MANGOSTEEN SKIN MEAL IN THE DIET (*Garcinia Mangostana L*) INFLUENCE ON EDIBLE AND IN-EDIBLE COMPOSITION OF SENTUL CHICKEN 10 WEEK AGES

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Abstract

The aim of the present study was to evaluate effect of mangosteen skin meal in the diets on edible and in-edible chicken Sentul aged 10 weeks. One hundred 1-d-old Sentul chicks were allocated in 4 experimental groups for 10 weeks. The birds were fed treatment diet and depending on the addition were labelled as follows. There are 4 types of treatment diets P0 = Basal diets (without giving mangosteen skin meal), P1 = Basal diets + 2.5%, mangosteen skin meal, P2 = Basal diets + 5% mangosteen skin meal, P3 = Basal diets + 7.5% mangosteen skin meal. This study used an experimental method using a completely randomized design (CRD) with five replications. The variables observed were edible and in-edible. Data were analyzed by Analyzed of Variance and continued with Duncan Test. The results showed that the administration of mangosteen skin meal on the diets affected the weight of edible and did not affect the weight of in-edible Ayam Sentul. The level of administration of mangosteen skin meal in the diets of 7.5% produced optimal edible weight, but did not affect the weight of in-edible.

Key words: mangosteen skin meal, edible, in-edible

INTRODUCTION

Acceleration of absorption of food substances from diets can be done by improving the health of the digestive tract and the balance of nutrients in the diets. The digestive tract health in commercial chicken feed is usually added with feed additive synthetic. Feed additives are additional feeds derived from non-nutritive substances which include enzymes, antibiotics, antioxidants, organic acids, antibiotics function to suppress the growth of pathogenic microorganisms in the digestive tract so that the absorption of substances in the intestine will increase thus livestock can better utilize nutrient feed for growth and production. Continuous administration of synthetic antibiotics can cause livestock resistance to antibiotics and cause residues. One alternative ingredient feeds for antibiotic replacement additives is the xantonic compound found in the mangosteen skin.

Xanthones contained in mangosteen skin consist of *mangostin, mangostenol A, mangostinon A, mangostinon B, trapezifili xanthone, tovophyllin B, alpha mangostin, beta mangostin, garcinon B, mangostanol, flavonoid epicatechin and gartanin*. The amount of antioxidants in xanthones is more than the content of vitamin C and E. The provision of mangosteen skin meal in the diets there is a problem that is the antinutrient content in the form of tannins. High tannin content will inhibit feed absorption and growth. Proper administration of mangosteen skin meal needs to be considered to get optimal growth and proportionate meat content. This can be measured by considering the amount of edible and inedible.

MATERIALS AND METHODS

Chicken Rearing

One hundred 1-d-old sentul chicks were used this experiment. On the basis of similar

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body weight all sentul chicks were randomly assigned into 20 units of cages, each cage containing 5 birds. The birds were placed into 4 types of diets treatment and each treatment was repeated 5 times. The birds were fed treatment diet until 10 wk old. The dietary treatments were formulated to meet the nutrient requirement for sentul chickens [9].

Table 1 Feed composition and ingredients of experiment diets

Ingredients	(%)
Ingredient	
Yellow Corn	56.00
Rice bran	21.50
Soya Bean Meal	12.00
Fish Meal	9.25
Bone Meal	0.75
$CaCO_3$	0.50
Calculated Analysis	
ME (kcal/kg)	2781
CP (%)	17.04
Ca (%)	1.16
P (%))	0.36
Methionine (%)	0.40
Lysin (%)	1.21

The sentul chickens were reared in cages that were made of bambo with the size of 90 cm × 90 cm × 60 cm and each cage was filled by 5 chickens. Each cage was numbered according to the treatment and repeat. Each cage was equipped with a husk base and a feeding place (round feeder) and a drinking water (round waterer). As a heating device in each cage is given an incandescent lamp, until the age of 3 week. The diets is given adlibitum, given in the form of meal diets. Drinking water is provided by adlibitum

Mangosteen Skin Meal Processing

Mangosteen skin was obtained from Pasar Baru Bandung, then mangosteen skin was dried using solar heat until the moisture content reaches 14%. The dried mangosteen skin is then ground with a hammer mill.

Chicken Slaughter Process

Each cage unit is randomly taken 1 chicken at the age of 10 weeks, so the total number of chickens is 20. Chickens to be slaughtered are fastened for 12 hours. Weigh the weight of chickens at the age of 10 weeks as life weight.

The slaughter was carried out using the standards of the MUI (Majelis Ulama Indonesia). Slaughtering is done by cutting four channels, namely the jugular vein, carotid artery, esophagus and trachea. Place the position of the chicken head below or in the upside position to bleed in it so the blood comes out all. Preparing warm water ranges from 55-60 degrees Celsius for facilitate removal of chicken feathers. Soak the chicken for 30 seconds the immersion process. Performing the stages of separation and weighing parts edible and in edible of chicken.

Variable Observed

The variables to be observed are divided into two categories edible and in-edible parts:

1. Edible part

a. Empty carcass weight is the body without blood, feathers, neck, head, feet, and the entire cavity of the stomach.

b. Giblet weight; includes the amount of weight of the heart, liver and gizzard.

2. In-edible part

a. Blood weight is the weight of blood collected during cutting.

b. Head and neck weight.

c. The weight of the foot is the weight of the chicken legs starting from the hockjoint down.

d. The weight of the visceral without giblets, includes the sum of the duodenum, jejenum, ileum, caecum, colon, lungs, kidneys, trachea, reproductive organs and abdominal fat

e. The weight of the feather is the weight of the feather after being separated from the chicken's body. The way to get the weight of feathers is by reducing the weight of life with blood weight and weight of dressed carcass.

Experiment Design

In this study using a Completely Randomized Design (CRD) method with 4 treatments and 5 repetitions. The animals that will be tested are sentul chicken with a number of 100, so that there are 20 experimental units and, there are 5 chicken for each experimental units.

- $MSM_{0\%}$: A group of chickens fed diets without additional mangosteen skin

-$MSM_{2,5\%}$: Basal diets + 2.5% mangosteen skin meal
-$MSM_{5\%}$: Basal diets + 5% mangosteen skin meal
- $MSM_{7,5\%}$: Basal diets + 7.5% mangosteen skin meal

Statistical analysis

Data were analyzed by one-way ANOVA in which the main effect was giving treatment diets. The statements of statistical significance were based on $p<0.05$ and the variation between samples is expressed as mean ±SE. Differences between means were examined using Duncan`s multiple range test

RESULTS AND DISCUSSION

Effect of Diets Treatment on Edible Composition of Sentul Chicken

The average value of the weight of the edible chicken sentul that treated with mangosteen skin meal can be seen in Table 2. The average weight of edible chicken sentul results of research ranged from 276±19.41 to 324±14.64 g. The highest average edible weight was found in treatment $MSM_{7,5\%}$ (324±14.64 g) followed by $MSM_{5\%}$ (312±15.71 g), $MSM_{2.5\%}$ (280.6 g) and $MSM_{0\%}$ (275.8g). In order to determine the effect of mangosteen skin meal (*Garcinia mangostana L.*) in the diets on the edible portion, a statistical analysis was carried out using analysis of variance. The results of the diversity analysis showed that the addition of mangosteen skin meal in the diets gave a significant effect ($P> 0.05$) on the weight of the edible chicken sentul. To find out the differences between treatments, Duncan's Multiple Range Test was performed.

Table 2 Edible composition of Sentul Chickens at 10 wk of age that was given mangosteen skin meal (MSM) in the diets

	$MSM_{0\%}$	$MSM_{2.5\%}$	$MSM_{5\%}$	$MSM_{7.5\%}$
Breast (g)	69±6.47 ^{a}	71±9.62 ^{a}	82±6.02 ^{b}	86±3.36 ^{b}
Thigh+Drumstick (g)	77±6.91^{a}	79±10.90 ^{ab}	88±6.07 ^{bc}	92±5.10 ^{c}
Wing (g)	39±1.95 ^{a}	40±2.86 ^{a}	42±2.97 ^{a}	42±1.79 ^{a}
Back (g)	57±2.97 ^{a}	57±9.40 ^{a}	64±6.99 ^{a}	65±6.84 ^{a}
Carcass (g)	243±16.46 ^{a}	246±29.43 ^{a}	275±16.65 ^{b}	286±14.23 ^{b}
Gizzard (g)	16±2.07 ^{a}	17±4.69 ^{a}	17±1.10 ^{a}	18±1.67 ^{a}
Liver (g)	14±2.28 ^{a}	15±2.74 ^{a}	18±2.41 ^{a}	18±1.79 ^{a}
Heart (g)	3±0.55 ^{a}	3±0.55 ^{a}	2±0.55 ^{a}	3±0.45 ^{a}
Edible (g)	276±19.41 ^{a}	281±35.89 ^{a}	312±15.71 ^{b}	324±14.64 ^{b}

The results of statistical analysis with multiple duncan range tests showed that the weight of chicken edible given a 5% MSM and 7.5% MSM was higher than those given MSM 2.5% and without MSM. This shows that mangosteen skin meal which contains active *xanthones* which functions as an antioxidant can reduce cell damage especially those caused by free radicals. The mangosteen skin containing xanthone compounds have high antioxidant functions that can be used to protect and reduce cell damage, especially those caused by free radicals. Antioxidants convert free radicals into relatively stable compounds and stop chain reactions from free radical damage so that it will have an impact on the growth rate of chickens [10], while according to Velmurugan and Citarasu [8] mangosteen skin contains *xanthone* compounds as antioxidants, Antiviral, antifungal and antimicrobial which is thought to be able to improve the structures of intestinal villi in the process of absorption of nutrients and able to suppress the growth of pathogenic bacteria in the intestine so as to increase body weight growth.

The content of mangosteen skin meal plays a role in the growth and increase in body weight of sentul chicken, from the increase in body weight can produce high edible weight, this is according with the statement of Oluyemi and Roberts [6], which states that the higher the increase in body weight achieved also affects increased growth of edible parts. Giving the mangosteen skin meal which is

added to the diets which is the higher the dose of administration can produce good edible sentul chicken. It is also evident that the xanthones contained in the mangosteen skin work according to their function as antioxidants, *antiproliferative* and antimicrobial. Where these compounds are able to suppress the growth of pathogenic bacteria in the sentul chicken intestine so as to bring about changes in the digestive tract which causes an increase in body weight growth, so that the optimal edible weight is obtained. In accordance with the statement of Jull [4] which states that the higher increase in body weight achieved influences the growth of edible parts.

The average weight of edible sentul chicken when compared to the standard value of edible which consists of carcass and giblet weights is still in the normal range. The weight of edible obtained after being calculated in the form of percentage ranges between 61.25-67.25 percent. Edible weight will usually continue to increase along with age growth, the more age, the size of the chicken's body increases. This happens because the addition of age can increase muscle growth that is attached to the bone. The growth sequence of body tissues is nerve tissue, bone, muscle and fat. When nerve growth and bone slow down, muscle growth increases. During the growth period, bones grow earlier than muscle and fat growth [7]. Bone growth is very influential on the amount of edible produced, because bone is the place where meat is attached as the main carcass component [5].

Effect of Diets Treatment on In-dible Composition of Sentul Chicken

The average value of the weight of the In-edible chicken sentul that treated with mangosteen skin meal can be seen in Table 3. The average weight of edible chicken sentul results of research ranged from 157±10.99 to 169±13.91 g. The highest average edible weight was found in treatment $MSM_{5\%}$ (169±13.91 g) followed by $MSM_{7.5\%}$ (166±12.18 g), $MSM_{0\%}$ (162±5.64 g) and $MSM_{2.5\%}$ (157±10.99 g). In order to determine the effect of mangosteen skin meal (*Garcinia mangostana L.*) in the diets on the In-edible portion, a statistical analysis was carried out using variance analysis. The results of the diversity analysis showed that the addition of mangosteen skin meal on the diets gave a no significant effect (P> 0.05) on the weight of the In-edible chicken sentul.

Table 3 In-edible composition of Sentul Chickes at 10 wk of age that was given mangosteen skin meal (MSM) in the diets

	$MSM_{0\%}$	$MSM_{2,5\%}$	$MSM_{5\%}$	$MSM_{7,5\%}$
Blood (g)	32±2.07 ^{a}	31±2.65 ^{a}	32±3.46 ^{a}	29±2.88 ^{a}
Feathers (g)	23±1.58 ^{a}	22±3.13 ^{a}	24±2.55 ^{a}	24±1.82 ^{a}
heads (g)	22±1.10 ^{a}	22±2.00 ^{a}	25±1.82 ^{b}	24±1.22 ^{ab}
Neck (g)	25±2.86 ^{a}	24±3.29 ^{a}	27±2.61 ^{a}	24±1.58 ^{a}
Feet (g)	17±3.03 ^{a}	18±0.84 ^{a}	14±2.77 ^{a}	20±6.23 ^{a}
Viscera (g)	39±3.90 ^{a}	39±3.49 ^{a}	45±8.97 ^{a}	42±5.55 ^{a}
Abdominal Fat (g)	3.6±1.14 ^{a}	2.6±0.89 ^{a}	2.6±0.55 ^{a}	2.6±0.89 ^{a}
In-edible (g)	162±5.64 ^{a}	157±10.99 ^{a}	169±13.91 ^{a}	166±12.18 ^{a}

Jull [4] states that the higher the carcass weight, the lower the non carcass weight. At the age of 8 weeks the weight of the organs in the maximum growth, so that increased body weight is not followed by an increase in internal organ weight. Forest, et al. [3] state that the percentage of in- edible parts will decrease with increasing life weight. The in-edible part of Sentul chicken, age 6 weeks is still growing at the peak of maximum growth, at the age of 8 weeks ago it decreased to 12 weeks [2]. The head and feet are the external organs of the body which are. Parts of internal organs except reproductive organs on the body of livestock are parts of the body that cook early because it is important in providing substances produced by metabolism for growth, as well as parts of the head and feet, because the head is a very important organ in regulating all livestock

life, namely the brain, while feet are an important tool in finding food from hatching [2]. The in-edible weight of this study was calculated in the form of a percentage, the results obtained were 32.74-38.48 percent. Card [1] argues that in-edible percentages vary, ranging from 20-35 percent of body weight.

CONCLUSIONS

Based on the results of the study it can be concluded that:

1. Giving the mangosteen skin meal (Garcinia mangostana L) gives Real influence on the edible weight of Sentul chicken, but not affect the inedible weight of Sentul chicken.

2. The administration of mangosteen skin meal produces the most edible weight average high in the addition of 7.5% mangosteen skin meal, while for the lowest inedible results the results are at addition of 2.5% mangosteen skin meal (2.5%)

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