



RESEARCH ARTICLE

MEAT QUALITY OF BROILER CHICKEN AFFECTED BY SUPPLEMENTATION OF COMBINATION GEMBILI TUBER FLOUR AND LACTOBACILLUS PLANTARUM

Sri Setyaningrum, Dini Julia Sari Siregar and Tengku Gilang Pradana

Faculty of Science and Technology, University of Pembangunan Panca Budi, Medan, Indonesia.

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Abstract

The objective of this research was to determine the meat quality of broiler chicken affected by supplementation of combination of gembili tuber flour and *Lactobacillus plantarum*. A total of 144 of day-old-chick of broiler chicken was used in this research. The experimental design was used in this research was completely randomized design consist of 6 treatments and 4 replicates. The treatment supplementation of synbiotic were T0: control (synbiotic 0%), T1: 1.0% of synbiotic, T2: 1.5% of synbiotic, T3: 2.0% of synbiotic, T4: 2.5% of synbiotic and P5: 3.0% of synbiotic. Parameter observed were pH, drip loss and cooking loss. The research showed that supplementation of synbiotic significantly ($p < 0.05$) on pH of meat broiler chicken but not different effect on drip loss and cooking loss of meat broiler chicken.

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Introduction:-

The use of antibiotic growth promoter (AGP) antibiotics in order to improve the growth performance of livestock has been carried out for a long time [1,2]. However, along with the negative effects resulted from the utilization of antibiotic growth promoters, that was caused antibiotic resistance and residues in livestock products, so the used of AGP has been banned [3]. Needed an alternative the use of AGP by utilizing of synbiotics. Synbiotic was a combination of prebiotic and probiotic that was improved the activity beneficial of microbial in the digestive tract of the host [4,5]. There were various types of prebiotics and probiotics that have been used as an alternative of AGP. In this research, the synbiotic used was the local prebiotic in the form of gembili tuber flour combined with the probiotic *Lactobacillus plantarum*.

Gembili tuber contains of 14.77% inulin and was able to supported the growth of *Lactobacillus plantarum* [6,7]. The results of previous studies the used of synbiotics from the combination of gembili tuber flour and *Lactobacillus plantarum* were able to increase the carcass of native chickens [8]. The used of synbiotics not only to increase the growth performance but also known to play a role in improved the meat quality of broiler.

Several studies have been showed that the use of synbiotics can be improve the meat quality of broiler including pH, drip loss and cooking loss [1,9,10,11]. Based on that, this research was to determine the meat quality of broiler chicken affected by supplementation of combination of gembili tuber flour and *Lactobacillus plantarum*.

Corresponding Author:- Sri Setyaningrum

Address:- Faculty of Science and Technology, University of Pembangunan Panca Budi, Medan, Indonesia, Jl. GatotSubroto Km. 4,5 Medan, North Sumatera, Indonesia.

Material and Methods:-

Manufactured of Synbiotic (combination of gembili tuber flour and *Lactobacillus plantarum*)

Manufactured of synbiotic was conduct by gembili tuber flour mixing with 5% of *Lactobacillus plantarum* (1×10^9 cfu/ml). Then incubated of the mixture at 37 °C for 4 d.

Treatments and collecting data

This research used 144 of day-old-chick of broiler chicken, diet and combination of gembili tuber flour and *Lactobacillus plantarum* (synbiotic). The composition formulation of diet showed at Table 1. The treatment supplementation of synbiotic were T0: control (synbiotic 0%), T1: 1.0% of synbiotic, T2: 1.5% of synbiotic, T3: 2.0% of synbiotic, T4: 2.5% of synbiotic and P5: 3.0% of synbiotic. Parameters observed were pH, drip loss and cooking loss.

Table 1:- Experimental basal diet.

Ingredient (%)	Starter (d 1-21)	Finisher (d 22-42)
Rice bran	6.00	10.00
Corn	49.30	51.90
Fish meal	10.00	10.00
Soy bean meal	31.20	26.00
Premix ¹	1.00	0.60
Palm oil	2.50	1.50
Total	100	100
Nutrient composition of diet		
Crude eter (%)	5.40	5.28
Calcium (%)	1.08	1.02
Phosphor (%)	0.75	0.60
Crude protein (%)	22.37	20.62
Metabolizable Energy (kcal/kg)	3048.09	3020.19
Crude fiber (%)	5.64	6.79

The treatment given at the birds during 42 d. The bird placed into 6 treatments and 4 replicate (24 experimental units). Data of pH, drip loss and cooking loss was collected at the end of experiment used of one bird from each replicate was randomly selected. The birds then fasted, weighed and slaughtered, de-feathered and eviscerated. The breast and thigh meat were collected to measurement of pH, drip loss and cooking loss at 24 h postmortem. Measurement of pH based on [12] with modification. Drip loss conducted based on [13] methods with some modification. Cooking loss based on modification of methods [14].

Statistical analysis

Completely randomized design (CRD) used in this research with 6 treatments with 4 replicates. Data obtained in this research were analyzed used of one-way of analysis variance and when there were significant between treatments was followed Duncan's multiple range test.

Result:-

The research showed that the supplementation of synbiotic from combination of gembili tuber flour and *Lactobacillus plantarum* significantly ($p < 0.05$) on pH, but did not effect on drip loss and cooking loss of meat broiler chicken. Data of meat quality (pH, drip loss and cooking loss) of broiler chicken showed at Table 2.

Table 2:- The average of meat quality of broilers chicken.

Parameters	Treatments					
	T0	T1	T2	T3	T4	T5
Breast meat						
pH	6.40 ^a	6.30 ^a	5.86 ^b	5.60 ^c	5.64 ^c	5.56 ^c
Drip Loss (%)	1.81	1.80	1.42	1.56	1.72	1.73
Cooking Loss (%)	33.12	30.73	30.30	30.00	31.64	30.95

Thigh meat						
pH	6.47 ^a	6.44 ^a	6.12 ^b	5.87 ^c	5.82 ^c	5.73 ^c
Drip Loss (%)	1.92	1.84	1.80	1.67	1.74	1.55
Cooking Loss (%)	34.23	31.76	32.95	31.55	33.97	33.03

Means of different letter on the same row indicate of significant different ($p < 0.05$)

pH value

The result of research showed that the treatment significantly difference ($p < 0.05$) on pH of meat broiler chicken. The average of pH in this research within in range pH based on [15]. The muscle pH was used as an indicator to determine of the meat quality [2]. The study showed that the supplementation of synbiotic decrease the pH of meat in broiler chicken. This was in line with [16], supplementation of synbiotic also decrease the pH of meat. [2] also reported that the supplementation of probiotic, antibiotic and antibiotic-probiotic mix also influenced the decline of pH of meat at 24 h postmortem.

The result of the research was similar with [17], supplementation of probiotic had significant effect decreased the pH of broiler leg muscle after 5 h postmortem. [13], reported that supplementation of chestnut wood extract significant effect on breast muscle pH of broiler chicken. Contrary with [18], supplementation of turmeric rhizome extract did not influence on pH of muscle.

Drip Loss

The average data of drip loss meat of broiler chicken presented at Table 2. The highest of drip loss of breast meat achieved at the chicken without supplementation of synbiotic (T0) as 1.81% and the lowest of drip loss at supplementation of synbiotic 1.5% (T2) as 1.42%. Drip loss of thigh meat the highest at T0 as 1.92% and the lower T5 as 1.55%. Drip loss was an important factor in meat quality because it will be affected on the loss of some nutrients during exudation due to the water loss [19]. [11] report that the supplementation of synbiotic reduced the drip loss of meat breast and leg of broiler chicken. [20], administration of *Saccharomyces cerevisiae* probiotic did not change the drip loss of broiler chicken.

The supplementation of synbiotic from combination of gembili tuber flour and *Lactobacillus plantarum* did not affect ($p > 0.05$) on drip loss of meat broiler chicken. The research was line with [21], supplementation of cassava pulp fermented with *Acremonium charticola* did not effect on drip loss of breast meat broiler. However, the research contrast with the [22], supplementation of probiotic significant effect on drip loss of breast meat broiler. [11] also reported that the supplementation of synbiotic had significant effect on drip loss of leg and breast meat of broiler.

Cooking loss

The average data of cooking loss was presented at Table 2. The treatment of supplementation of synbiotic did not significant effect ($p > 0.05$) on cooking loss of breast meat or thigh meat of broiler chicken. Data of cooking loss meat of broiler chicken at breast meat were 30.00 – 33.12% and the thigh meat were 31.55% - 34.23%. The highest of cooking loss at breast meat achieved at the treatments without supplementation of synbiotic (T0) as 33.12% and the lowest of cooking loss at supplementation of synbiotic 2% (T3) as 30.00%. The highest of cooking loss thigh meat at T0 as 34.23% and the lower was T3 as 31.55%.

Based on the research, the treatment of supplementation of synbiotic not influenced of cooking loss at breast or thigh meat of broiler chicken. This research was consistent with the [14], reported that administration of probiotic not resulted the differences of cooking loss meat broiler chicken. But this research inconsistent with [23], administration of probiotic influenced of cooking loss of meat indigenous chicken.

Conclusion:-

The conclusion of the research was the supplementation of synbiotic from combination gembili tuber and *Lactobacillus plantarum* had positive effect on meat quality of broiler chicken.

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