



Chemical Quality Analysis of Meal Quail Meat with Rations Containing Fermented Bean Sprouts Waste Flour

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ABSTRACT

Quail is one of the poultry that has the potential to be developed as a source of diversification for meat and egg products. Bean sprouts have high levels of crude protein and crude fiber, so fermentation is necessary. The amount of ration costs range from 60-80% of all production costs. This study aims to determine the chemical quality of male quail meat given rations containing fermented bean sprout waste and to compare the various levels of bean sprout flour in the ration to the chemical quality of male quail meat. This research was conducted using a completely randomized design (CRD) with 4 treatments and 4 replications for each treatment. The treatments consisted of rations without the addition of fermented bean sprouts waste flour (TLTF) (P0), rations with 5% TLTF (P1), rations with 10% TLTF (P2), and rations with 15% TLTF (P3). The variables analyzed were water content, ash content, crude fat, and pH. The results of this study indicate that the provision of rations containing fermented bean sprout waste does not affect the quality of male quail meat.

1. INTRODUCTION

1.1. Research Background

In line with the awareness of nutrition, especially in the middle to lower class, there is also increasing demand for livestock products which are a source of protein. The population of quail in Indonesia is increasing from year to year. The population of quail in Indonesia from 2012 to 2016 was 12,234,188 to 13,932,649, while in Central Java the population of quails was 4,827,825 to 4,771,680 [1].

Quail is one of the poultry that has great potential to be developed as a source of diversification of meat and egg products to support the increase in the need for animal protein sources in fulfilling community nutrition. Eggs and quail meat have high nutritional content and are not inferior to eggs and other poultry meat [2].

The quail used in this study was the Japanese quail (*Coturnix-coturnix japonica*) because there are several considerations, namely rapid growth, early sexual maturity, relatively high egg production, short generation intervals, resistance to disease, high metabolism and can be farmed on land that is not so large [3].

An important factor that determines the success of a livestock business is the provision of quality rations. The amount of ration costs range from 60-80% of all production costs, so the quality of the ration must be maintained and maintained. Good and quality rations must meet quality requirements covering aspects of safety, health aspects, and economic aspects.

A ration is a finished material that is a mixture of several feed ingredients that are given to livestock to meet the needs of one day for various body functions, such as basic life, production, and reproduction. Rations contain several nutrients including water, energy, fat, protein, minerals, and vitamins [4]. Feed raw material is a part or preparation of a combination or mixture of feed [5]. The preparation of the ration formula needs to pay attention to the quality of raw materials (physical, chemical, and biological), low prices, easy access, no negative effects, not competitive with humans, and sustainable availability. The raw materials for the ration can be components of agricultural waste, agricultural products, agricultural and plantation by-products, fishery and livestock by-products, market waste, and hotel and restaurant waste. Some of these ingredients are commonly used as a compiler for rations, such as yellow corn, rice bran, soybean meal, fish meal, and coconut oil, except for bean sprouts.

There are quite a lot of bean sprouts available, but their use for quail rations is still limited. Green bean sprout waste has high crude protein and crude fiber content. The use of bean sprout wastes in quail rations as an addition to vegetable protein. The protein content in the diet of livestock is needed for basic living, new tissue growth, repair of damaged tissue, and metabolism for energy and production [6]. However, the high crude fiber content contained in green bean sprouts can reduce digestibility and livestock productivity. Ref. [7] stated that the protein and crude fiber content of green bean sprouts was 13.60% and 49.44%. The crude fiber content of bean sprouts must be lowered through the fermentation process. Fermentation is the process of converting organic material into other more useful materials with the help of microorganisms in a controlled manner. The purpose of fermentation is to reduce anti-nutritional substances, improve digestibility, increase storage time and increase selling value. In general, all fermentation end products usually contain compounds that are simpler and easier to digest than the original material [8].

The quality of the feed ingredients for the rations and the process of making the rations greatly affect the final product, namely the ration. Good quality feed ingredients will produce a good final product and vice versa if poor quality feed ingredients will produce a bad final product [9]. Currently, the quality of feed ingredients varies. Many factors influence the diversity of feed ingredients. Among them, climate change, differences in suppliers, places to grow, and manufacturing processes have allowed a decrease in the quality of the ration.

In addition to eggs, quail meat also has very good nutritional content, with details of the nutritional content of quail meat per 100g having 227 calories (kcal), 14g fat, 86mg cholesterol, 52mg sodium, 216mg potassium, 25g protein, vitamins, and calcium. In addition, the taste of quail meat is not inferior to other poultry meat [10].

1.2. Research Objective

This study aims to determine the chemical quality of male quail meat given rations containing fermented bean sprout waste and to compare the various levels of bean sprout flour in the ration to the chemical quality of male quail meat

2. MATERIALS AND METHOD

2.1. Research methods

The study used a completely randomized design with 4 treatments and 4 replications. The treatments applied are in Table 1.

Table 1. Chemical content of male quail meat from proximate analysis results

Chemical analysis	Treatment			
	P0	P1	P2	P3
Water content (%)	71.94 a	71.82 a	71.95 a	71.74 a
Ash content (%)	2.01 a	2.15 a	2.26 a	2.16 a
Fat content (%)	6.27 a	6.29 a	7.53 a	7.71 a
pH	5.75 a	5.66 a	5.69 a	5.52 a

The same letter on the same line shows insignificantly different results ($P > 0.05$).

3.1. Water Content of Male Quail

The range of water content of male quail meat given rations containing fermented bean sprouts waste flour in this study were

P0 = ration without the addition of fermented bean sprouts waste flour

P1 = ration with 5% addition of fermented bean sprouts flour waste

P2 = ration with 10% addition of fermented bean sprouts waste flour

P3 = ration with 15% addition of fermented bean sprouts flour waste

2.2. Materials and Equipments

This study used 100 grams of male quail meat. The materials used are petroleum benzene. The tools used are heat mantle, Soxhlet, muffle furnace, knife, plastic, cutting board, basin, stove, pH meter, beaker glass, scale, stirring rod, porcelain cup, and oven.

2.3. Observed Variables

The parameters observed were water content analysis, ash content analysis, fat content analysis, and pH analysis.

2.4. Statistic Analysis

The data obtained were analyzed by analysis of variance, if there were significantly different results ($P < 0.05$) then it was followed by Duncan's New Multiple Range Test [16].

3. RESULT AND DISCUSSION

In this study, male quail were given rations with treatment without containing fermented bean sprout waste and rations containing fermented bean sprout waste. Male quail meat according to the treatment was then analyzed in the laboratory with parameters of water content analysis, ash content analysis, fat content analysis, and pH analysis. From the results of the analysis, it was continued with the analysis of the variance test. Based on the results of statistical analysis, it was found that male quail meat which was given rations without adding fermented bean sprout flour was not significantly different ($P > 0.05$) from male quail meat given rations containing fermented bean sprouts waste flour in all treatments (Table 1).

71.74% to 71.95%. The water content of male quail meat was not significantly different ($P > 0.05$). In general, the chemical composition of meat consists of 70% water, 20% protein, 9% fat, and 1% ash. According to Ref. [17] quail meat contains 72.5-

75.1% water, 20-23.4% protein, 1.0-3.4% fat and 1.2-1.6% minerals.

In the results of this study, the water content of male quail meat which was given rations containing fermented bean sprout waste showed no significant difference ($P > 0.05$). This is due to the fermentation process in bean sprout waste. The high crude fiber content and low protein value of local feed ingredients are one of the obstacles to its utilization which can be improved by fermentation techniques [12]. In principle, fermentation is a process of breeding selected microorganisms in bean sprout flour media with certain conditions so that these microorganisms can develop and change the chemical composition of bean sprouts to be of better nutritional value. Fermentation is often done using molasses because it is easier to grow on the media and the value of the fermentation yield is quite good [13].

3.2. Ash Content of Male Quail

The ash content of male quail meat given fermented bean sprouts waste flour in this study ranged from 2.01% to 2.26%. Statistically, all treatments were not significantly different ($P > 0.05$) as presented in Table 4.1 Ash content is a mixture of inorganic or mineral components contained in a material. Food consists of 96% organic matter and water, while the rest is mineral elements or ash content. The ash content in this study was not significantly different for all treatments compared to the control. This was because the quail which was given a ration containing fermented bean sprouts got almost the same nutritional consumption. The high crude fiber content and the low protein value of local feed ingredients is one of the constraints in its utilization, it can be improved by fermentation techniques [12].

3.3. Fat Content of Male Quail

The results showed that the fat content of male quail meat given rations containing fermented bean sprout waste ranged from 6.27% to 7.71%. Statistically, for all treatments, the results were not significantly different ($P > 0.05$). This is following the opinion [15] which states that quail meat is highly nutritious with a protein content of around 21.1% and a fairly low-fat content of 7.73%. Several factors affect meat quality, including age, feed, maintenance management, cage cleanliness, and the number of nutrients consumed. One of the factors that influenced the quality of the meat was the ration, the provision of rations containing fermented bean sprout waste to male quail in this study statistically showed no significant difference ($P > 0.05$). The value of fat content was not significantly different in each treatment compared to this control, due to the fermentation process which reduced the crude fiber content in the bean sprout flour, by breaking the complex components of food into simple components so that they were easily digested [11].

3.4. pH of Male Quail

The pH of male quail meat given fermented bean sprouts waste flour in this study was between 5.52-5.75 and statistically not significantly different for all treatments ($P > 0.05$). [14] stated that the normal pH of meat ranges from 5.4 to 5.8. The pH value of the meat is determined by the glycogen and lactic acid levels of the meat after being slaughtered. From these results, the pH of the meat is still in the normal range. The addition of fermented bean sprouts waste flour to the ration did not make much difference to the nutritional content of the treatment rations.

4. CONCLUSION

Statistically, from the results of the study, giving fermented bean sprouts waste flour to male quail rations did not reduce the chemical quality of male quail meat compared to the control, namely the ration without giving fermented bean sprouts waste flour.

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