



# Chemical Quality Analysis of Male Quick Meat with Rate Containing Fermented Rice Bran

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## A B S T R A C T

Quail is a small but fat land fowl. One of the most popular types of quail is the quail (*Coturnix coturnix japonica*). Quail is a diversified source of meat and egg products. In raising quail, the cost of feed is very high, reaching 70% of the total cost of quail production. Rice bran is an industrial waste that still has a high enough nutritional value but has the disadvantage that it contains high fiber, to overcome this, it needs to be fermented to improve the quality of the feed ingredients. The protein content of rice bran ranges from 8 -12%, rice bran is very taken into account in the preparation of poultry rations. This study used a completely randomized design with 5 treatments and 3 replications. Each replication consisted of 3 quail so the number of quail used was 45. The treatments were as follows: P0 = Treatment of 100% artificial ration, P1 = Treatment of 95% ration + 5% fermented rice bran, P2 = Treatment of 90% ration + 10% fermented rice bran, P3 = Treatment of 85% ration + 15 % fermented rice bran, P4 = treatment 80% ration + 10% fermented rice bran. The data obtained will be analyzed utilizing variance and if between treatments shows a significant effect, then proceed with Duncan's smallest real distance test. The results showed that the provision of rations containing fermented rice bran had no significant effect ( $P>0.05$ ) on the variables of Protein Content, Cooking Loss, and Water Holding Capacity, while the water content variable showed significant results ( $P<0.05$ ). At the level of administration, 20% fermented rice bran produced the optimal chemical quality of male quail meat.

## 1. INTRODUCTION

### 1.1. Background

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 is quail. Quail meat has very good nutritional content, with details of the nutritional content of quail meat per 100g containing calories (kcal) 227, fat 14g, cholesterol 86mg, sodium 52mg, potassium 216mg, protein 25g, vitamins, and calcium. In addition, the taste of quail meat is not inferior to other poultry meat [1].

One of the important factors that determine the success of a livestock business is the provision of quality rations in sufficient quantity. The cost of rations ranges from 60-80% of the total cost of production. Rice bran is used as animal feed because it has a fairly high nutritional content, the price is relatively cheap, easy to obtain, and its use does not compete with humans.

The protein content of bran which ranges from a minimum of 8 -12% of rice bran is very taken into account in the preparation of poultry rations. It should also be noted that the storage period of rice bran is due to its high-fat content in it which can cause rancidity (an indication that the bran is damaged). Rice bran is used as an energy source in poultry feed [2].

The crude fiber content of rice bran must be reduced through the fermentation process. Fermentation is the process of converting organic matter into other more useful materials with the help of microorganisms in a controlled manner. In general, all fermented end products usually contain compounds that are simpler and easier to digest than the original ingredients [3]. Based on the above, it is necessary to research to test the chemical quality of quail meat given fermented rice bran.

### 1.2. Literature Review

Quail (*Coturnix cortunix Japonica*) is one of the poultry commodities that produce meat and eggs that have good nutritional value and delicious taste. Quail has several advantages compared to other poultry, including fast growth, faster sexual maturity, and relatively high egg productivity. Quail can produce

250-300 eggs per year and the production costs are relatively cheap [4].

Ref. [5] stated that the nutritional content of quail meat is no different from other poultry. Based on the results of chemical composition analysis in the laboratory, quail meat contains 73.2% water; 22.5% protein; 2.5% fat; and 0.94% ash. Meanwhile, according to Ref. [6] the nutritional content of quail meat includes water 70.50%, fat 7.70%, protein 21.10%, ash 1%, calcium 129%, phosphorus 189%, iron 1.50%, thiamine 0.05%, 0.07% riboflavin, 5.20% niacin and 1.636 IU of vitamin A.

Rice bran is a by-product of the rice mill in producing rice. Rice bran is used as animal feed because it has a fairly high nutritional content, the price is relatively cheap, easy to obtain, and its use does not compete with humans. The main drawbacks of rice bran are its high crude fiber content and the presence of phytic acid compounds that can bind minerals and proteins, making it difficult for digestive enzymes to digest. This is the limiting factor for its use in the preparation of poultry rations. The protein content of bran which ranges from a minimum of 8 -12% of rice bran is very taken into account in the preparation of poultry rations.

The high crude fiber content and the low protein value of local feed ingredients, which are one of the obstacles to its utilization, can be improved by fermentation techniques [7]. In principle, fermentation is a process of cultivating selected microorganisms in media with certain conditions so that these microorganisms can develop and change the chemical composition of rice bran so that it becomes better nutritional value.

### 1.3. Research Objective

The purpose of this study was to determine the chemical quality of male quail meat given rations containing fermented rice bran, by measuring variables: water content, protein content, cooking loss, and water holding capacity of male quail meat.

## 2. Material and Method

### 2.1. Research Material

The materials used in this study were 45 male quail (*Coturnix-coturnix japonica* L.) aged 14 days with a body weight range of 39.3 - 52.16 g, fermented rice bran with levels of 0%, 5%, 10%, and 15%, 20%, commercial quail feed.

### 2.2. Research Location and Time

The research was conducted at Jalan Badak Agung X No.11, Br. Badak Sari, Sumerta Kelod, East Denpasar District and at the Laboratory of Basic Sciences, Faculty of Agriculture, Warmadewa University, Denpasar. The research will start in March 2022 and end in October 2022.

### 2.3. Research Method

The study used a completely randomized design with 5 treatments and 3 replications. Each replication consisted of 3 quail so the number of quail used was 45. The treatment is as follows:

P0 = Treatment of 100% artificial ration

P1 = Treatment of 95% ration + 5% fermented rice bran

P2 = Treatment of 90% ration + 10% fermented rice bran

P3 = Treatment of 85% ration + 15% fermented rice bran

P4 = Treatment 80% ration + 20% fermented rice bran

### 2.4. Observed Variable

Parameters observed were: water content, protein content, water holding capacity, cooking loss

### 2.5. Data Analysis

The data obtained were analyzed by analysis of variance, if between treatments there were significantly different results ( $P < 0.05$ ), then continued with Duncan's smallest real distance test [8].

## 3. Result and Discussion

Male quail meat according to treatment was then analyzed in the laboratory of the Faculty of Agriculture, the University of Warmadewa with the parameters observed: analysis of water content, analysis of protein content, analysis of cooking loss, and analysis of water holding capacity. The results of the analysis, it was followed by a test of analysis of variance. Based on the results of statistical analysis, it was found that male quail meat given rations without the addition of fermented rice bran had no significant difference ( $P > 0.05$ ) in the parameters of protein content, cooking loss, and water holding capacity with male quail meat is given various levels of ration. fermented rice bran except for water content the results were significantly different ( $P < 0.05$ ) (Table.1)

### 3.1. Water Content

The purpose of determining the water content is to provide a minimum limit or range of the amount of water content in the material [9]. The water content in feed ingredients (water activity) affects the growth of microorganisms. Bacteria and fungi require humidity above 85% for their growth [10]. The water content obtained in this study averaged 62.51 -69.68% per 100 g of quail meat, and the results of the variance test showed that there was a significant difference ( $P < 0.05$ ) between treatments P1 and P2, P3, and P4. The lowest percentage was shown in treatment P1 than P0, P3, and P4 while the highest was in P2. The method of determining the water content is influenced by the temperature and humidity of the workspace or laboratory. According to Ref. [11], quail meat contains 72.5-75.1 % water, 20-20.4% protein, 1.0-3.4% fat and 1.2-1.6 minerals.

### 3.2. Protein Content

From the results of the analysis of variance, the protein content values in all treatments were not significantly different ( $P > 0.05$ ). The protein levels obtained in this study ranged from 19.63 to 20.40, the lowest was in the P3 treatment, then P1, P0, and P2, and the highest in P4. In general, the composition of meat consists of 70% water, 20% protein, 9% fat, and 1% ash. According to [11], quail meat contains 72.5-75.1 % water, 20-20.4% protein, 1.0-3.4% fat and 1.2-1.6 minerals. Giving fermented rice bran did not affect the protein content of male quail meat. This is due to the fermentation process in rice bran which can reduce the crude fiber content and increase the protein content of rice bran. This is following the opinion of Ref. [7] who said that the high crude fiber and low protein content in the material can be improved by the fermentation process.

### 3.3. Cooking Loss

Cooking loss values in this study ranged from 32.00 – 35.79. Cooking loss is an indicator of the nutritional value of meat concerning the amount of water bound in and between muscle fibers. Meat with a lower cooking loss has better quality than the higher cooking loss [12]. The cooking loss value of broiler chickens aged 6-7 weeks is 24.89-34.57. The cooking loss value is closely related to the water holding capacity, the higher the water holding capacity, the less nutrient liquid comes out and is wasted in the cooking process so that the meat mass decreases slightly. The results of the analysis of cooking loss variance in this study showed that the results were not significantly different

( $P>0.05$ ) for all treatments. This shows that giving fermented rice bran to male quail rations does not affect the chemical quality of male quail meat. [6] said that cooking loss is influenced by temperature and cooking time. According to Ref. [13], cooking loss is a function of temperature and cooking time, because a large cooking loss indicates the number of nutrients lost during cooking.[14] said that the cooking implant decreased linearly with the increasing age of the livestock.

Table 1 Results of Analysis of Male Quail Meat Quality Given Various Levels of Fermented Rice Bran

| Observation Variable (%) | Treatment |         |         |         |         | SEM  |
|--------------------------|-----------|---------|---------|---------|---------|------|
|                          | P0        | P1      | P2      | P3      | P4      |      |
| Water Content            | 66.49 ab  | 62.51 b | 69.68 a | 69.35 a | 68.36 a | 0.90 |
| Protein Content          | 20.25 a   | 20.15 a | 20.40 a | 19.63 a | 20.67 a | 0.23 |
| Cooking loss             | 35.79 a   | 33.85 a | 32.28 a | 32.29 a | 32.00 a | 0.69 |
| Water Holding Capacity   | 32.92 a   | 33.48 a | 33.40 a | 32.30 a | 32.67 a | 0.48 |

Description: P0: control ration; P1: ration with 5% fermented rice bran; P3: ration with 15% fermented rice bran  
P4: ration with 20% fermented rice bran;

### 3.4. Cooking Loss

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### 3.5. Water Holding Capacity

The water holding capacity of the analysis of variance obtained in this study was not significantly different for all treatments ( $P>0.05$ ). This is probably due to the quail slaughtered at the same age and sex according to the opinion of [15]. According to Ref. [16], water binding capacity is the ability of meat protein to bind water, so the higher the protein contained in meat, the higher the water holding capacity. According to Ref.[17] several factors can cause variations in the water holding capacity of meat. Among them: are pH factors, and cooking or heating treatment factor. Also influenced by biological factors such as muscle type, type of livestock, sex, and age of livestock.

## 4. Conclusion

The Provision of fermented rice bran to male quail rations had no significant effect on protein content, cooking loss, and water holding capacity, but quantitatively the results increased and the best results were obtained at P1 which significantly reduced water content without lowering protein content. Giving fermented rice bran at the level of 20% produces optimal meat quality without reducing protein content. Based on the results of the study, it can be suggested that the addition of fermented rice bran by 20% still produces the same chemical quality of meat as the control.

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