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Nutritional Content of Finisher Phase Boiler Chicken Rations Containing Fermented Bean Sprouts Waste Flour

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Abstract

The ration must meet quality requirements because the provision of the quality ration is an important factor that determines the success of broiler chicken farming. Bean sprouts waste flour has the potential as one of the ingredients in broiler chicken ration and is a source of vegetable protein. Protein content in bean sprouts waste flourishes quite high, but the crude fiber content is also high so fermentation needs to be done to improve digestibility and nutritional quality. The quality of feed ingredients that form the ration greatly influences the final product made, which is ration. The purpose of this study was to determine with certainty the water content, ash content, BETN, and ME of finisher phase broiler chicken rations containing fermented bean sprouts waste flour by proximate analysis. This research was conducted using a completely randomized design (CRD) with 4 treatments and 3 replications in each treatment. The treatments applied were P0 = rations without fermented bean sprouts waste flour, P1 = rations with 3% bean sprouts waste flour, P2 = rations with 6% bean sprouts waste flour and P3 = rations with 9% Bean sprouts waste flour The variables analyzed were water content, ash content, BETN and ME ration. The results of this study indicate the use of fermented bean sprouts waste flour in finisher phase broiler chicken ration significantly (P<0.05) on the variable water content, ash content, BETN and ME ration. From the results of this study, it can be concluded that there was an increase in water content but the ash content, BETN and ME decreased in broiler chicken rations using fermented bean sprouts waste flour, and the ration that was most close to the standard requirement for finisher phase broiler chickens was rations using 6% bean sprouts waste flour

Keywords: *Broilers, Chemical Quality, Fermented Waste Flour Tauge*

1. Introduction

The ration is a mixture of several feed ingredients given to livestock to meet the needs of one day for various body functions, such as basic living, production, and reproduction. The ration contains several food substances including water, energy, fat, protein, minerals and vitamins [1]. Nutrients contained in rations that match livestock needs will support good productivity.

Feed ingredients are components or compilers of a mixture of feed [2]. The formulation of the ration formula needs to pay attention to the quality of the material (physical, chemical and biological), low prices, ease of obtaining, no negative effects, not competing with humans and sustainable availability. The ingredients of the ration can be in the form of components of agricultural waste, agricultural products, by-products of agriculture and plantation industries, fishery and livestock by-products, market waste and hotel and restaurant waste.

Bean sprouts waste flour is quite a lot, but its use for the ingredients of chicken rations is still limited [3]. Bean sprouts waste flour has high levels of crude protein and crude fiber. The use of bean sprouts waste flour in broiler chicken rations is as a source of vegetable protein. However, the high crude fiber content in bean sprouts waste flour can reduce digestibility and livestock productivity [4]. Ref [1] stated the protein content and crude fiber of bean sprouts waste flour was

13.60% and 49.44%. Levels of crude fiber Bean sprouts waste flour must be reduced through the fermentation process. Fermentation is the process of converting organic material into other more useful materials with the help of controlled microorganisms. The purpose of fermentation is to increase the nutritional content, increase the digestion, increase shelf life, increase sales value, and reduce anti-nutrient substances.

The ration quality requirements for finisher phase broiler chickens include a maximum water content of 14%, maximum ash of 8% and a minimum of 2,600 kcal/kg of metabolized energy [5] and [6]. As an assessment of the quality of the ration, chemical tests are used. Chemical testing generally uses proximate analysis, which is a method of chemical analysis to identify the nutritional content of the ration. Tests with chemical tests will get definite data about the nutritional content of the ration. Based on the description above, it is necessary to research to test the nutritional content of the ration using fermented Bean sprouts waste flour

2. Material and Methods

2.1 Place and Time Research

The research was conducted at the Laboratory of Basic Sciences, Faculty of Agriculture, Warmadewa University and at the Laboratory of Nutrition and Animal Feed, Udayana University, Denpasar. The study began in May 2019 and ended in December 2019.

2.2 Research Materials

The study used a completely randomized design with 4 treatments and 3 replications in each treatment. The treatments applied were P0 = rations without fermented Waste flour tauge, P1 = rations with 3% Waste flour tauge, P2 = rations with 6% Bean sprouts waste flour and P3 = rations with 9% Bean sprouts waste flour

2.4 Research Variabel and Data analysis

The variables analyzed were water content, ash content, BETN, and ME ration. The data obtained were analyzed by analysis of variance, if there were significantly different results ($P<0.05$) then proceed with the smallest real distance test from Duncan [7].

3. Results and Discussion

3.1 Moisture Content

The range of water content in the research ration was 6.67% - 7.67%. The water content contained in the ration, showed significantly different results ($P <0.05$) in the ration using fermented bean sprouts waste flour This can be explained because, during the fermentation process of bean sprouts flour, there is the addition of water to thin the molasses and EM-4. Besides, when the fermentation process takes place, the use of energy by microorganisms from EM-4 produces byproducts in the form of water. [8] states, the increase in water content after fermentation is caused by the metabolism of microorganisms that produce CO_2 and H_2O. The water content of bean sprouts before fermentation (5.05%) and after fermentation (12.45%) will affect the water content of the rations in P1, P2, and P3.

Water content is the percentage of the water content of a material that can be expressed based on wet weight or dry weight. The water content of a material is one indicator of the quality of a material. According to [5] regarding poultry feed ingredients, the water content for poultry feed

ingredients should not be more than 14%. The value of research ration water content ranged between 6.67% - 7.67%, this value is lower than the standard stipulated by [5], meaning that the research ration water content is still at a safe limit. Moisture content is at a safe limit, in addition to protecting the material from fungi producing aflatoxin, it also increases the concentration of nutrients in the material. Also explained by [9], that differences in ration water content can be caused by differences in the ingredients of ration, temperature, the humidity of the surrounding environment during the measurement process that allows the absorption of water from the air. Water content in feed ingredients influences the resistance against microorganisms, so it can affect the shelf life of feed ingredients. Feed material with high water content is easier to mold and rot [10]. The greater the water content in the material will also tend the availability of free water that can be used for metabolism by microorganisms. High water activity has an impact on the increasing number of microorganisms that grow on the material during storage.

3.2 Ash Content

The results of the analysis of the ash content of the research ration ranged from 7.47% to 9.19%. The ash content of the P2 ration was significantly different ($P < 0.05$) from the other ash content of the ration, as presented in Table 1. The ash content of the ration was largely determined by the constituent feed ingredients. [11] states that ash content depends on the type of material and is related to the mineral of a material.

The standard ash content of finisher broiler chicken ration according to the Indonesian National Standard [12] is 5.0% - 8.0%. The value of ration ash content in P2 of 7.47% is within the specified standard limits. While the value of ration ash content at P0, P1, and P3 (9.14%, 9.19%, and 8.72%) is higher than the standard. This can be explained that organic matter in the rations P0, P1, and P3 such as protein, fat, crude fiber, and BETN are less decomposed so that the ash content does not decrease much. Described by [11] that the less organic material is degraded, the less ash will decrease.

Ash is an inorganic substance from the combustion residue of organic material. Organic materials in the combustion process will burn but the inorganic components do not. Because that's called ash content[13], an ingredient not only contains water but also contains minerals or inorganic compounds. The content of ash in an ingredient affects the quality of the material. Determination of total ash content can be used to determine the nutritional value parameters of an ingredient.

3.3 Materials Without Nitrogen (BETN)

Extract material without nitrogen is part of food containing carbohydrates, sugars, and starches which are a group of carbohydrates that are soluble [10]. The BETN ration of the research decreased in line with the increase in the level of fermented bean sprouts waste flour. The results obtained are likely due to increased crude fiber content in rations containing fermented bean sprouts waste flour. Crude fiber is a food that is not soluble and is difficult to digest by poultry. [14] stated that increasing the crude fiber content of a feed ingredient would decrease its BETN content. The BETN ration content is highly dependent on other components, such as water, ash, crude protein, crude fat, and crude fiber. Decreasing BETN levels in terms of nutrition is less beneficial because the less BETN, the less the component of organic matter can be digested so that the less energy produced [15].

Table 1
Nutritional Content of Proximate Analysis Research Ration

Nutrition	Treatment				Standard
	P0	P1	P2	P3	
Water content (%)[1)]	6.67[c]	7.03[bc]	7.67[a]	7.59[ab]	10 maks 14[*]
Ask content (%)[1)]	9.14[a]	9.19[a]	7.47[b]	8.72[a]	5-8[**]
BETN (%)[3)]	64.38[a]	59.40[b]	59.42[b]	57.68[c]	-
ME (kkal/kg)[3]	3099.62[a]	3017.71[bc]	3034.99[b]	2975.13[c]	2900 - 3200[*]

Information :
1. Analysis Result of Warmadewa Faculty of Agriculture Basic Sciences, 2019
2. Analysis Results of Udayana University's Animal Science and Food Laboratory, 2019
3. Calculation Results with Formulas
   BETN = {100- (Ash + CP + LK + SK)}
   EM = 40.81 {0.87 (PK + 2.25LK + BETN} + k (Banton, 1983)

** Indonesian National Standard, 2006
* Indonesian National Standard, 2008

4. Conclusions

Based on the results of this study it can be concluded that: Finisher phase broiler chicken feed using fermented bean sprouts flour has increased water content, but a decrease in ash, BETN and ME levels compared to diets that do not contain fermented bean sprouts waste flour. The research ration that most closely matches the finisher phase requirements of broiler chickens is ration using 6% fermented bean sprouts flour because the nutritional content of rations such as water content, ash content, and ME are within the standard limits set by SNI (2006) and SNI (2008).

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