



## Organoleptic Qualities of Broiler Chicken Meat Given with Herbal Feed with Turmeric

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### Abstract

This study aims to determine the organoleptic qualities of broiler chicken meat-fed herbal feed in the form of turmeric. The research was conducted at the Animal Husbandry Department, Pangkajene Islands State Agricultural Polytechnic Campus. The research used a completely randomized design (CRD) with a unidirectional pattern with three treatments and four replications. Each replication consisted of 8 chickens. The treatment arrangements were P0 = conventional feeding and drinking water (control); P1 = Mixing turmeric into feed; P2 = Mixing turmeric in drinking water. The maintenance stage is carried out for approximately 30 days, feed and drink are given ad libitum, and no vaccination program is carried out. Sampling was carried out at the age of approximately 30 days. A total of 2 chickens were taken randomly from each replication in each treatment so that the total sample of the study was 24 chickens then processed into the carcass. The organoleptic test of meat is carried out by cooking a meat sample without salt or seasoning. The panelists used were ten semi-trained (semi-trained) panelists to provide a score for each sample. Organoleptic test results data were analyzed by the Analysis of Variance test for a significant difference followed by the LSD test. The results of the analysis of variance showed that there were no significant differences ( $P > 0.05$ ) in the organoleptic test of color, aroma, the impression of juice (wetness), and level of preference for broiler chicken meat. Still, there were significant differences ( $P < 0.05$ ) in the organoleptic texture test. And the tenderness of broiler chicken. In general, it can be concluded that P2 treatment (Maintenance using turmeric herbs through drinking water) is the best in showing the organoleptic qualities of broiler chicken meat.

Keywords: Broiler chicken meat, turmeric, organoleptic

### A. Introduction

One of the great poultry products, easy to process and very good for human consumption, is broiler chicken because it contains nutrients needed by the body. The broiler is a technologically engineered chicken strain with economic characteristics with fast growth as a meat producer, short harvest period, soft fibrous meat, good meat stock, and larger breasts (North & Bell, 1990). The chemical composition of chicken meat consists of water 65.95%, protein 18.6%, fat 15.06%, and ash 0.79% (Stadelman et al., 1988).

Broiler chicken meat is in great demand by the public because the meat is tender, contains a lot of protein and fat that the body needs, and is soft in fiber and easy to process. However, some people think that broiler chicken meat is not safe for consumption because of drug residues or antibiotics that can interfere with body health. Hence, they feel reluctant to eat broiler chicken meat. Therefore, the community's perspective needs to be changed by providing safe and healthy broiler chicken meat, one of which is broiler chicken meat that uses feed additives in the form of herbal feed (turmeric), which is healthier and safer for the body. Replace the function of antibiotics and other drugs. In line with the increasing intelligence of the people, they are also more selective in choosing livestock products, including meat broiler (Purwanti et al., 2019).

Meat quality is influenced by the number of nutrients contained in feed ingredients so that the food produced tastes good, has high nutritional value, and is safe for consumption (Manafe & Ressie, 2021). Turmeric is one of the herbal plants that can be mixed into poultry rations or drinking water. The content of the active substance curcumin in turmeric can increase poultry's endurance improve the digestive tract's performance and the quality of the carcass produced (Lokapirnasari, 2017). The addition of turmeric had a significantly different effect on several organoleptic attributes such as color, taste, and general acceptance ( $P < 0.05$ ) and had no significant effect on day 0 odor and texture (Murti et al., 2013). One of the qualities of broiler chicken carcass/meat can be known by looking at the organoleptic properties of the meat. The acceptability of meat products is judged using the mouth and nose and the eye (which can be viewed on the product's appearance) in the assessment. Sensorial attributes include flavor and texture palatability associated with meat products. These aspects have an important impact on consumers in selecting products (Purwanti et al., 2019).

Meat quality is influenced by various factors grouped into intrinsic and extrinsic factors. Intrinsic factors include breed, sex, and age. Extrinsic factors include the feed given, maintenance management, and meat handling management after slaughtering (Lawrence et al., 1994). Feed ingredients with different nutritional qualities will produce different meat qualities (Marlina et al., 2012). Meat quality is determined by four factors: the number of meat microbes, chemical composition, physical properties, and eating quality (Winarno, 1980).

In general, when choosing meat consumed daily, consumers prioritize eating quality and physical properties compared to the other two factors because the determination of microbes and chemistry of meat is not easy to do and takes a long time (Marlina et al., 2012). Eating quality is more demanding of the sensitivity of the human senses, which includes: sight, smell, taste, and touch of the five senses because eating quality includes acceptance of color, smell, flavor, texture, and acceptance of meat as a whole (Sutji & Sulandra, 1994).

Sensory quality/meat quality properties are parameters of meat quality: aroma, color, taste, texture, tenderness, and overall panelists' acceptance/preference of meat tested subjectively by panelists (Sundari et al., 2013). The organoleptic test, also known as a sensory test, is a way to measure, test, or observe aroma, tenderness, color, taste, and juiciness. Of a product by using the sensitivity of the human senses. Assessment in the sensory test includes hedonic test and hedonic quality test. The hedonic test is an assessment to express the panelists' likes or dislikes responses to samples with a scale of 1-5 (Merliana et al., 2020). Considering this is necessary to study the organoleptic quality of broiler chicken meat with herbal feed-in turmeric. This study aimed to determine the organoleptic quality of broiler chicken meat fed with turmeric as an herbal feed.

## **B. Methodology**

### *1. Research Time and Location*

This research was conducted in 2019 at the Department of Animal Husbandry, Pangkajene Islands State Agricultural Polytechnic Campus, Pangkep, for eight months. It started from April 2019 to November 2019.

### *2. Research Tools and Materials*

The tools used in this study include feed and drink containers, stoves, pans, cutting boards, knives, containers. The materials used include litter cage, conventional feed, drinking water, turmeric, clean water for cooking, flip plastic, label paper, stationery.

### *3. Research Design*

This study used a completely randomized design (CRD) with a unidirectional pattern with three treatments and four replications. Each replication consisted of 8 chickens. Chickens are

kept in group cages with a capacity of 10 chickens per cage plot. The arrangement of treatments is as follows:

P0 = Maintenance using conventional feed and drinking water

P1 = Maintenance using herbs (turmeric) through feed

P2 = Maintenance using herbs (turmeric) through drinking water

#### 4. Research Procedure

The maintenance phase is carried out for approximately 30 days. Feed and water were provided *ad libitum* in the research cage. In this Maintenance, no vaccination program was carried out for broiler chickens because they wanted to see the effect of herbal feed in the form of turmeric on the health/body resistance of broiler chickens from disease by looking at one of them from the physical quality of the chicken meat produced.

Sampling was carried out at the age of approximately 30 days. A total of 2 chickens were taken randomly from each replication in each treatment so that the total sample of the study was 24 chickens and then processed into carcasses. Broiler chickens were slaughtered, blood removed, and scalding was carried out for 45 seconds at 630C (Sams, 2001). The resulting carcasses were then subjected to organoleptic testing to see the physical quality of the broiler meat, including observing the color, texture, aroma, tenderness, the impression of juice/wetness, and level of preference with scores/numbers starting from a scale of 1 – 5 as shown in Table 1.

**Table 1. Parameters of Broiler Chicken Meat Organoleptic Test**

Parameter Test	Value				
	1	2	3	4	5
Color	Dark red/dark	Slightly dark red/slightly dark	Pale white	Slightly pale white	Not pale white/slightly yellow
Texture	Long and Coarse Fiber	Long and slightly coarse fiber	Short and slightly coarse fiber	Short and slightly fine fiber	Short and fine fiber
Flavor	Very not typical of meat	Not typical of meat	A bit typical of meat	The typical meat	Very typical of meat
Tenderness	Very tough	Tough	Slightly tough	Slightly Soft	Soft
Effect of juice/wetness	Very dry	Dry	Slightly dry	Slightly juicy/wet	Juice/wet
Levels of delight	Very disliked	Dislike	Kind like	Liked	Very liked

Cooking meat samples carried out the organoleptic test of meat without salt or seasoning. Then boiling the meat is done for 60 minutes at a temperature of 80°C. The length, width, and height of each piece of meat is 1 x 1 x 1 cm. The panelists used in this test were moderately trained (semi-trained) panelists of 10 people, according to Sundari et al. (2013). All panelists are tasked with providing a score for each sample presented in the form provided. Organoleptic test results data were analyzed using Kruskal Wallis non-parametric statistics and ANOVA for significantly different results, followed by LSD test using the computer program SPSS version 16 for Windows.

### C. Result and Discussion

The result of organoleptic quality tests of broiler chicken meat, such as color, texture, flavor, tenderness, juiciness, and levels of delight, are shown in table 2.

#### 1. The Color

The results of the analysis of variance showed no significant effect ( $P > 0.05$ ) on meat color between treatments, either without the addition of turmeric (control) or with the addition of turmeric to feed or drinking water.

**Table 2. The result of organoleptic quality tests of broiler chicken meat**

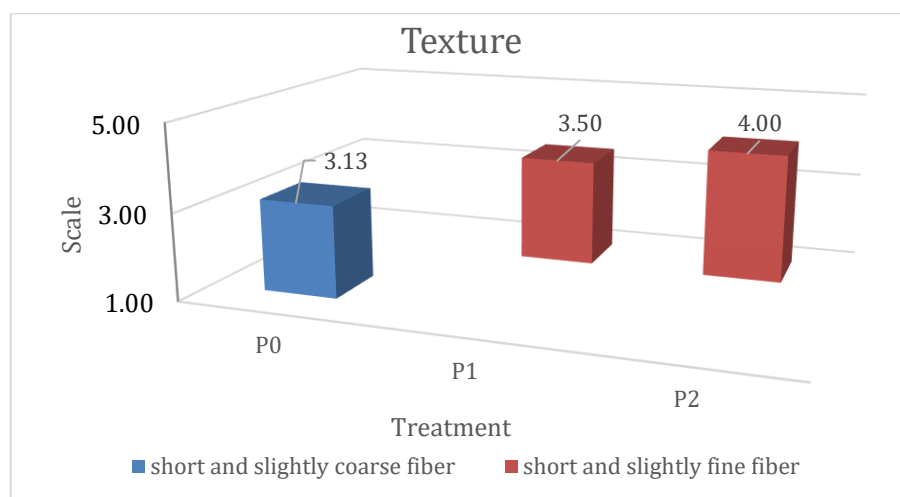
Treatment mean	Parameters					
	Color	Texture	Flavor	Tenderness	Juiciness	Levels of Delight
P0	2,88±0,35 <sup>a</sup>	3,13±0,99 <sup>a</sup>	3,25±1,49 <sup>a</sup>	3,75±0,71 <sup>ab</sup>	3,38±1,06 <sup>a</sup>	3,75±1,03 <sup>a</sup>
P1	3,00±0,00 <sup>a</sup>	3,50±0,93 <sup>ab</sup>	3,13±1,13 <sup>a</sup>	3,38±0,74 <sup>a</sup>	3,13±0,99 <sup>a</sup>	3,63±0,52 <sup>a</sup>
P2	2,75±0,46 <sup>a</sup>	4,00±0,00 <sup>b</sup>	3,25±0,71 <sup>a</sup>	4,13±0,35 <sup>b</sup>	3,38±1,51 <sup>a</sup>	3,88 ±0,83 <sup>a</sup>

**Description:** P0 = Maintenance using conventional feed and drinking water; P1 = Maintenance using herbs (turmeric) through feed; P2 = Maintenance using herbs (turmeric) through drinking water; Different superscripts in the same column show differences real ( $P < 0.05$ ).

Color is one of the parameters to assess the physical quality of broiler meat and is often the first thing that consumers pay attention to when buying carcass or chicken meat. The color of good broiler chicken meat tends to be white, not pale, but several factors cause color changes in broiler chicken meat. Table 2 showed that from all treatments, the color of the meat showed the same score, namely on a scale of  $\pm 3$  (pale white). Soeparno (2005) stated that several factors that affect meat color include: feed, species, nation, age, gender, stress (activity level and muscle type), pH, and oxygen. The color of broiler meat that did not differ between treatments indicated that the color pigment in turmeric did not affect the color change in broiler meat when turmeric was added to feed/ration or drinking water. The yellow pigment of Curcumin in turmeric loses its pigment when there has been a metabolic process in the body's digestive system. Following the statement of Sundari et al. (2013) in their research, Curcumin is a yellow pigment from turmeric once it is in the body's cells. It will be rapidly metabolized and turned into its derivatives. It has lost its original color (yellow), so it does not give a significantly different color to the meat whose ration is added with turmeric extract. The addition of turmeric extract nanocapsules did not affect myoglobin (Soeparno, 2005), and the heme pigment determines meat color. According to Soeparno (2005), the factors that affect meat color are feed, species, nation, age, gender, stress (activity level and muscle type), pH, and oxygen.

## 2. The Texture

The variance analysis showed a significantly different effect ( $P < 0.05$ ) between the texture of the meat in the P0 and P2 treatments. At the same time, it was not significantly different between the P0 and P1 and P1 and P2 treatments.

**Figure 2. Graphics of texture chart on broiler chicken**

Meat texture shows the fineness of broiler meat fibers that determine the quality and quality of broiler chickens. Masni et al. (2010) stated that texture is the most important determinant of its role because this texture is a physical condition seen directly in Production. The chart in Figure 2. shows that of the three treatments, the meat texture of treatment P0 showed a score on a scale of  $\pm 3$  (short fiber texture and slightly coarse), while treatments P1 and P2 showed the same score on a scale of  $\pm 4$  (short fiber textured and slightly coarse). Fine). It indicated that the addition of turmeric either through feed or drinking water could improve the texture of broiler meat fibers to be smoother. Lokapirnasari (2017) stated that turmeric

(*Curcuma domestica* Valet) could be used as an immunomodulator and growth promoter resulting from it in poultry. According to Warris (2010), three main factors affect the texture of meat: the length of the sarcomere, the amount of connective tissue and cross-links, and the level of proteolytic changes that occur during withering. The area and amount of intramuscular fat (marbling) will also make the meat more tender because fat is softer than muscle.

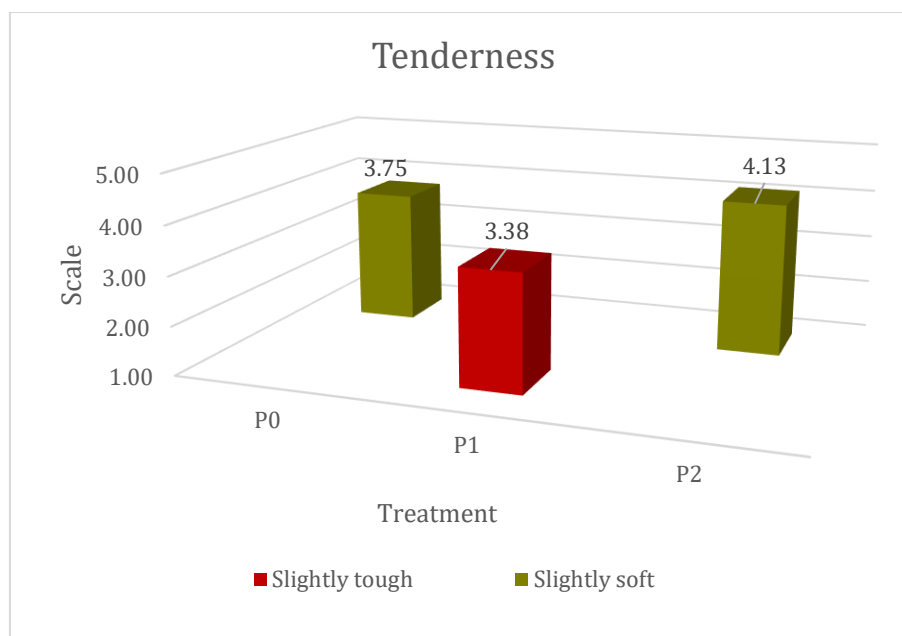
### 3. The Flavor

The results of the analysis of variance showed no significant effect ( $P>0.05$ ) on the aroma of meat between treatments, either without the addition of turmeric (control) or with the addition of turmeric to feed or drinking water.

The flavor is one of the parameters in sensory testing of the physical quality of broiler meat. The aroma of meat quickly gives an impression on consumer acceptance because it can be smelled from a close distance even though they have not seen the product directly. Table 2 above showed that from the three treatments, broiler chicken meat was not significantly different between treatments because it was on the same score, namely on a scale of  $\pm 3$  (smells slightly typical of meat). According to Soeparno (2005), the aroma of meat is influenced by the age of livestock, type of feed, duration, and storage conditions after slaughter. Sundari et al. (2013) stated that the type of feed/nanocapsules of turmeric extract, a small part, will be degraded after arriving in the digestive tract of chickens. Some will be absorbed into the blood and carried throughout the body. Once in the cell fluid, Curcumin will be rapidly metabolized and converted into its derivative compounds, so it has lost its original pleasant-smelling properties after becoming meat. It gives an aroma that is not significantly different. Syamsuryadi & Afnan (2017) added that the aroma of poultry meat is influenced by several factors such as gender, race, cage environment, slaughtering environment, conditions before slaughter, intramuscular fat, and water content of meat.

### 4. The Tenderness

The various analysis results showed a noticeable distinct influence ( $P<0.05$ ) between the ability of P1 and P2 treatment meats. At the same time, the difference was not noticeable between the P0 and P1 treatments and P0 and P2.



**Figure 4. Chart graph of ability on broiler chicken meat**

Tenderness indicates the level of hard/tough or soft meat when chewed. It is one of the sensory test parameters for the physical quality of meat in assessing the physical quality meat. Masni et al. (2010) stated that the tenderness of chicken meat is meat. When it is chewed, it crumbles. The tenderness of the meat is not solely due to the effect of the meat being cooked, but rather the meat is easily crushed; in other words, when the meat is formed, the chicken grows when it is raised. With the addition of turmeric (*Curcuma domestica* Val) or temulawak (*Curcuma xanthorrhiza* Roxb) in drinking water, you can get tender chicken meat according to

consumer expectations. Based on Figure 4., the chart of broiler meat tenderness shown between treatments P0 and P2 has a score on the same scale, namely  $\pm 4$  (somewhat soft), while treatment P1 has a score on a scale of  $\pm 3$  (rather hard). Duncan's test results show scores on a scale that was significantly different between treatments P1 (addition of turmeric through the feed) and P2 (addition of turmeric through drinking water), namely P1 on a scale of  $\pm 3$  (rather hard) while P2 on a scale of  $\pm 4$  (somewhat soft). It is presumably because the addition of turmeric through drinking water is more easily absorbed. It happened into the body tissue cells of broiler chickens than the addition of turmeric through feed which must go through a series of digestive processes in the stomach and absorption in the small intestine so that with the absorption of water into the body's tissue cells, it will add tenderness to the formed meat. Research by Raharjo et al. (2015) showed that the addition of turmeric and ginger had no significant effect on the tenderness of broiler meat because the content of turmeric extract, essential oils, and Curcumin functioned as anti-microbial and increased relaxation of the small intestine. It means reducing the small intestine's peristaltic movements but does not reach the structure of protein or muscle. At the same time, the content of ginger extract, namely essential oils, and oleoresin, serves to increase endurance, so the addition of turmeric and ginger extract in drinking water has no significant effect on the tenderness of broiler chicken meat.

Tambunan (2010) stated that the factors that affect the tenderness of meat have to do with the composition of the meat itself, namely in the form of woven binders, meat fibers, fat cells that exist between the meat fibers and the meat rigor mortis that occurs after the cattle are slaughtered. Factors that affect meat tenderness are classified into antemortem factors (before slaughter) such as genetics (including race, species, and physiological status), age, management, gender, and stress. Postmortem factors (after cutting) include chilling, refrigeration, withering/cooking (meat), freezing (including storage time and temperature), and processing methods (including cooking methods and the addition of tenderizers). The tenderness of the meat can be determined by measuring the braking power; the lower the breaking power value, the more tender the meat.

### 5. *Juiciness*

The results of the analysis of variance showed no significant effect ( $P>0.05$ ) on the effect of juice/wetness of meat between treatments, either without the addition of turmeric (control) or with the addition of turmeric to feed or drinking water.

The impression of juice or wetness is one of the sensory properties observed in the assessment or testing of the physical quality of meat, which is related to the level of wetness of the meat when pressed or chewed. Table 2 shows that all treatments were not significantly different because they had scored on a scale of  $\pm 3$  (slightly dry). Treatment without the addition of turmeric or turmeric through feed or drinking water did not significantly affect the juice/wetness of broiler chicken meat. Soeparno (2005) stated that a high cooking loss of cheese caused the low meat juice content; the minimum can be achieved when the pH of the meat is  $\pm 6.0$ . Soeparno (2005) added that good quality meat contains relatively more juice than low-quality meat.

### 6. *Levels of delight*

The results of the analysis of variance showed no significant effect ( $P>0.05$ ) on the level of preference for meat between treatments, either without the addition of turmeric (control) or with the addition of turmeric to feed or drinking water.

Sensory test on the level of preference shows how much consumer acceptance of the overall sensory properties of meat. Table 2 showed that all treatments, both without adding turmeric and adding turmeric through drinking water or feed, were on a score that was not significantly different, namely on a scale of  $\pm 4$  (preferred). The treatment given did not affect the level of panelists' acceptance of broiler chicken meat. Panelists' acceptance of broiler meat varies depending on which side can satisfy the physiological and sensory responses. The research of Sundari et al. (2013) showed that the level of panelists' acceptance of broiler chicken meat was not affected by adding turmeric extract nanocapsules in the feed. It can be caused because the satisfaction from meat consumers depends on the physiological and sensory responses among individuals (Soeparno, 2005).

#### D. Conclusion

Based on the results obtained, it can be concluded that, in general, P2 treatment (Maintenance using turmeric herbs through drinking water) is the best in showing the organoleptic quality of broiler chicken meat.

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