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CARCASS CHARACTERISTICS OF NATIVE CHICKENS CONSUMED *Abelmoschus manihot* LEAVES JUICE IN DRINKING WATER

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Abstract

The study aimed to determine the carcass characteristics of native chickens consumed gedi (Abelmoschus manihot (L) Medik) leaves in drinking water. A total of 100 unsexed DOC super native chickens were used. The treatments were: water without gedi leaves; 10 mL of gedi leaves juice (GLJ)/L; 20 mL of GLJ/L and 30 mL of GLJ/L. Treatments began to drink to chickens 6 weeks of age, for 5 weeks. Diet was 73% commercial diet plus 10% yellow corn and 17% rice bran. The study used a CRD consisting of 4 treatments and 5 replications. The data have been processed into the following indicators: carcass yield (carcass weight, percentage of carcass, and percentage of carcass commercial pieces), and carcass characteristics (percentage of heart, liver, gizzard, pancreas, and abdominal fat). Results showed that the administration of GLJ up to 30 mL had a non-significant different effect on carcass yield and carcass characteristics except in liver was significantly different. GLJ did not have a negative effect on livestock, there was even a tendency to reduce the abdominal fat, and economically still profitable. As a conclusion, GLJ can be used as an alternative additive in drinking water of native chicken up to 30 mL/L.

Key words*: drinking water, gedi leaves, native chicken, water additive.*

INTRODUCTION

Demand for poultry meat was increasing in line with increasing in income and public awareness of the fulfillment of animal protein needs. The role of broiler chickens was very dominant in providing animal protein, but the role of broiler chickens is very vulnerable, because of the dependency on imported of feedstuffs and birds, so the risk of production failure was very high. While local chicken was very low in productivity, but the level of dependence on foreign countries was small, because the birds are native to Indonesia and have adapted to the environment, so that they are able to utilize local feed ingredients and agricultural by-products as well as agricultural industries which are abundant in the vicinity (Suprijatna, 2010).

The effort that can be done to increase the productivity of poultry was by providing additional herbal plant as feed additive. The scientists have been giving their attention on medicinal plants to achieve the targeted nutritional and health status of poultry. The herbal products and spicy have been used in animal feed as digestion stimulants and growth promoters (Frankic et al., 2009). The use of feed additive can increase immunity, growth, appetite, and meat production. Additional herbal feed was considered safer when compared to the use of antibiotics. The use of antibiotics can produce residues in poultry meat so that it can cause resistance to antibiotics if the poultry meat was consumed. In January 2006, the European Union banned the use of antibiotic growth promoters in animal feeds, which shifted the producers' attention to plant-based supplements (Lipiński et al., 2017).

Gedi plants (*Abelmoschus manihot* (L.) Medik) and their benefits to broilers have been studied by Mandey et al. (2013); Mandey et al. (2014); and Mandey et al. (2015). The results of the study found the chicken meat which was low-fat, safe and healthy, and it was because of gedi leaf juice contained bioactive compounds that have anti-oxidant potential, anti-microbial, hepatoprotective, as a growth promoter. However, from a commercial point of view, it was not optimal to produce chicken meat according to market demand, because gedi leaves contain high mucilage. Subsequent research in the form of gedi leaf juice given

through drinking water in broilers results in higher body weight than when given through diets (Mandey and Pontoh, 2016).

Depending on market demand, poultry can be sold as a whole, ready-to-cook bird, split into two halves, separated into different parts such as wings, whole breast, deboned fillets, drumstick, thigh, whole leg, etc. It is determined that some factors such as line, sex, age, health, nutrition, body weight, fattening period before slaughtering influenced these carcass parts (Nikolova and Pavlovski, 2009). Summers (2004) stated that meat at the most carcasses was deposited on the breast, upper thighs (thighs) and lower thighs (drumsticks). About 70% of the thorax and upper thighs were flesh and less in the lower thighs.

Super-native chickens were the crossing of male native chickens that have a large posture with female laying hens (Salim, 2013). Super-native chickens have faster growth than native chickens. Researchers have suggested that although the growth performance of local chicken is less efficient than that of commercial broiler, the quality of their meat is more appropriate for premium chicken meat (Choo et al., 2014). Research on the use of gedi leaves in super-native chickens has never been done, therefore this study aimed to determine the production of super-native carcasses yields and characteristics given gedi leaves juice through drinking water.

MATERIALS AND METHODS

The study was conducted using 100 of one-day-old super-native chickens. The treatment used was gedi leaves which were made juice and given through drinking water, with the following treatments arrangement: T0 = drinking water without gedi leaves; T1 = 10 ml of gedi leaf juice (GLJ) / L drinking water, T2 = 20 ml of GLJ / L drinking water and T3 = 30 ml of GLJ / L drinking water. The treatment began to be given to chickens at 6 weeks of age, and data collection was carried out for 5 weeks. The dietwas commercial feed 73% plus 10% corn and 17% rice bran, and the nutrients composition: crude protein 19.49%, crude fiber4.66%, fat 3.63%, Ca 1.02%, P 0.66 %, and metabolizable energy 2920 Kcal/kg, which was given *ad libitum*. The preparation of gedi leaf juice based on Alom (2013).After washing, the fresh leaves were cut into small pieces by scissors and water was added at 1:10 ratio. Then juice was prepared by blending the leaves with pestle and motor and stored in a refrigerator at 4°C.

This study used a completely randomized one-way design (CRD) (Steel and Torrie, 1982) consisting of 4 treatments and 5 replications. The variables measured were carcass yield (slaughter weight, carcass weight, percentage of carcass and commercial cutting: breast, back, thigh, drumstick, and wing), carcass characteristics (percentage of abdominal fat, heart, liver, gizzard, pancreas), and IOFCC (income over feed and chick cost).The carcass was cut into commercial pieces (Irham, 2012), namely: the chest was separated at the tip of the scapula and dorsal ribs, chest weight was measured by weighing on the chest after being separated from the carcass; thighs (separated in the acetabulum, pelvix muscles were included while the pelvix bone does not participate in the thorsal and dorsal end of the tarsus metatarsus bone); the back was separated from the pelvix bone, the tip of the scapula dorsal from the ribs and the posterior part of the neck; the wings can be separated through pieces of the shoulder joints.

The value of carcass percentage was obtained by comparing the weight of the carcass (g) with the slaughter weight (g) multiplied by 100%. Individual part yields were obtained as: (part weight / carcass weight) ×100 (Sariözkan et al., 2016). The percentage of abdominal fat was obtained by comparing the weight of abdominal fat (g) with the slaughter weight (g) multiplied by 100%. The liver, heart, pancreas, and empty gizzard weight were recorded. Income over feed and chick calculation was obtained using the formula: (average body weight x Price per Kg weight of life) - ((average of feed intake x price per Kilogram ration) + price of D.O.C.) (Prawirokusumo, 1990). The data was then analyzed using IBM SPSS 24 software.

RESULTS AND DISCUSSIONS

The use of GLJ in drinking water and its effect on the carcass yield and characteristics, and IOFCC of super-native chickens showed in

Table 1 and Table 2. The results showed that treatment until 30 ml GLJ/L drinking water had no significantly different (P> 0.05) on carcass yield and carcass characteristics (heart, gizzard and pancreas) but had a significant effect (P <0.05) on the percentage of liver. The IOFCC value was also not significantly different.

This result was consistent with the result from An et al. (2015) who found no significant difference in the body weight, carcass cutting (breast, thigh, leg), and abdominal fat, except in liver weight of white mini broilers fed diet with 0.3% or 0.5% onion extract. White mini broiler is a local mixed breed produced by crossbreeding between meat-type male breeder and egg-type hens. Moreover, the weight of body, carcass cutting and abdominal fat in this study were higher than An et al. (2015) reported.

Factors that influence the percentage of carcass were breed, age, sex, ration, and slaughter weight (Abubakar, 2003).

Table 1. Effect of gedi leaves as water additive on carcass yield and IOFCC of super-native chicken

Variables	Treatments				SEM	p Value
	0 ml GLJ	10 ml GLJ	20 ml GLJ	30 ml GLJ		
Slaughter Weight (g)	1124.8	1098.8	1095.2	1085.6	10.29	0.61
Carcass Weight (g)	836.2	818.0	816.0	804.8	7.79	0.59
Carcass Percentage (%)	74.34	74.12	74.68	74.12	0.25	0.73
Breast (%)	23.93	24.25	22.84	22.16	0.43	0.30
Back (%)	29.51	30.64	30.42	30.95	0.26	0.25
Thigh (%)	16.10	16.20	16.46	16.66	0.14	0.53
Drumstick (%)	15.94	16.20	16.61	16.73	0.15	0.23
Whole Chicken Leg (%)	32.04	32.40	30.55	32.93	0.47	0.34
Wing (%)	13.22	13.29	13,.4	13.66	0.19	0.86
IOFCC (Rp)	8.401	8.670	8.60	8.964	142,00	0.67

SEM = standard error of mean; GLJ = gedi leaves juice

The carcass component that consists of muscles, fat, skin, and bones have different growth speeds. And, the good carcass was characterized by the maximum amount of meat, the minimum amount of bone and the optimum amount of fat.

Carcass weight was closely related to the percentage of carcass. In this study giving 30 ml of GLJ/L drinking water gave no significant different effect on the percentage of carcass. The average percentage of carcasses in this study ranged from 74.12 to 74.68%. This data was higher than the results of Usman et al. (2016) in broilers that were given the prebiotic Immuno Forte in drinking water. This may also be due to the good quality of the dietused in this study. According to Gultom et al. (2012) that protein was known as one of the constituent of body cells and tissues which showed that protein plays an important role in achieving the desired carcass weight.

According to Soeparno (2005), that there was a close relationship between carcass weight and carcass parts with slaughter weight, so if the slaughter weight and carcass weights were not significant effect then the results were not much different on the parts of carcass. Whole carcasses were usually cut according to the customer's order, the usual carcass was cut into nine parts consisting of 2 lower thighs, 2 upper thighs, 2 wings, 2 breast chests and 1 middle chest. According to Merkley et al. (1980), carcasses were divided into five major parts of commercial pieces, namely the chest, wings, back, thighs and drumstick. Chest was part of the body with the most of meat.

The size of the chest was used as a measure of the quality of trade because most of the muscles that were the largest carcass component were around the chest (Jull, 1979). The average percentage of chest weight in this study ranged from 22.16 to 24.25%, lower than that reported by Usman et al. (2016) in broilers that were given the prebiotic Immuno Forte in drinking water, which was 32.7 to 35.7%.

The upper thighs and lower thighs were usually associated with oxidative metabolism of the muscles, because the use of fat as an energy substrate supported their development (Temim et al., 1999; 2000).

The percentage of whole chicken legs in this study (30.55 to 32.93%) compared to Usman et al. (2016) (26.8 to 28.2%) may be caused by the size of the bone. Muryanto et al. (2002) stated that the small amount of meat deposited in carcass parts was strongly influenced by the percentage of bone. The higher the percentage

of carcass, the higher the percentage of thigh pieces produced.

The relatively similar results in the percentage of back showed that the JDG treatment in drinking water had no significant effect (P> 0.05). The percentage of back weight in this study ranged from 29.51 to 30.95%, higher than Usman et al. (2016). Basoeki (1983) suggested that broiler backs contain a lot of bone tissue, so the mineral content in the ration has more influence on back weight compared to protein.

Research showed that the treatment of GLJ in drinking water has no significant effect on the percentage of wings (P> 0.05). The mean value of wing percentage ranged from 13.22 to 13.66%.

Table 2. Effect of gedi leaves as water additive on carcass characteristics of super-native chicken

Carcass Traits	Treatments				SEM	p Value
	0 ml GLJ	10 ml GLJ	20 ml GLJ	30 ml GLJ		
Heart (%)	0.67	0.83	0.65	0.67	0.04	0.26
Liver (%)	2.37[a]	2.91[b]	2.53[a]	2.50[a]	0.07	0.04
Gizzard (%)	3.35	3.02	2.97	2.97	0.11	0.64
Pancreas (%)	0.31	0.32	0.29	0.25	0.01	0.30
Abdominal fat (%)	1.67	1.48	1.44	1.43	0.10	0.53

SEM = standard error of mean; GLJ = gedi leaves juice

The administration of GLJ in drinking water did not affect the weight of the heart, gizzard and pancreas, but had a significant effect on liver weight. This result was different from the results of the Tahalele (2018) that the provision of herbal ingredients up to 5 ml added to drinking water did not cause changing in the percentage of carcass and liver, but at 5 mL administration there was a decreasing in the percentage of abdominal fat in super-native chickens. According to the study of Sulistyoningsih (2015) giving herbal variations significantly affected body weight, broiler liver weight but did not affect the weight of the heart, gizzard, intestines, and spleen.

Liver is an important organ involved in various metabolic path ways regulating growth and productivity in poultry. It has a wide range of functions, and it is vulnerable to various diseases. Phytobiotics are plant derivatives such as herbs, plant extracts or spices. They have a wide range of activities *viz.* stimulation of feed intake, growth and endogenous secretions in the gut. Phytobiotics possess hepatoprotective and hepatogenic properties, which tone up liver resultingin increased nutrient utilization and better performance (Bhattacharyya et al., 2015).

One of the few parts of the body used to store fat in broilers was the part around the abdomen called abdominal fat. The average percentage of abdominal fat in this study ranged from 1.43 to 1.67%. The results showed that the treatment had no significant effect (P> 0.05) on the abdominal fat percentage, but the data showed a downward trend. Furthermore, the average percentage of abdominal fat in this study was lower than that reported by Bilgili et al. (1992), that the percentage of broiler abdominal fat was 2.6 - 3.6%. This was partly due to differences in strains and nutritional content of rations. The nutrient content in all treatments in this study together caused the same feed intake which will affect carcass weight.

Abdulkarimi et al. (2011) reported that adding 0.6% thyme extract to drinking water significantly reduced the accumulation of fat in the abdominal areas of broiler chickens. The reduction in the abdominal fat traits caused by thyme supplementation may have been attributable to the saponins in thyme (Abdulkarimi et al., 2011), which have inhibitory effects on lipogenesis (Qureshi et al., 1983).

Many scientists have explored ways to decrease the abdominal and/or carcass fat in poultry. It has become clear that fat accretion is closely related to the rate of gain (Lin, 1981), and nutritional and management practices.

The value of IOFCC in this study was not affected by the administration of JDG in drinking water, but there was a tendency to increase with increasing levels of GLJ in drinking water.

CONCLUSIONS

The weight of the carcass pieces, namely the thighs, chest, back, and wings of the super-native chickens that were given GLJ in drinking water increase the weight range of the standard appearance of super free-range chickens, likewise, with the weight of the heart, gizzard and pancreas, except liver weight. Abdominal fat spread around the abdomen was

not significantly different from the increased level of administration of GLJ in drinking water. The value of IOFCC was also not affected by the increase in the provision of GLJ. Based on the results of this study, GLJ did not have a negative effect on livestock, there was even a tendency to reduce the abdominal fat, and economically still profitable. As a conclusion, GLJ can be used as an alternative additive in drinking water of native chicken up to 30 mL/L.

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