albumen Index

When looking at egg quality, there are several components that serve as benchmarks for assessing quality, namely physical, chemical and biological. Physical quality criteria include egg weight, albumen index value, yolk index, and haugh unit value, shell weight, egg cleanliness, shell thickness and shell strength. The research results in Table 1 delineate that the Albumen Index value circulating in the traditional market Majene is 0.050. The Albumen Index is related to the albumen condition were based on the Indonesian National Standard (2008), fresh eggs have an albumen index value ranging between 0.050 and 0.174. The older the egg after leaving the cloaca, the wider the diameter of the albumen which causes the small of albumen index value. The research results illustrate that the index value of albumen circulating in the traditional market is included in the standard category.

The protein content in feed, in this case Ovomucin, can be a factor in the viscosity of albumen, the presence of Ovomucin can have an effect on viscosity and able to make the albumen index value higher, thus the quality of the albumin is maintained (Sudaryani 2000). However, the index value will decline with the length of storage due to evaporation which causes the egg cavity to enlarge due to the entry of air through the pores of the shell (Worang 2022). Carbon dioxide that comes out through the pores of the egg shell causes the concentration of bicarbonate ions in the albumen to reduce and disrupts the balance of the buffer system. This causes the pH of the egg to rise and makes the albumen alkaline might damage the ovomucin fibers. When the ovomucin is damaged the albumen will no longer thicken (Jazil 2013). Saraswati (2015) added that the longer the storage time for eggs will cause the pores in the egg shell to become more open and larger, thereby damaging the mucosal layer, water, gas and bacteria can effortlessly enter through the pores, thus the eggs become damaged quickly and experience a reduction in quality. This is in line with the opinion of Sigar (2020) and Azizah (2018) that the longer egg storage results in the diameter of the albumen becoming thinner.

Yolk Index

Based on the results of testing the quality of eggs circulating in the traditional market Majene, the yolk index (YI) value is included in quality class III, where the quality level based on SNI (2008) is divided into 3 quality classes, including quality I ranging from 0.458 to 0.521, quality II ranges from 0.394 to 0.457 and quality III ranges from 0.330 to 0.393). This is in accordance with research conducted by Meilyanti (2021) which found that the value of YI circulating in Kendari traditional markets was also included in quality class III. Djaelani (2019) believes that the low YI value can be affected by the egg white experiencing dilution due to the long storage process, thus water from the albumen enters the yolk.

Fresh eggs have yolks that are right in the middle position, however long storage may cause the position of the yolk to move to the side, even if stored for too long the yolk can break due to decreased elasticity of the vitelline membrane followed by dilution of the albumen (Cornelia 2014) resulting in damage to the yolk. The decrease in albumen quality can be seen by the transfer of water from the albumen to the yolk (Wulandari 2013) which also causes damage to the yolk. The continuous process of water diffusion causes the yolk to enlarge, thus the yolk becomes wider and then breaks, the faster the movement of water from the albumen to the yolk depends on the level of viscosity (Sumitra 2012). The low YI value will

further reduce the quality of the eggs. The YI value can be interpreted as indicating that there is damage and decreased function of the egg's vitelline membrane, where the vitelline membrane is responsible for keeping the egg yolk in the center. According to Argo (2013) the YI value can be influenced by the content of protein, essential amino acids and fat. The YI value will continue to decline as the shelf life of the egg increases because the diameter of the yolk increases due to the diffusion of water from the albumen to the yolk (Pratiwi 2020).

Haugh Unit

Haugh Unit is a unit indicator used to determine the freshness level of egg contents, especially albumen. When the haugh unit value is higher, it means that the quality of the eggs is getting better. The storage time factor affects the value of the haugh unit. If eggs are stored for a long time, the haugh unit value will also decrease. The HU value has a relationship between egg weight and albumen height (Sihombing 2014). The smaller the haugh unit value indicates that the albumen is getting thinner, causing the quality to decrease. The HU value in this study was 60.79. SNI (2008) regarding eggs states that the haugh unit value is divided into 3 quality categories, including quality I having a haugh unit value of more than 72, quality II having a haugh unit value of 62 to 72 and quality III having a haugh unit value of less than 60.

Based on the national standard quality category, the quality of eggs circulating in the traditional market Majene is in the quality II. This is in accordance with research conducted by Alfianor (2023), although the Haugh unit value is included in the low quality class, it is still included in the appropriate standard. The results of the haugh unit assessment of eggs at the Majene traditional market confirm that the quality of albumen is still relatively good. Generally, the decrease in haugh unit value might be caused by increasing humidity, increasing ambient temperature and prolonged storage time which causes the contents of the egg to evaporate and the loss of CO2 makes the air cavity bigger and the albumen thinner (Worang 2022; Lestari 2013).

CONCLUSION

Based on the results and discussions that have been carried out in this research, it can be concluded that egg weight, albumen index value, yolk index value and haugh unit value of layer eggs originating from the traditional market Majene have good quality and are still in the safe category for consumption based on National Standards for consumption eggs.

ACKNOWLEDGEMENT

Directorate General of Higher Education, Research and Technology, Ministry of Education, Culture, Research and Technology of Republic of Indonesia 2023.

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