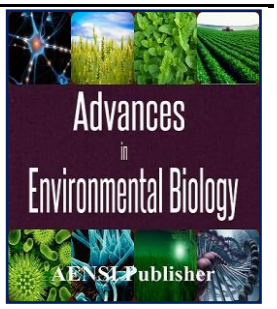
Advances in Environmental Biology, 9(23) October 2015, Pages: 68-70

AENSI Journals

Advances in Environmental Biology

ISSN-1995-0756 EISSN-1998-1066

Journal home page: http://www.aensiweb.com/AEB/



The Effects of Fermented Heaps of *Bacillus mycoides* Addition to the Broiler Feeds on the Meat Protein, Fat, and Cholesterol Contents

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ARTICLE INFO

Article history:
Received 28 September 2015
Accepted 15 November 2015
Available online 24 November 2015

Keywords:
heaps, *Bacillus mycoides*, meat protein content, fat, cholesterol, broiler

ABSTRACT

Background: An experiment was conducted to determine the effect of *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed on meat protein content, fat, and cholesterol of broiler chicken. **Objectives:** The study utilizes 32 broiler strain Ross from PT Charoen Pokphand Jaya Farma at one day of age (DOC), and they are raised up to 35 days of age. Design applied herein is completely randomized design by 4 treatments and 4 repetitions where every repetition has 2 broilers. Treatments consist of P0 (controlled feed/no fermented-heaps), P1 (feed by 10% fermented-heaps), P2 (feed by 20% fermented-heaps) and P3 (feed by 30% fermented-heaps). Observed variables are meat protein, fat, and cholesterol content. **Results:** The findings indicate that *Bacillus mycoides*-fermented heaps addition to the feed by has real effect ($P < 0.05$) in increasing meat protein content and decreasing meat fat and cholesterol content of broiler. **Conclusion**: Average meat protein content are P0 = 18,5315%; P1 = 18,9633%; P2 = 19,184%; and P3 = 19,862%. Average meat fat content are P0 = 4,6285%; P1 = 4,4813%; P2 = 4,338%; and P3 = 4,2203%. Average meat cholesterol content are P0 = 95,0598 mg/100g; P1 = 89,2953 mg/100g; P2 = 84,4263 mg/100g; and P3 = 79,2435 mg/100g.

To Cite This Article: Ulfah Utami**,** Alfi Hidayah and Sukarsono., The Effects of Fermented Heaps of *Bacillus mycoides* Addition to the Broiler Feeds on the Meat Protein, Fat, and Cholesterol Contents. ***Adv. Environ. Biol., 9(23),*** *68-70, 2015*

INTRODUCTION

Broiler chicken is an animal protein source commonly liked and eaten by Indonesian. Based on Statistics Ranch Indonesia in 2014, broiler population increased from 1.24 billion in 2012 to 1.35 billion in 2013. The chemical composition of broiler meat consists of 65.95% water, 18.6% protein, 15.06% fat and 0,79%. High fat percentage in broiler meat can cause problems for human health such as obesity and terosklerosis. High fat content in broiler decreases feed efficiency. It happened because the more energy in the feed will be stored as fat. It encourages stockbreeders to improve the production, quality and livestock health, so can produce animal protein quality and safe for consumption.

Feeding broiler chicken with a high fiber content can decrease the fat content of the carcass. The mechanism of action of fiber in the digestive tract of chicken is partially bind to bile salts released through excreta, because most of the bile salts removed, the body needs to synthesize bile salts are derived from cholesterol in the body so the body can decrease cholesterol [1].

Based on research [2] *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed up to 30% percentage can maintain the performance of broiler on feed conversion and carcass percentage parameters. The aim of this research is to determine the effect of *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed on meat protein content, fat, and cholesterol of broiler.

Methodology:

The study was conducted in broiler husbandry Ploso, Selopuro-Blitar and Chemistry Laboratory. The study utilized 32 broiler strain Ross from PT Charoen Pokphand Jaya Farma at one day of age (DOC). The cages are 16 units with food and drink places, and lamps as a source of heat and light. Design applied herein is completely randomized design by 4 treatments and 4 repetitions where every repetition has 2 broilers. Treatments consist of P0 (controlled feed/no fermented-heaps), P1 (feed by 10% fermented-heaps), P2 (feed by 20% fermented-heaps)

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and P3 (feed by 30% fermented-heaps). Feed and drinking water provided ad libitum (continuously). Nutrient content of the treatments are shown in Table 1.

Observed variables are chemical quality of broiler meat consist of meat protein, fat, and cholesterol content. Data yang diperoleh dianalisis menggunakan ANOVA *One Way* dan Data were analyzed using One Way ANOVA and if the results is significant continued by the Least Significant Difference Test (BNT) 5%.

Table 1: Nutrient content of the Broiler chicken feeds treatments.

Nutrient Content	Treatments			
	P0	P1	P2	P3
Dry Matter (%)	86,56	85,96	85,74	85,36
Ash* (%)	6,06	5,85	5,71	6,31
Crude Protein* (%)	24,44	22,65	21,06	19,05
Crude Fibre* (%)	3,91	5,18	6,51	7,74
Crude Fat* (%)	5,51	4,90	4,44	4,31

*) Based on 100% dry matter
Results of Nutrition and Food Animal Husbandry Laboratory University of Brawijaya Malang

RESULTS AND DISCUSSION

The Effect of *Bacillus mycoides*-Fermented Tapioca by Product (Heaps) Addition to the Feed on Meat Protein Content, Fat, And Cholesterol of Broiler chicken are shown in Table 2.

Table 2: The Averages of Meat Protein Content, Fat, and Cholesterol of broiler at 35 Day of Age.

Variables	Treatments			
	P0	P1	P2	P3
Meat protein content (%)	$18,5315^{a}$	$18,9633^{b}$	$19,184^{b}$	$19,862^{c}$
Meat fat content (%)	$4,6285^{a}$	$4,48125^{ab}$	$4,338^{bc}$	$4,22^{c}$
Meat cholesterol content (mg/100g)	$95,0598^{a}$	$89,2953^{b}$	$84,4263^{c}$	$79,2435^{d}$

Results of Chemical Analysis Laboratory, University of Muhammadiyah Malang
Remarks: The notation is not the same superscript in the same row indicate significant effect ($P < 0.05$)

(i) The Effect of Bacillus mycoides-Fermented Tapioca by Product (Heaps) Addition to the Feed on Meat Protein Content:

Table 2 showed that the higest meat protein content is P3 (19,862 %); then P2 (19,184 %) ; P1 (18,9633 %) and the lower is P0 (18,5315 %). To determine the significance of the effect of *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed on meat protein content performed statistical analysis.

The findings indicate that *Bacillus mycoides*-fermented heaps addition to the feed by has real effect ($P<0,05$) in increasing meat protein content. This is due to the feed containing *Bacillus mycoides*. *Bacillus sp.* capable of producing the enzyme protease [3] and amylase [4] can enhance energy metabolism and protein digestibility due to enzyme protease [5]. Meat protein content is closely related to the feed has enough nutritional value as well as a good digestive system. The addition of *Bacillus sp*. in feed potential to provide the protein requirements of broiler feed [6]. Feed fermented by microorganism been recast so that the simpler organic feed contained therein will be more easily absorbed by the body. This is due to the fermentation produces certain enzymes that can break down proteins into amino acids so it is more easily absorbed by the body and utilization of nutrients for growth to be better [7].

(ii) The Effect of Bacillus mycoides-Fermented Tapioca by Product (Heaps) Addition to the Feed on Meat Fat Content:

Based on Table 2 it can be seen that P0 has the highest fat content of meat (4.6285%), followed by P1 (4.48125%), P2 (4.338%), and the lowest is P3 treatment (4.22%). This indicates that the heaps fermented by *Bacillus mycoides* addition in the feed can reduce levels of fat in meat broiler. Furthermore, to determine the significance of the effect of *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed on meat fat content performed statistical analysis. The findings indicate that *Bacillus mycoides*-fermented heaps addition to the feed by has real effect ($P<0,05$) in decreasing meat fat content. The decreasing of meat fat content as the effect of heaps fermented by *Bacillus mycoides* addition in the feed. It is cause the ability of genus *Bacillus sp.* to increase the activity of the enzyme lipase to break down fat, so the fat content of meat decreased [8].

(iii) The Effect of Bacillus mycoides-Fermented Tapioca by Product (Heaps) Addition to the Feed on Meat Cholesterol Content:

Table 2 shows that the highest meat cholesterol content is at P0 (95.0598 mg /100g); then followed by P1 treatment (89.2953 mg / 100g); P2 treatment (84.4263 mg/100g) and the lowest is P3 treatment (79.2435 mg /

100g). Furthermore, to determine the significance of the effect of *Bacillus mycoides*-fermented tapioca by product (heaps) addition to the feed on meat cholesterol content performed statistical analysis.

The findings indicate that *Bacillus mycoides*-fermented heaps addition to the feed by has real effect (P<0,05) in decreasing meat cholesterol content. The decreasing of meat cholesterol content is also consistent with decreasing in meat fat content. There is a tendency meat cholesterol content decreased with increasing level of addition of heaps fermented by *Bacillus mycoides* in the feed. Crude fiber content lowest found in PO treatment (without the addition of fermented heaps) amounted to 3.91% , then P1 treatment (5.18%) , P2 treatmen (6.51%), and P3 treatment (7.74%) (Table 1). The fiber has the ability to bind cholesterol so that the cholesterol content of the feces will increase [9].

Conclusion:

The results of this study show the substitution of concentrate in Broiler chicken feeds with heaps fermented up to 30% (P3 treatment) successful in increasing meat protein content and decreasing meat fat and cholesterol content of Broiler chicken.

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