



The Effect of Recitation Al Qur'an Verses of Pre-laughter as Psychological Treatment on the Physical Quality of the Broiler Meat

Tahrir Aulawi^{a*}, Joko Hermanianto^b, Rizal Syarief^c, Henny Nuraini^d

^a*Study Program Food Science Department of Food Science and Technology, Faculty of Agricultural Technology, Bogor Agricultural University, Campus of IPB Dramaga, West Java, Indonesia.*

^b*Department of Food Science and Technology, Faculty of Agricultural Technology, Bogor Agricultural University, Campus of IPB Dramaga, PO. BOX 220. Bogor 16680. West Java, Indonesia.*

^c*Southeast Asian Food and Agricultural Science and Technology (SEAFASST) Center, Bogor Agricultural University, Campus of IPB Dramaga, PO. BOX 220. Bogor 16680. West Java, Indonesia.*

^d*Department of Science Animal Production and Technology, Faculty of Animal Science Bogor Agricultural University, Campus of IPB Dramaga, PO. BOX 220. Bogor 16680. West Java, Indonesia.*

^a*Email: tahrira@yahoo.com*

Abstract

The purpose of this study was to determine the effect of recitation Al Qur'an pre-slaughter as psychological treatment on the physical quality of broiler meat such as the pH value, WHC, drip loss, tenderness and cooking loss. The assessment of physical quality was done by evaluating the 20 samples of broiler chicken (*Pectoralis superficialis*) breast pieces of 20 days weighing 900-1000 g with 4 treatments (P1 = control, P2 = recitation of the Al Qur'an oral, P3 = recitation of the Al Qur'an recording, and P4 = electrical stunning) of pre-slaughter and 5 replications of which experimental design of this research was completely randomized design.

* Corresponding author.

The results of this research showed that the recitation of the Al Qur'an oral had psychological effect ($P < 0.05$) on the response of pH value, WHC, drip loss, tenderness and cooking loss more than other treatments.

Keywords: broilers; Al Qur'an; psychological; physical quality; pre-slaughter.

1. Introduction

The main principles of animal handling is prevent animal from pre-slaughter stressors that can increase stress [5]. Pre-slaughter handling in several countries is issues and debates. The importance of animal management used to avoid stress before and during slaughter implications for the formation of written rules as a guide animal welfare to facilitate the handling of animal that will be slaughter, improve security of butcher, and reduce stress levels cattle that will be slaughter. Animal welfare can be linked to carcass and meat quality. 'The welfare of an animal was defined by [4] as its state as regards its attempts to cope with its environment'. The welfare of an animal can be said to have been compromised if the animal cannot cope with its environment or copes with difficulty.

In recent years, animal stunning has been primarily viewed from an animal welfare perspective as a means of minimizing the pain and suffering associated with slaughter, which should produce a rapid onset of stress free insensibility of sufficient duration to keep the animal unconscious until harvested. Poultry stunning, neck cutting (killing), and bleeding operations are inseparable and interrelated steps in the harvesting process [13], and relationships exist between stunning method, killing, muscle metabolism, and broiler meat quality [16].

Stunning before harvest can be accomplished by using chemical, mechanical, vacuum, or electrical means. Electrical stunning is the most commonly used method for immobilizing poultry before harvest in commercial poultry plants [8]. The effectiveness of an electrical stunning system is dependent on electrical variables (i.e., current, voltage, wave form, frequency, and duration) and biological factors that affect bird impedance (i.e., size, weight, sex, and feather cover [15]).

However, electrical stunning has been shown to cause meat quality defects such as wing hemorrhages, red skin conditions, red wing tips, broken bones, and blood blemishes in breast muscle [13, 16]. During electrical stunning, broilers may defecate, fling their claws into the broilers around them, and inhale contaminated water, which leads to carcass contamination and carcass downgrades [18] concluded that the use of electrically fainted technic can cause 10-35% of the chickens died before the slaughtering process. To eliminate these problems, one of the efforts to suppress the stress animal and be a point of measuring the ethical people in the handling of animal pre-slaughter is to explore, and learn interdisciplinary science with a value based on religious norms. This is confirmed by the hadith narrated by Muslim from Syaddad bin Aus ra, Prophet Muhammad SAW said: "Verily Allah commanded to do good on all things, ... and if you slaughter, slaughter well, let of you sharpen his knife and accelerate the process of animal slaughter".

Researchers have reported significant relationships between ultimate pH and poultry meat quality [13, 7]. The rate and extent of postmortem pH decline are 2 major factors that affect many properties of meat, including objective color, water-holding capacity (WHC), protein solubility, and rate of microbial spoilage [3, 10].

Antemortem stress and postmortem lactic acid production, along with protein denaturation while the muscle temperature is still elevated, result in meat quality defects such as poor texture, decreased WHC, decreased juiciness, drip loss, cooking loss and increased incidence of pale, soft, and exudative (PSE) meat [20, 3, 9].

There is no other published information regarding identifies the physical quality of broiler meat that were recited verses of the Al Qur'an pre-slaughter. Research needs to be conducted to determine whether similar results are present when reading of verses of the Al Qur'an is used pre-slaughter. Limited research has been conducted regarding the effects of recitation of Al Qur'an verses pre-slaughter as psychological treatment to pH, WHC, cooking loss, drip loss and tenderness of broiler breast muscle.

2. Material and Methods

2.1. Material

The main material used in the study were breast muscle broiler type Abror acres age of 20 days with a range of body weight 900-1000 g as many as 20 chicken. Health broilers examined and fasted for 8 hours (not a given feed, water is still given) before the treatment of pre-slaughter will be unduated. Each treatment consisted of five broiler chickens with the treatment of the following: a) P1 = Control, b) P2 = reading of verses of the Al Qur'an oral, c) P3 = reading of verses of the Al Qur'an recordings, d) P4 = electrical stunning (by manually placing their heads in a saturated saline bath of 20 V, 0.3 A, 5-10 seconds).

After slaughter, the blood is let out as much as possible and after death, chicken dipped in hot water temperature of about 60 °C for about 1 minute to facilitate hair removal. Evisceration of the abdominal cavity is done by making a horizontal incision in the abdominal area and then viscera pulled out by hand to obtain the carcass. Sampling each treatment is slicing one side of the chest at random and weighed as needed.

2.2. Methods

pH Measurement

The pH value is measured after 30 minutes of the slaughter process using a pH meter (Hanna Instruments, USA) to measure the pH of 20 broiler meat every 15 minutes postmortem. before using a pH meter calibrated with buffer solution pH 4 and 7, cathode pH meter inserted in the sample and leave it to the numbers listed do not change anymore. PH meter cathode rinsed with distilled water and dried before being used again.

Water Holding Capacity (WHC)

WHC was essentially as described by [12]. ± 0.3 g sample of meat is placed on the filter paper between two plates of stainless steel plate, then given a weight of 35 kg for 5 minutes. On filter paper looks areas covered by the sample of meat that has become flat (inner circle) and the wet area surrounding (outer circle). Both areas are illustrated on graph paper. Extensive wet area obtained by subtracting the second broad area covered meat from areas covering a total area of wet filter paper. DMA is calculated based on the percentage between the wet area of the total area.

Cooking Loss

Cooking loss was essentially [2]. Frozen breast samples were thawed (2 °C) overnight, trimmed to an approximate weight of 50 g, and vacuum packaged in 15.2 × 20.3 cm, 3-mil cooking bags (Rebel Butcher Supply Co. Inc.). Samples were cooked by immersing cooking bags in hot water (85 °C) for approximately 20 min until an internal temperature of 80 °C was reached. A poultry thermometer (beef and poultry thermometer; Chaney Instrument Co, Lake Geneva, WI) was inserted into the middle portion of a breast sample before packaging to measure the internal temperature of the sample. The bags were tempered at ambient temperature (20 °C) before opening to drain the liquid from each bag. Each breast sample was patted dry with one paper towel (one ply) and reweighed. Cooking loss was reported as a percentage and calculated as $(\text{initial weight} - \text{final weight})/(\text{initial weight}) \times 100$.

Tenderness

Tenderness was assessed by using an objective texture procedure [3]. Breasts that were used for cooking loss determinations were cooled to room temperature and used for shear force determinations. Four to 6 adjacent 1-cm (width) × 1-cm (thickness) × 2-cm (length) strips were cut from the cooked breast, parallel to the direction of the muscle fibers. Each strip was sheared once, and the mean was calculated for each breast. Samples were sheared perpendicular to the muscle fibers by using a Warner-Bratzler shear attachment mounted on an Instron Universal Testing Center (Model 3300, Instron, Norwood, MA) with a 50-kg load transducer and a crosshead speed of 200 mm/min.

Drip Loss

Drip loss was essentially [24]. In brief, About 15 g (wet weight) of regular-shaped muscle, cut from the same location in the pectoralis majors using a cork borer, was weighed and placed in an airtight container that was then filled with nitrogen to avoid evaporation, oxidation, and mutual conglutination. All samples were stored at 4 °C. After 48 h, the surface moisture of fillets was absorbed with filter paper and reweighed. Drip loss was calculated as a percentage: $[(\text{initial weight} - \text{final weight})/ \text{initial weight}] \times 100$.

2.3. Statistical Analyses

The study design used completely randomized design (CRD) of 4 treatments and 5 replications. Data were analyzed by ANOVA at 5% significance level, if the result is different between the treatment, it will be followed by Duncan test. Data were processing with SPSS 21.

3. Result and Discussion

3.1. pH

pH measurements intended to determine the level of acidity in food products. The pH value obtained in this study ranges from 6.97±0.04 to 5.44±0.18 (Figure 1). Recitation of the Al Qur'an pre-slaughter had effect ($P < 0.05$) on the pH value of broiler meat. According [17], the average value of chicken meat nad final pH

ranging from 5.9 to 6.0. The average pH value in the research was 6.20 ± 0.11 . Treatment recitation of the Al Qur'an pre-slaughter broilers showed that a pH value of meat is still within the normal range. Results of research [6], the average initial pH of broiler meat 7.09 later became 5.94 ie at six hours after death. This is supported by [21], broiler before slaughter had a pH of about 6.31 and will declined to 5.96-5.82 after 10 to 12 hours of slaughter. A decrease in the pH value of *postmortem* on broiler meat from slaughter with and without treatment recitation of Al Qur'an verses can be seen in Figure 1.

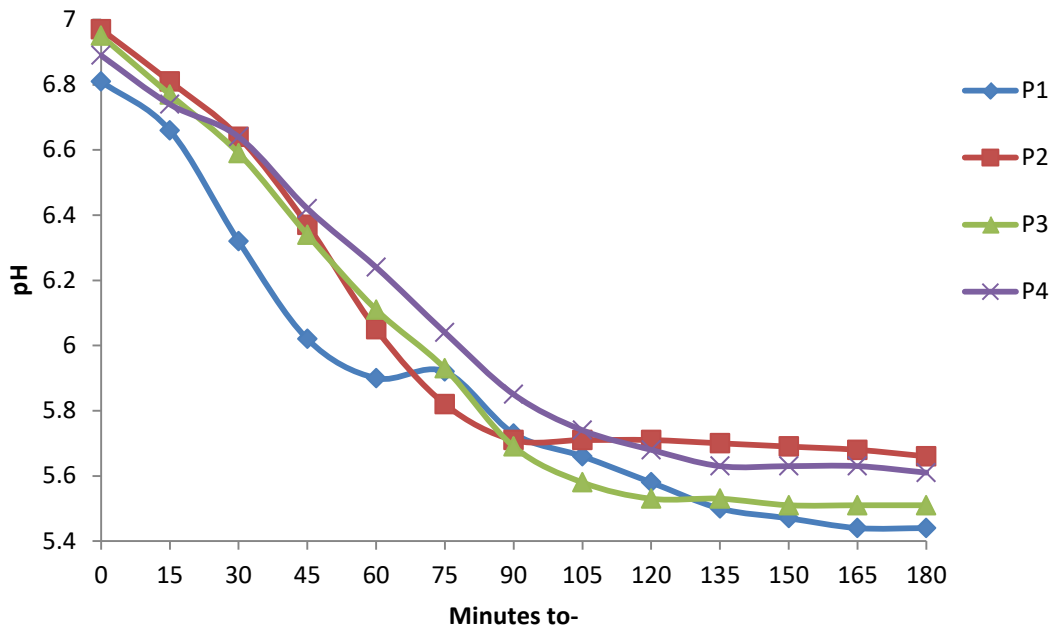


Figure 1: Graphs pH value changes of broiler meat on a variety of treatments

Description: P1 = Control, P2 = reading of verses of the Al Qur'an orally, P3 = reading of verses of the Al Qur'an recording, P4 = electrical stunning.

The pH value of broiler meat in the controls was 6.81 ± 0.08 became 5.44 ± 0.18 , the treatment of oral recitation of Al Qur'an verses was 6.97 ± 0.04 became 5.66 ± 0.11 , treatment recitation of Al Qur'an verses record was 6.95 ± 0.04 became 5.51 ± 0.14 and electrical stunning was 6.89 ± 0.03 became 5.61 ± 0.11 . [14] reported a pH value in broiler chicken breast with three different strains of 5.91-5.93. A decrease in the pH value during one hour *postmortem* in broiler chickens in the control group pre-slaughter is relatively faster than broilers were slaughter with a recitation from the Al Qur'an (oral and recording) and electrical stunning. This difference is expected, in the control group occurred stress pre-slaughter that muscle glycogen reserves and potassium are increasingly used. These conditions stimulated the occurrence of anaerobic glycolysis, resulting in fatigue and impact the lack of oxygen and produce lactic acid as a determinant of decrease in the pH value of broiler chicken meat, while in the treatment of oral recitation of Al Qur'an verses allegedly pre-slaughter effect tranquility in broiler chickens to be slaughter.

WHC

WHC principle is the ability of protein meat to bind water in meat, so the WHC will describe the level of meat protein damage. According to [3], WHC demonstrates the ability of meat to bind water in percent. WHC greater percentage of causing the lower the binding ability of meat in water that is affected by the age, species, race, gender and pre and post treatment cuts. Table 1 shows the average WHC 74.83±0.08d range to 86.75±0.06a. Recitation of the Al Qur'an pre-slaughter as psychological treatment had effect (P<0.05) against WHC broiler meat. WHC average value can be seen in Table 1.

Table 1: The mean WHC and drip loss broiler meat

Treatment	WHC (%)	Drip loss (%)
P1 = Control	74.83±0.08d	6.79±0.04a
P2 = Recitation Al Qur'an oral	86.75±0.06a	3.62±0.09d
P3 = Recitation Al Qur'an recording	82.60±0.18b	5.23±0.03b
P4 = Electrical Stunning	81.85±0.11c	4.95±0.14c

^{abcd} different superscripts at the same row indicate significant differences (P<0.05)

WHC broiler meat of control group was 74.83±0.08d lower than other treatments, allegedly broiler experience stress during slaughtered. The ability of meat to retain water is influenced by several factors, among others, the production of lactic acid, protein oxidation and pH [19].

The low value of broiler meat pH control group was 6.81±0.08 who later became 5.44±0.18, resulting in open flesh structure thereby reducing the WHC, and the high of pH value of meat resulting structure covered flesh, causing high WHC. WHC Decrease due to a change of pH proteins actin and myosin approached the isoelectric point of the meat after postrigor, thus narrowing the gap between the filaments of the protein and reduce the ability of the protein to bind water and will lower the WHC of meat.

Drip Loss

Drip loss is the loss of some of the components that go with meat nutrient discharge of the reinvigoration of meat during frozen meat or during the process of withering line with a decrease in muscle pH [22]. WHC increases, the drip will decline and rapid decrease in pH can increase drip loss, in line with the duration of storage in the refrigerator. The average value of broiler chicken meat of drip loss resulting from slaughter by treatment with recitation of the Al Qur'an pre-slaughter is relatively lower than that of broiler meat without the recitation of the Al Qur'an. It indicates the treatment recitation of the Al Qur'an to produce meat with a WHC relatively higher than the cuts without the recitation of the Al Qur'an (Table 1).

Table 1 shows the average drip loss ranged 3.62±0.09d to 6.79±0.04a. Recitation of the Al Qur'an pre-slaughter as psychological treatment had effect (P<0.05) against drip loss broiler meat. It is anticipated by the treatment of

broiler chickens of which recitation of Al Qur'an verses pre-slaughter is not treated roughly, so the broiler is in calm conditions and not under stress. While the control group suspected of broiler chickens under stress, so that the rate of anaerobic glycolysis takes place more quickly, so that the rate of postmortem pH decline is also faster and resulted in increased WHC which followed the release of the meat increased fluids and drip loss increases and otherwise. This is in line with [22], that the drip loss was influenced rigor, packaging and stress pre-slaughter. This study is in line with research [25] with the administration of sodium butyrate treatment to reduce oxidative stress on the value of drip loss ranging from 2.47 to 3.18% and research [23] with electrically fainted treatment ranges from 0.94% to 1.29%.

Cooking Loss

Cooking Loss which is one indicator of the nutritional value of meat associated with higher levels of meat juice is the amount of water that is bound in and between the muscle fibers. Cooking loss value in the study ranged 25.73±0.06d to 31.90±0.17a with the average value of 28.81±0.11% (Table 2). Analysis of variance showed cooking loss percentage of broiler meat with and without recitation of the Al Qur'an significantly different (P<0.05).

Table 2: The mean cooking loss and tenderness broiler meat

Treatment	Cooking Loss (kg cm⁻²)	Tenderness (Kg/cm²)
P1 = Control	31.90±0.17a	5.60±0.20a
P2 = Recitation Al Qur'an oral	25.73±0.06d	3.63±0.17d
P3 = Recitation Al Qur'an recording	27.66±0.17c	4.08±0.34c
P4 = Electrical Stunning	28.21±0.21b	4.27±0.10b

^{abcd} *different superscripts at the same row indicate significant differences (P<0.05)*

Meat that has a low WHC will lose a lot of fluid, resulting in decreased weight of the meat. According to [11], cooking loss is also influenced by the pH value. The pH value of broiler meat were significantly different (P<0.05) among treatment that is 6.97±0.04 to 5.44±0.18, then produce cook loss different between treatments (P<0.05). According [3], good-quality meat has a low cooking loss, due to loss of nutrients during cooking would be less. The decline in food cooking loss after boiling caused by diminished or loss of water content in food due to heating. The greater of the heat supplied and the longer the heating will result in reduced water content in foodstuffs in large quantities. This is in accordance with the opinion of [25], the average value of cooking loss is closely connected with the WHC. The higher the WHC, then when the heating process, water and liquid nutrients are slightly out of or discarded so that the mass of the meat was slightly reduced.

Tenderness

Tenderness indicates the amount of pressure required to cut each unit area (kg cm^{-2}) product. the smaller the number, the more tender the tenderness of the product. The higher the value of the power breaking *Warner Blatzler* means more force is needed to break the meat fibers per square centimeter, means increasingly tough meat or tenderness of the lower level [3]. Treatment recitation of the Al Qur'an pre-slaughter has a value smaller tenderness of $3.63 \pm 0.17 \text{d kg cm}^{-2}$ while the tenderness of meat chickens in the control group was $5.60 \pm 0.20 \text{a kg cm}^{-2}$. Based on the test results Duncan, tenderness of broiler meat Al Qur'an recitation treatment were significantly different ($P < 0.05$). The average value of broiler chicken meat tenderness can be seen in Table 2.

According to [1], fat intermuskular affect the tenderness by reducing the strength of the connective tissue of muscles resulting in muscles more tender. Perimesium and endomesium involved in determining the tenderness of chicken meat. Treatment recitation of the Al Qur'an (oral and recording) pre-slaughter have a relatively tender meat. It is suspected animal verses of the Al Qur'an to be quiet and not a lot of activity, so the meat is less structured myofibril and less meat contains protein which causes a lower water holding capacity so that the tenderness of meat would be better. According to [3] the value of tenderness of meat by locally trained panelists mentioned that the meat is very tender has a breaking warner bratzler $< 4.15 \text{ kg/ cm}^2$, the meat is tender $4.15 - < 5.86 \text{ kg/ cm}^2$, rather tender meat $5.86 - < 7.56 \text{ kg/ cm}^2$, the meat was rather tough $7.56 - < 9.27 \text{ kg/ cm}^2$, tough meat $9.27 - < 10.97 \text{ kg/ cm}^2$ and the meat was very tough $\geq 10.97 \text{ kg/ cm}^2$. Based on these categories, the results showed that the average value of broiler chicken meat tenderness $3.63 \pm 0.17 \text{d kg/ cm}^{-2}$ to $5.60 \pm 0.20 \text{a kg/ cm}^{-2}$ with a coefficient of 5.159 diversity. Research [20] with 3.19 electrical stunning treatment

4. Conclusion

Recitation of the Al Qur'an pre-slaughter as psychological treatment had effect ($P < 0.05$) on pH, WHC, cooking loss, drip loss and tenderness of broiler meat.

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