

ORIGINAL RESEARCH ARTICLE

**THE QUALITY AND TOTAL MICROBES OF BROILER CHICKEN IN  
TRADITIONAL MARKETS OF DENPASAR CITY**

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**ABSTRACT**

The purpose of this study was to determine the quality and total microbes of broiler at different location at the traditional markets in Denpasar City. This study used a completely randomized design (CRD) with four treatments. The treatments used in this study, broiler chicken sold at traditional markets in East (DT), North (DU), West (DB), and South of Denpasar (DS). The data obtained from this study were analyzed with analysis of variance. If there were significant differences ( $P < 0,05$ ) among the treatments, then continued with Duncan's multiple range test. The variables used in this study were carcass weight, cooking loss, drip loss, water holding capacity, water content, protein, fat, ash, and total microbes. The results showed that on the average, the highest carcass weight in DB treatment was 1.482 grams, with other treatments to get results not significantly different ( $P > 0,05$ ). The result of this study for variable drip loss, water content, protein, fat, and ash significantly different ( $P < 0,05$ ), then research result for cooking loss, and water holding capacity, were not significantly different ( $P > 0,05$ ). The research result for total microbes broiler chicken at traditional markets in Denpasar City have a range of  $1,84 \times 10^4$  to  $2,62 \times 10^4$  CFU /gram. The results were still normal when compared to SNI 7388: 2009 which states that the maximum amount that the content of TPC  $1 \times 10^6$  CFU/gram. From these results, it was concluded that there were similarities quality of broiler chicken (carcass weight, cooking loss, water holding capacity, and total microbes), however, there were differences in the quality of broiler seen from drip loss, water content, protein, fat, and ash of broiler at traditional markets in Denpasar City.

**Keywords:** Broiler, Traditional Market, Quality of Meat, Microbies of Meat

**INTRODUCTION**

Broiler is one of the livestock products that play a role in fulfilling needs of animal protein, where in 2014, the average consumption of chicken per capita in a week is 0.086 kg. (Badan Pusat Statistik, 2015). One of the problems of chicken is the rampant sale of chicken originating from chicken that expired or die before cutting, chicken that comes from slaughtering process that is not good (Ibrahim, 2004). Traditional market is one marketing

place of daily needs which one of them is broiler chicken.

In Denpasar City, the improvement of traditional market conditions by the City government is committed to empower the traditional markets as an effort to develop the people's economy. The revitalization of traditional markets has a positive impact on traders and communities. The number of traders in the markets in Denpasar City, based on data Central Bureau of Statistics Denpasar 2014, as many as 7,542 people, or increased 67 people since 2013 (Yudistira, 2015). Based on this matter, the research was conducted on physical and chemical quality of broiler chicken in traditional market of Denpasar City.

## **MATERIALS AND METHODS**

Sample on this research is taken at four traditional markets in Denpasar (traditional market of East (DT), North (DU), West (DB), and South of Denpasar (DS)). Chicken sample used the breast chicken for chicken quality. The research was conducted at the Laboratory of Animal Product Technology and Microbiology, Faculty of Animal Science and Laboratory of Faculty of Agricultural Technology, Udayana University, Denpasar-Bali. The

study lasted eight weeks, beginning in early November 2016 until the end of December 2016. This research used a completely randomized design (CRD) with four treatments. The variables that are measured in the research were: carcass weight, cooking loss, drip loss, water holding capacity, water content, protein, fat, ash, and total microbes. The data obtained from this research are analyzed by analysis of variance, then continued by Duncan's multiple-range test (Steel and Torrie, 1989). The data processing was done by the SPSS 16 program.

## **RESULTS AND DISCUSSION**

### **Carcass Weight**

Carcass weight of the broiler chickens that circulated in the traditional market of Denpasar City was 1.481 g. The results showed that carcass weight of the broiler chickens was carcass weight that many consumers demand. According to Dewi *et al.* (2014) the increasing of the digestible feed in the chicken resulted in much nutrients being absorbed and molded into meat and reflected in carcass weight as high as percentage of carcass. In addition, increasing the carcass weight and carcass percentage is closely related to weight of pieces (Antari *et al.*, 2015).

### Cooking Loss

The average of broiler chicken's cooking loss of DT was 31.38% and it was not statistically significant ( $P > 0.05$ ) with the average of broiler chicken's cooking loss of DB, DU, and DS. The broiler chicken with the lower cooking loss has a better relative quality than

broiler chicken with the greater cooking loss, because, the loss of nutrients during cooking will be slight (Soeparno, 2009). This is in accordance with Prayitno *et al.* (2010) the smaller percentage of cooking loss means the less of lost water and nutrients that dissolve in the water.

**Table 1. The Quality and Total Microbes of Broiler Chicken in Traditional Markets of Denpasar City**

Variables	Treatments <sup>1)</sup>				Standard	SEM <sup>2)</sup>
	DT	DB	DU	DS		
Carcass Weight (g)	1.481,0 <sup>a 3)</sup>	1.481,6 <sup>a</sup>	1.480,2 <sup>a</sup>	1.479,2 <sup>a</sup>		4,23
Cooking Loss (%)	31,38 <sup>a3)</sup>	32,68 <sup>a</sup>	32,80 <sup>a</sup>	32,82 <sup>a</sup>	28,1-34,48 <sup>4)</sup>	0,31
Water Holding Capacity (%)	34,43 <sup>a</sup>	34,28 <sup>a</sup>	34,22 <sup>a</sup>	34,15 <sup>a</sup>	30,22 <sup>5)</sup>	0,68
Drip Loss (%)	10,26 <sup>a</sup>	11,97 <sup>b</sup>	12,14 <sup>b</sup>	12,16 <sup>b</sup>	4,57-5,10 <sup>6)</sup>	0,26
Water Content (%)	73,24 <sup>b</sup>	65,49 <sup>a</sup>	63,54 <sup>a</sup>	63,33 <sup>a</sup>	65-80 <sup>8)</sup>	0,42
Protein (%)	25,35 <sup>b</sup>	24,49 <sup>ab</sup>	24,03 <sup>a</sup>	23,96 <sup>a</sup>	16-22 <sup>8)</sup>	0,17
Fat (%)	5,09 <sup>a</sup>	5,81 <sup>a</sup>	9,60 <sup>b</sup>	9,74 <sup>b</sup>	1,5-13 <sup>8)</sup>	0,20
Ash (%)	1,24 <sup>b</sup>	1,20 <sup>ab</sup>	1,19 <sup>ab</sup>	1,09 <sup>a</sup>	1 <sup>9)</sup>	0,02
Total Microbes (CFU/gram)	2,45x10 <sup>4a</sup>	1,84x10 <sup>4a</sup>	2,62x10 <sup>4a</sup>	2,22x10 <sup>4 a</sup>	1x10 <sup>6 10)</sup>	0,13

#### Information :

- 1) DT: Broiler Chicken Sold at Traditional Market in Denpasar East, DB: Broiler Chicken Sold at Traditional Market in West Denpasar, DU: Broiler Chicken Sold at Traditional Market in North Denpasar, DS: Broiler Chicken Sold at Traditional Market in South Denpasar.
- 2) SEM (Standard Error of Means)
- 3) The values with the same superscript on the same line show no significant difference ( $P > 0.05$ )
- 4) Source: Kasih *et al.* (2012); 5) Source: Fernando (2007); 6) Source: Fauziah (2014); 7) Source: Suradi (2008); 8) Source: Soeparno (2011); 9) Source: Campbell and Lasley (1975) in Anggorodi (1985); 10) Source: SNI 7388: 2009

### Water Holding Capacity

The average of broiler chicken's water holding capacity of DT was 34,43% and that was not statistically

significant ( $P > 0,05$ ) with the average of broiler chicken's water holding capacity of DB, DU, and DS. The higher the protein content of broiler chicken, the

higher the water holding capacity, because of the protein's ability in holding water chemically and increasingly according to the fat content (Oktaviana, 2009).

### **Drip Loss**

The average of broiler chicken's drip loss of DT was 10.26% and it was statistically significantly different ( $P < 0.05$ ) with the average of broiler chicken's drip loss of DB, DU, and DS (Table 1). Drip loss was related to the water holding capacity of the chicken. When the water holding capacity increases, then the drip will decrease (Soeparno, 2009). Furthermore, Sriyani *et al.* (2015) suggested that the differences of family in livestock have a significant effect on the value of drip loss which was produced, where the drip loss was in line with the value of cooking loss.

### **Water content**

The average of broiler chicken's water content of DT was 73,67% and it was statistically significantly different ( $P < 0,05$ ) with the average of broiler chicken's water content of DB, DU, and DS. High water content was due to the young age of the livestock, since the

formation of protein and fat was not completely perfect (Rosyidi *et al.*, 2010).

### **Protein Content**

Statistically, the broiler chicken's protein content of DT was significantly different ( $P < 0.05$ ) with the average of broiler chicken's protein content of DB, DU, and DS (Table 1). Protein was closely related to water content, where animal protein has hydrophilic characteristic that interacts with water to form hydrogen bonds (holding the water molecules of the meat) so that when the water holding capacity and water content decreases, protein level also decreases. Fernandez *et al.* (2003) stated that livestock which given concentrate type of feed has high protein content when compared with livestock which only consume plants.

### **Fat Content**

The average of broiler chicken's fat content of DT is 5.09% was statistically significantly different ( $P < 0.05$ ) with the average of broiler chicken's fat content of DU, and DS and was not significantly different ( $P > 0,05$ ) with the broiler chicken's fat content of DB. The high fat content in broiler chicken of DU and DS can be caused on feed content which was consumed by

broiler chicken when it kept. As what Ariana and Suranjaya (2016) stated that high carcass fat was the result of high-energy rations.

### Ash Content

The results showed that the average of broiler chicken's ash content of DT was 1.24% and it was statistically significantly different ( $P < 0.05$ ) with the average of broiler chicken's ash content of DB, DU, and DS (Table 1). The ash content showed total minerals in a food. Organic materials in the combustion process will burn but not as in the inorganic components that so-called ash content (Astuti, 2011).

### Total Microbes

Total microbes results showed that total of broiler chicken's microbes that circulated in traditional market of Denpasar City was not significant ( $P > 0,05$ ). The average of broiler chicken's total microbes of DT was  $2.45 \times 10^4$  CFU / gram. Microbial contamination of broiler chicken proceeds from the infected chicken or post-mortem contamination (Ariana et al., 2014). According to SNI 7388: 2009 described the maximum amount of TPC content was  $1 \times 10^6$  CFU / gram. Broiler chicken which was sold in the traditional market of Denpasar City was still in accordance

with the standard since it has number of total microbes below the maximum limit of the standard. The low TPC on all the broiler chicken sold by the traders in the market was likely to be still fresh (freshly slaughtered of broiler chicken) as well as the time between the slaughtering to purchases of less than 4 hours, so minimizing the contamination at the time of sale resulting in fewer bacterial growth.

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