



Slaughter Weight, Carcass Weight, Giblet Percentage, and Abdominal Fat of Broilers Given White Turmeric Extract

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ABSTRAK

Kunyit putih merupakan tanaman herbal yang mengandung aditif dan memiliki potensi yang baik, tidak menimbulkan residu atau berbahaya jika dikonsumsi oleh ternak. Komponen utama rimpang kunyit putih yang memiliki khasiat obat adalah minyak esensial dan kurkuminoid. Senyawa kurkuminoid memiliki sifat antibakteri yang dapat meningkatkan proses pencernaan dengan membunuh bakteri patogen dan merangsang dinding kantong empedu sehingga dapat memperlancar metabolisme lemak. Pemberian ekstrak kunyit putih 0%, 2% dan 4% tidak berpengaruh signifikan terhadap bobot potong, bobot karkas, persentase giblet dan persentase lemak abdominal ayam broiler

Kata kunci: kunyit putih, kurkuminoid, antibakteri

ABSTRACT

White turmeric is an herbal plant that contains additives and has good potential, does not cause residues or is harmful when consumed by livestock. The main components of white turmeric rhizome which have medicinal properties are essential oils and curcuminoids. Curcuminoid compounds have antibacterial properties that can improve the digestive process by killing pathogenic bacteria and stimulating the walls of the gallbladder so that they can facilitate fat metabolism. Administration of white turmeric extract 0%, 2% and 4% had no significant effect on slaughter weight, carcass weight, giblet percentage and abdominal fat percentage of broiler chickens

Keywords: white turmeric, curcuminoids, antibacterial

INTRODUCTION

Broiler chickens or meat chickens are superior breeds resulting from crossbreeding of chicken breeds that have high productivity, especially in producing chicken meat. Broiler chickens have an important role as a source of animal protein from livestock. Qurniawan et al., (2016) stated that broiler chickens have a large role in

meeting the current needs for animal protein in Indonesia, the protein content is quite high and the price is relatively cheap, making broiler chickens easy to obtain in the market. Rasyaf (2004) stated that in Indonesia broiler chickens can be marketed at the age of five to six weeks with a live weight of between 1.3 to 1.6 kg per head.

The success of this broiler chicken farming business is influenced by external factors, namely the environment, one of which is feed, and internal factors, namely genetic factors. One of the internal factors that is also important in determining the speed of chicken growth is the strain. Achievements continue to be made by researchers in an effort to increase broiler chicken productivity using herbal ingredients for broiler chicken performance, replacing the use of antibiotics because chemical residues are found that threaten consumer health.

White turmeric (*Curcuma Zedoaria*) is a herbal plant that contains additives and has good potential when mixed into broiler chicken drinking water. White turmeric contains essential oils in the form of thick liquids consisting of monoterpenes and sesquiterpenes (Windono et al., 2002). White turmeric is an herbal plant that is included in the group of natural antibiotics and does not cause residue or is harmful when consumed by livestock or humans. The main components of white turmeric rhizomes that have medicinal properties are essential oils and curcuminoids. Curcuminoid compounds have antibacterial properties that can improve the digestive process by killing pathogenic bacteria such as *haemophilus paragallinarum* bacteria commonly known as infectious coryza (snot), *Pasteurella Multocida* (Fowl Cholera) and stimulate the gallbladder wall so that it can facilitate fat metabolism (Suprayitno and Indradji, 2007).

The use of white turmeric extract in drinking water has not provided sufficient information on the extent of the effect on the slaughter weight and giblet percentage of broiler chickens. Therefore, this study was conducted with the aim of determining the effect of giving white turmeric extract in drinking water on the slaughter weight, carcass weight, giblet percentage and abdominal fat of cobb stain broiler chickens.

White turmeric (*Curcuma zedoaria* [Berg.] Roscoe), also known as "Temu Putih," is commonly found in regions of Indonesia, such as West Java, Central Java, Sumatra, Ambon, and Irian. According to Heyne (1987), the classification of white turmeric is as follows: Division Spermathopyta, Subdivision Angiospermae, Class Monocotyledonae, Order Zingiberales, Family Zingiberaceae, Genus *Curcuma*, and Species *Curcuma zedoaria* [Berg.] Roscoe. This plant is known for its potential to enhance the performance of broilers due to its medicinal properties.

Widono and Parfiani (2002) explained that the characteristic of white turmeric is that it has elongated lanceolate leaves with a reddish purple color along the middle bone. The flower crown is white, with red, white or yellow striped edges. The rhizome is white or light yellow, and tastes very bitter. In addition to Indonesia, it has been cultivated in other countries such as India, Bangladesh, China, Madagascar, the Philippines and Malaysia. The white turmeric plant (*Curcuma zedoaria*) is known as a medicinal plant for several diseases including pain during menstruation (dysmenorrhea),

absence of menstruation (anemore) due to blocked blood flow, cleansing the blood after giving birth, restoring digestive disorders (dipepsi) such as nausea and bloating due to gas, stomach ache, fullness and pain in the chest due to blocked vital energy, enlarged liver (hepatomegaly), splenomegaly, bruises, toothache, sore throat, cough, cervical, vulva and skin cancer, increasing the effectiveness of radiation and chemotherapy treatment for cancer (Rita et al., 2011).

The chemical content of *Curcuma zedoaria* [Berg.] Roscoe rhizome consists of curcuminoids (Diarylheptanoids), essential oils, polysaccharides and other groups. Known diarylheptanoids include curcumin, demethoxycurcumin, bisdemethoxycurcumin and 1.7 bis (4 hydroxyphenyl) 1, 4, 6 heptatriene 3 on containing essential oils in the form of thick golden yellow liquid consisting of monoterpenes and sesquiterpenes. Monoterpenes consist of monoterpene hydrocarbons (alpha pinene, D-camphene), monoterpene alcohol (D-borneol), monoterpene ketone (D-camphor), monoterpene oxide (cineole).

The function and use of white turmeric (*Curcuma zedoaria*) gives a fragrant aroma and taste, is bactericidal against bacteria of the *Bacillus cereus*, *Bacillus subtilis*, and *Bacillus megaterium* groups. In addition, it can inhibit the growth of vegetative bacillus cells and inhibit the growth of its spores. Rhizomes can provide a mild spicy character, antibacterial, anti-inflammatory, anti-inflammatory, smoothing bile secretion (Agustina and Sri, 2009). The appearance of white turmeric herbs, yellowish white, sturdy pseudo stems, brownish red, at least 25 cm (Plantus, 2008). White turmeric is a source of natural antioxidants containing curcuminoid compounds and polyphenol compounds which cause the material to have high antioxidant activity (Pujimulyani and Wazyka, 2009).

RESEARCH METHODS

This research was conducted from July to September 2023 at the Animal Husbandry Unit, Faculty of Agriculture, Pattimura University, Ambon. The material used in this study was 90 cobb strain broiler chickens. The feed given was BR1 and BR2 feed produced by PT. Malindo Feedmilk.Tbk, vita stress and gumboro vaccine. This study used a Completely Randomized Design (CRD) with 3 treatments and 3 replications. The treatments in this study were as follows:

P0= without white turmeric extract treatment

P1= 20 ml white turmeric juice and 980 ml water (20% white turmeric juice)

P2=40 ml white turmeric juice and 960 ml (40% white turmeric juice)

Data collection of parameters measured when the chickens were 5 weeks old. The parameters measured in this study are as follows:

1. Slaughter weight is obtained by weighing chickens before slaughter (gr) which have been fasted for six hours (Blakely and Bade, 1998)
2. Carcass weight is obtained by weighing the chicken without blood, feathers, head to knee level and organs in percentage of carcass weight (Esminger, 1998) which can be calculated using the formula:

$$\text{percentage of carcass weight} = \frac{\text{Carcass Weight (gr)}}{\text{Living weight (gr)}} \times 100\%$$

3. The giblet percentage is obtained by weighing the liver, heart, and gizzard separately. The percentage of liver, heart, and gizzard can be calculated using the following formula:

$$\text{percentage of liver} = \frac{\text{Weight of the liver (gr)}}{\text{Living weight (gr)}} \times 100\%$$

$$\text{percentage of heart} = \frac{\text{Weight of the heart (gr)}}{\text{Living weight (gr)}} \times 100\%$$

$$\text{percentage of gizzard} = \frac{\text{Weight of the gizzard (gr)}}{\text{Living weight (gr)}} \times 100\%$$

RESULTS AND DISCUSSION

Cutting Weight

Slaughter weight is a picture of growth for broiler chickens, which is used to assess the success of a livestock business. Slaughter weight will determine the selling price of livestock, thus affecting the size of the farmer's income.(Suryanah et al., 2016).

Table 1. Results of Analysis of Slaughter Weight, Carcass, Giblet and Abdominal Fat

Variables		Treatment		
		P0	P1	P2
Cutting Weight (grams)		2163.57a	2140.57 a	2131.33 a
Carcass (%)		72.47 a	73, 73 a	75.27 a
Giblet				
- Liver (%)		1.69 a	1.68 a	1.63 a
- Heart (%)		0.38 a	0.42 a	0.42 a
- Gizzard (%)		0.89 a	0.92 a	0.89 a
Abdominal Fat		1.53 a	1.56 a	1.51 a

Rizal (2006) stated that high protein consumption will result in faster growth which will affect the slaughter weight of chickens. Rapid growth in broiler chickens occurs at the age of eight to ten weeks, and the growth rate will decrease after the chicken is ten weeks old (Kompang et al., 2001). Chickens that grow faster are characterized by faster feather growth. The animal's body will experience rapid growth from birth to sexual maturity. After sexual maturity, animal growth continues even though growth is slow but bone and muscle growth has stopped at that time (Herren,

2000). Factors that affect the slaughter weight of broiler chickens are macroclimate conditions, cage microclimate, quality and quantity of rations and the amount of rations consumed. (Nurhidayat et al 2020). According to Oktaviana et al. (2010) that the slaughter weight of broiler chickens is influenced by good effective temperatures so that it has a good impact on the consumption and digestion of chickens to the feed given. The slaughter weight of broiler chickens is very closely related to the consumption of rations and abdominal fat and the digestibility of broiler chickens. According to Kiramang (2011) that chickens will consume rations according to the energy needed if the energy needed by the body is met then the chickens will stop eating. If the consumption of broiler chicken rations is high, the slaughter weight of the chickens will also be high, while if the consumption of rations is low, the resulting slaughter weight of the chickens will be small. According to Syahrudin et al. (2012) that high environmental temperatures can have a negative impact on the physiological conditions and productivity of broiler chickens, because at high temperatures chickens will experience heat stress which can result in decreased feed consumption. According to Sulistyoningih et al. (2016) that temperatures that are hotter than normal will cause stress in broiler chickens and have an impact on chicken growth.

The results of the analysis of variance showed that the administration of white turmeric juice had no significant effect ($p > 0.05$) on the slaughter weight of Cobb strain broiler chickens. The average slaughter weight of Cobb strain broiler chickens in this study was in the range of 2131.33 grams - 2163.57 grams. The results showed that the largest average slaughter weight was shown in the P0 treatment, namely 2163.57 grams, then followed by the P1 treatment (2140.57 grams) and P2 (2131.33 grams). These results are in accordance with the results of the study by Horhoruw and Rajab (2019), the administration of turmeric (*Curcuma longa*) as much as 10 grams, and 20 grams in broiler chicken drinking water did not differ significantly on the body weight of broiler chickens. The results of the broiler chicken body weight measurement were higher than the results of the study by Horhoruw and Rajab (2019) namely P0 = 1988.47, P2 = 2031.34, and P3 = 2060.00. It is suspected that white turmeric (*Curcuma zedoaria*) has higher curcuminoid compounds when compared to turmeric (*Curcuma longa*), which is efficacious as an antibacterial that can improve the digestive process. This is in accordance with the opinion of Suprayitno and Indradji (2007) that curcuminoid compounds have antibacterial properties that can improve the digestive process by killing pathogenic bacteria such as *Haemophilus paragallinarum* bacteria commonly known as infectious coryza (snot), *Pasteurella Multocida* (Fowl Cholera) and stimulate the gallbladder wall so that it can facilitate fat metabolism. Furthermore, it is explained that white turmeric is a herbal plant that contains chemical compounds such as curcuminoids, essential oils, astringes, flavonoids, sulfur, gum, resin, flour, a little fat (Lobo et al., 2009). Apart from that, *Curcuma zedoaria* also contains alkaloids, phenols, saponins, glycosides, steroids, terpenoids and other ingredients which are thought to be able to be used as antimicrobials, antifungals, anticancer, antiallergic, antioxidants and analgesics (Lobo et al., 2009; Sumathi et al., 2013).

Carcass Percentage

Carcass percentage is often used to assess livestock production, especially meat production. The percentage of chicken carcass increases with increasing slaughter age. Dewanti, et al., (2013) that the percentage of carcass is influenced by slaughter weight. The percentage of carcass increases from six to eight weeks of age because crossbred chickens are still growing. Herren (2000) stated that the animal's body experiences rapid growth from birth to sexual maturity. According to Haroen (2003) that carcass weight is closely related to slaughter weight and body weight growth. According to Nahashon et al. (2005) that carcass weight is greatly influenced by the live weight produced. The higher the live weight, the higher the carcass weight and vice versa. According to Resnawati (2004) that the carcass weight produced is influenced by several factors, namely macroclimate and microclimate conditions of the cage, age, sex, slaughter weight, body size and conformation, fat, quality and quantity of rations and strains maintained.

The carcass weight obtained in this study was 1,060.58 g in the lowlands, 1,029.11 g in the medium plains and 1,006.01 g in the highlands or around 69-70% of the live weight. This shows that carcass production is still within the normal range. According to Sari et al. (2014) that the average carcass weight of broiler chickens ranges from 65-75% of the live weight. According to Ihsan (2006) that the carcass weight of broiler chickens at the age of 4 weeks is 932 - 1,225 grams.

The results of the analysis of variance showed that the administration of white turmeric juice had no significant effect ($p > 0.05$) on the average percentage of carcasses of broiler chicken strain cobb. The average percentage of carcasses of broiler chicken strain cobb in this study was in the range of 72.47% -75.27%. The results showed that the largest average carcass percentage was shown in the P2 treatment, which was 75.27%, then followed by the P1 treatment (73.73%) and P2 (72.47). These results are not much different from the results of the study by Subekti et al., (2012) that the average carcass percentage ranged from 72.98% -76.26%. Many factors can influence differences in carcass weight values in broiler chickens, apart from live weight (Suryanah et al., 2016).

According to Subekti et al. (2012) that the percentage of broiler chicken carcass at 28-35 days is between 65-75% of live weight. Factors that affect the percentage of carcass are the final weight of the chicken, genetics, ration composition and environmental temperature. At low temperatures will have an impact of increased humidity, so in this condition the chicken will experience stress due to cold and the chicken will also have difficulty in removing body heat while at high temperatures the chicken will experience heat stress so that there will be a decrease in appetite because the chicken will try to remove body heat through panting. According to Subekti et al. (2012) that high environmental temperatures can reduce the growth rate of poultry. Broiler chickens grow quickly and are able to convert the food eaten into meat very efficiently, this ability will run optimally at the appropriate environmental temperature. According to Subekti et al. (2012) that when chickens experience heat stress, the

chicken will reduce feed consumption which will have an impact on achieving final body weight not being optimal, thus affecting the achievement of carcass weight to be less than optimal. Carcass weight greatly affects the final weight of broiler chickens. Factors that affect the percentage of carcass weight are macroclimate and microclimate conditions of the cage, breed, age, sex, body weight, and consumption. According to Subekti et al. (2012) that the factors that affect carcass are age, sex, and body weight.

Giblet Percentage

Giblet growth is generally influenced by several factors, including the nutritional intake available in feed and the growth rate of livestock (Husana et al, 2017).

Liver

The results of the analysis of variance showed that the administration of white turmeric extract had no significant effect ($p>0.05$) on the percentage of liver weight (%) of cobb strain broiler chickens. The average percentage of liver weight (%) of cobb strain broiler chickens in this study was in the range of 1.63% - 1.69%. The results of the study showed that the average percentage of the largest liver weight was shown in the P0 treatment, which was 1.69%, then followed by the P1 treatment (1.68%) and P2 (1.63%). This result is lower than the results of the study by Suyanto et al., (2013), that the percentage of broiler chicken liver was an average of 2.16% and Afif (2020), the percentage of chicken liver was in the range of 2.0% to 2.4% in the experiment of adding starbio probiotics 0.5-2 grams/kg body weight. The results of the study by Jumiati et al (2017) that the average percentage of broiler chicken liver weight was 2.01% to 2.25% in the experiment of giving 0-3% temulawak flour.

Heart

The results of the analysis of variance showed that the administration of white turmeric extract had no significant effect ($p>0.05$) on the percentage of heart weight (%) of cobb strain broiler chickens. The average percentage of heart weight (%) of cobb strain broiler chickens in this study was in the range of 0.38% (P0) - 0.42 (P1 and P2). The results showed that the average percentage of the largest heart weight was shown in the P1 and P2 treatments, namely 0.42%, then followed by the P0 treatment (0.38%). The results obtained in this study were almost the same as the results of the study by Jumiati et al (2017) where the percentage of heart weight ranged from 0.35% - 0.40% in the trial of giving temulawak flour in feed, but lower than the results of the study by Suyanto et al (2013), that the percentage of broiler chicken heart was 0.47% of live weight and the results of the study by Afif (2020) which was in the range of 0.6% -1% in the trial of adding starbio probiotics 0.5-2g/kg ration. The high cholesterol content in rations can block blood vessels and can cause an increase in the size and weight of the heart due to increased work of the heart muscle (Retnoadiati 2001).

Gizzard

The results of the analysis of variance showed that the administration of white turmeric juice had no significant effect ($p>0.05$) on the percentage of gizzard weight (%) of cobb strain broiler chickens. The average percentage of gizzard weight (%) of cobb strain broiler chickens in this study was in the range of 0.89% - 0.92%. The results

showed that the average percentage of the largest gizzard weight was shown in treatments P1 (0.92%) and 0.89% (P0 and P2). The results obtained in this study were lower than the results of Afif's study (2020), where the average percentage of gizzard ranged from 1.7% -2.3%, and in the range of 1.81% - 2.10% of body weight (Resnawati, 2004).

Abdominal Fat Percentage

The results of the analysis of variance showed that the administration of white turmeric juice had no significant effect ($p>0.05$) on abdominal fat in cobb strain broiler chickens. The average abdominal fat of cobb strain broiler chickens in this study was in the range of 1.51% - 1.56%. The results showed that the largest average abdominal fat was shown in treatment P1, which was 1.56%, then followed by treatment P0 (1.53%) and P2 (1.51%). These results are still within the range obtained by Subekti et al., (2012), the average percentage of abdominal fat ranged from 1.13% -1.75%. According to Salam et al. (2013) that the standard abdominal fat in broiler chickens ranges from 0.73% to 3.78%. Factors that affect the formation of abdominal fat are gender, ration nutrient content, environmental temperature. Environmental temperature conditions can affect the amount of abdominal fat, if the environmental temperature is high, it will cause the chicken's body temperature to become hotter and then make the chicken drink more than consume feed. According to Dewanti et al. (2013) that abdominal fat growth can be influenced by several factors such as age, gender, nutrient content in the ration and the ability of livestock to digest the ration to obtain the appropriate energy needed by the livestock's body. According to Setiawan and Sujana (2009) that fat formation in the chicken's body can occur due to excess energy consumed. The energy used by the body generally comes from carbohydrates and fat reserves. The source of carbohydrates in the body is able to produce fat which is usually stored around the innards and under the skin. Fat growth in 28-day-old broiler chickens is not too much because the energy in the body is still widely used for the growth process. According to Kusuma et al. (2014) that broiler chickens at the age of 21-33 days the formation of abdominal fat is not too much, this is because the nutrients absorbed by the body are still widely used for chicken growth. Abdominal fat growth can increase if the resulting body weight increases. According to Gultom. (2012) that abdominal fat weight will increase with increasing body weight, and vice versa if the body weight is small then the abdominal fat weight will be small so that the percentage of abdominal fat will be small.

CONCLUSION

From the research results it can be concluded that the influenceh administration of 2% and 4% white turmeric extract had no significant effect on slaughter weight, carcass weight, giblet percentage and abdominal fat of broiler chickens.

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