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Performance of Peking Ducks (*Anas platyrhynchos domesticus L*) Given a Mixture of Fermented Sago in the Main Feed

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Abstract
Ducks are one of the poultry that can be relied on as a source of animal protein, namely meat and eggs, which are greatly needed by the community. Peking ducks are a very potential meat-producing poultry besides chickens. One of the advantages of this poultry is that it has resistance to disease when compared to broiler chickens. More than 19% of egg needs are met from duck eggs, but its role as a meat producer is still low at 0.94%. The low role of ducks as meat producers is caused by inadequate and quite expensive feed. Animal-derived feed ingredients are generally industrial waste, so their nature utilizes waste such as sago pulp. This study aims to investigate the effect of providing fermented sago pulp in rations on the quality of carcasses and abdominal fat of Peking ducks. This study used an experimental method designed with a Completely Randomized Design (CRD), with 4 treatments and 3 replications. The treatments are P1. 100% Bran (Control), P2. 75% Bran + 25% Fermented Sago Pulp, P3. Bran 50% + Fermented Sago Pulp 50%, P4. Bran 25% + Fermented Sago Pulp 75%. Observation parameters in the form of feed consumption, weight gain, feed conversion. The results of the study of providing fermented sago pulp in bran in Peking ducks did not have a significant effect with ($P>0.05$) on feed consumption, had a very significant effect with ($P<0.05$) on daily weight gain, did not have a significant effect with ($P>0.05$) on feed conversion. Treatment P1 (Control) gave the best value for feed consumption, Treatment P4 (Bran 25% + Fas 75%) gave the best value for daily weight gain and treatment P2 (Bran 75% + Fas 25%) gave the best value for feed conversion.

Keywords: Sago Dregs, Fermentation, Duck Packing Performance

1. Introduction

Along with population growth and increasing public awareness of the importance of nutrition for body health, the demand for protein sources of food continues to increase. One of the livestock products that has great potential to meet the need for protein is duck livestock production. Ducks are one of the poultry that can be relied on as a source of animal protein, namely meat and eggs, which are greatly needed by the community. Duck farming is an alternative to meet nutritional

needs. In one year, ducks can produce around 250-300 eggs, and an average weight of 60-70 grams [1].

Peking ducks are a very potential meat-producing poultry besides chickens. One of the advantages of this poultry is that it has resistance to disease when compared to broiler chickens, so the maintenance process is much easier and does not have a high risk of death. In Indonesia, the duck livestock population is very large, from data from the Directorate General of Animal Husbandry and Animal Health from 2015 to 2019 there was a significant increase of 51,950 ducks [2]. The results of this data show that most farmers come from rural communities, but the Peking duck cultivation system in rural areas is not carried out intensively. Peking duck cultivation in rural areas has not implemented feed processing technology, farmers only rely on providing bran for duck feed.

Peking ducks are waterfowl classified as meat type. Peking ducks are one type of duck that has the potential to be a meat duck with a white and brown feather color appearance, stocky body. The color pattern of Peking duck feathers is mostly dominated by dark brown striped colors. Sometimes other colors appear as a combination with the dominant color [3]. Peking ducks grow quickly because they are able to consume large amounts of feed [4]. In Indonesia, the duck livestock population is very large, from data from the Directorate General of Animal Husbandry and Animal Health, data from 2015 to 2019 showed a significant increase of 51,950 ducks [2]. The results of this data show that most farmers come from rural communities.

Peking ducks are a type of meat duck whose body weight growth and maintenance age are relatively fast compared to other types of meat ducks [5]. The nutritional needs of meat ducks are feed containing crude protein, crude fiber, Ca, and P. The high level of needs causes duck production to continue to increase. More than 19% of egg needs are met from duck eggs, but their role as meat producers is still low at 0.94%. The low role of ducks as meat producers is due to inadequate and quite expensive feed [4]. Feed is anything that can be eaten by livestock, and can be digested in whole or in parts and does not interfere with livestock health. Feeding livestock needs to consider the quantity, content and quality of nutrients in the feed ingredients.

Animal feed ingredients are generally industrial waste, so their nature utilizes waste such as sago pulp. Animal feed ingredients commonly used are fish meal, bone meal, shrimp meal and shellfish meal, sago flour. Sago plants are one of the carbohydrate-producing plants that have great potential in supporting the national food security improvement program [6]. Sago pulp is one type of waste produced during the sago flour processing process. Sago processing produces sago starch and sago pulp. Sago pulp Based on the results of the analysis of the Nutrition Science Laboratory and [7] the nutritional content of sago pulp BK (Crude Weight) 47.20%, PK (Crude Protein) 0.83%, SK (Crude Fiber) 11.44%, LK (Crude Fat) 0.99%, Ash 1.80% and BETN (Nitrogen-Free Extract Material) 84.94%, and the sago pulp fiber content ADF (Acid Detergent Fiber) 13.79%, Lignin 10.34%, NDF (Neutral Detergent Fiber) 39.65%, Cellulose 1.74% and Hemicellulose 39.65%.

A processing process is needed before being given to livestock as feed to overcome this problem, namely fermentation, the results of the study showed that the NDF content of sago pulp decreased during the fermentation process with oyster mushrooms using white oyster mushrooms (Pleurotus ostreatus) with the addition of urea. [8]. According to [9] fermented feed is feed that has been treated with the addition of microorganisms or enzymes until biochemical changes occur and will then result in significant changes in the feed ingredients. Fermentation is one method to increase nutritional value according to the characteristics of tofu dregs raw materials because the

process is relatively easy and the results are palatable so that they are easier to give to livestock [10], [11], [12] [13].

2. Materials and Methods

Time and Place of Research

This research was conducted in a duck pen in Ujong Blang Village, Kuala District, Bireuen Regency and the process of making Fermented Sago Pulp was carried out at the FAPERTA Laboratory of the National Islamic University of Indonesia. This research will be conducted in February - March 2024.

Tools and materials

The tools used in this study were cameras, books, stationery, measuring instruments (rulers), scales, buckets, food containers, drinking containers, small nets, and cages. The materials used in this study were 1-month-old Peking ducks, bran, fermented sago dregs, and clean water.

Research methods

This study used an experimental method designed with a Completely Randomized Design (CRD), with 4 treatments and 3 replications. Each experiment consisted of 3 Peking ducks aged 1 month, so 36 ducks were needed and there were 12 experimental units. Addition of feed with Sago Pulp Fermentation. The treatments given are as follows.

A = Bran100% (Control)
B = Bran 75% + Fermented Sago Pulp 25%
C = Bran 50% + Fermented Sago Pulp 50%
D = Bran 25% + Fermented Sago Pulp 75%

Research Procedures

Making Fermented Sago Pulp

The sago pulp used was obtained from a private business owned by one of the communities in Geulempang Payoeng Village, Jeumpa District and in Kutablang District, Bireuen Regency, Aceh. The sago pulp used as additional feed in the main feed of Peking ducks is fermented sago pulp. FAS aims to increase the nutritional content of sago pulp. The FAS formulation is made using:

1. Dried sago dregs that have been cleaned and dried
2. EM4
3. Urea
4. Sufficient clean water

The four ingredients are mixed evenly. The FAS process is carried out for approximately 15 days and is carried out openly but protected from sunlight and rainwater. Sago dregs that have undergone perfect fermentation have the following characteristics:

a. The aroma smells very fruity or smells like sticky rice tape,
b. The color is a bit reddish
c. The texture is soft and the taste is slightly sweet.

Making a Test Cage

The cage used is 4 meters long and 7 meters wide. Inside the cage there are 12 cages (boxes). Each cage measures 100 x 100 x 100 cm, which is occupied by 3 ducks per cage unit. The equipment used is a feeder, a drinker, a scale to weigh the weight of the ducks and feed.

Cage Sanitation

Every morning, the cage base made of newspaper is cleaned and then replaced if the duck droppings are too much, after that the plastic base is cleaned from the droppings, as well as the food and drink places are cleaned every day. The remaining feed is collected every day and weighed once a week.

Feeding

After the fermented bran and sago pulp are prepared, the feed is then given to the Peking ducks in the cages that have been prepared. Before being fed, the Peking ducks are first divided into each cage, then the initial weight of the ducks is weighed and the time of feeding the ducks is given twice a day, namely in the morning at 08.00 and in the afternoon at 16.00. Feeding is carried out at all ages of the ducks. Ideally, the size of the feed is adjusted to the age of the duck's mouth opening. In this study, the Peking ducks used were 1 month old ducks. The amount of feed needed for 1 month old Peking ducks is 108 grams/head/day [14].

Observation Parameters

The parameters observed in this study were feed consumption, daily body weight gain (DGB) and feed conversion.

Feed Consumption

Feed consumption is calculated by finding the difference between the feed given and the remaining feed and expressed in grams of dry weight (DM)/head/day.

Consumption = feed given – remaining feed

Daily Weight Gain (DWG)

Body weight gain is obtained by calculating the difference between the final weight and the initial weight expressed in g/day.

$$PBBH = \frac{\text{final weight} - \text{initial weight}}{\text{Maintenance day}}$$

Feed Conversion

Feed conversion can be calculated by dividing the amount of feed consumption by the increase in body weight.

$$KP = \frac{\text{feed consumed}}{PBBH}$$

Data analysis

Observation data were analyzed using statistical tests using the SPSS program. To determine the effect of FAS administration on the growth of Peking ducks, Analysis of variance (Anova) was

used, and if there was a significant difference, the test (Duncan) was continued at a 95% confidence level.

3. Results and Discussion

Feed Consumption

Based on the statistical analysis of ANOVA which shows that the provision of fermented sago pulp in bran to Peking ducks for feed consumption has no significant effect (P>0.05). The value of the further test (DUNCAN) which shows the provision of fermented sago pulp in bran for feed consumption is presented in table 1.

Table 1. Feed Consumption

Treatment	Average
P1	6.5600a
P2	6.3367a
P3	6.4633a
P4	6.4967a

Description: a. Not significantly different

Feed consumption is the amount of food consumed by livestock to meet the basic needs and production of the animal [15]. Based on the results of the study using anova statistical analysis which showed that the provision of fermented sago pulp in bran had no significant effect (P>0.05) on the feed consumption of Peking ducks. It can be seen in table 4 that the Results of Duncan's Advanced Test Research stated that the highest feed consumption value was in treatment P1 (6.5600a), and the lowest consumption value was in treatment P2 (6.3367a). In treatment A, there was no significant difference (P>0.05) higher than treatment P2, treatment P3 and treatment P4. Treatment P2 was not significantly different (P>0.05) lower than treatment P3, treatment P4. And treatment P3 was also not significantly different (P>0.05) lower than treatment P4. Thus, treatment P1 provided a higher feed consumption value than treatment P2, treatment P3 and treatment P4. The increase in feed consumption value in treatment P1 was due to the nutritional value contained in the bran being fully consumed by the ducks. The difference in consumption value in treatment P1, treatment P2, treatment P3 and treatment P4 was due to the nutrients contained in fermented sago dregs not fully meeting the livestock feed consumption factors. Fermented sago dregs when mixed with bran did not provide an odor that could increase 100% the palatability of ducks to consume the feed. According to [16] feed consumption is influenced by several factors, including: age, feed palatability, livestock health, type of livestock, livestock activity, feed energy, production level, quantity and quality of feed. Feed consumption is influenced by the nutrients contained in the feed. Palatability is a physical and chemical form indicated by the appearance, odor, taste and texture that increases the attraction and stimulates livestock to consume it.

Weight Gain

Based on the statistical analysis of ANOVA which shows the provision of fermented sago pulp in bran to Peking ducks for weight gain has a very significant effect (P <0.05). The further test value

(DUNCAN) which shows the provision of fermented sago pulp in bran for daily weight gain is presented in Table 2.

Table 2. Weight Gain

Treatment	Average
P1	3.5200a
P2	4.3567b
P3	4.3933b
P4	4.4433b

Description:** Very real effect

Weight gain is defined as an increase in the shape and weight of tissues such as muscles, bones, heart and all other body tissues. Based on the results of the study using anova statistical analysis which showed that the provision of fermented sago dregs in bran had a very significant effect (P <0.05) on daily body weight gain. It can be seen in table 2 of the Duncan Advanced Test Research Results which show that the highest value was obtained by treatment P4 (4.4433b), the lowest value was obtained by treatment P1 (3.5200a). In Treatment P1, the effect was very significant (P <0.05) lower than treatment P2, treatment P3 and treatment P4. Treatment P2 had a very significant effect (P <0.05) lower than treatment P3 and treatment P4. Treatment P3 had a very significant effect (P <0.05) lower than treatment P4.

The high value of weight gain in treatment P2, treatment P3 and treatment P4 is due to the nutritional content in the feed meeting the needs of the livestock. The growth of livestock weight is greatly influenced by the intake or nutrition contained in the feed that will be consumed by the livestock. One of the nutrients that affects livestock weight gain is protein, if the protein value of the feed ingredients we provide is good, then the livestock weight gain will also grow well. This is supported by the opinion of [17] stating that, weight gain is influenced by the quality and quantity of feed consumed by livestock, so that differences in the content of substances in feed and the amount of feed consumed will affect the increase in body weight in livestock.

The low value of weight gain in the P1 treatment was caused by the nutritional content in the P1 treatment not being fully sufficient for livestock needs. According to [18], the main factors that influence weight gain are the amount of livestock feed consumption and the energy and protein content in the feed because energy and protein are very important in influencing the speed of weight gain, in general weight gain will be influenced by the amount of feed consumed and the nutritional content in the feed. According to [19], the factors that influence weight gain are differences in gender, feed consumption, environment, seeds and feed quality.

Feed Conversion

Based on the statistical analysis of ANOVA which shows that the provision of fermented sago pulp in bran to Peking ducks for feed conversion has no significant effect (P>0.05). Further test values (DUNCAN). which show the provision of fermented sago pulp in bran for feed conversion, are presented in table 3.

Based on the results of the ANOVA statistical analysis study, it shows that the provision of fermented sago dregs in bran has no significant effect (P>0.05) on feed conversion. It can be seen from table 6 which shows the results of the study with the highest value obtained by treatment P1 (6.5600a) and the lowest value obtained by treatment P2 (6.3367a). In treatment P1, there was no

significant effect (P>0.05) higher than treatment P2, treatment P3, treatment P4. Treatment P2 had no significant effect (P>0.05) lower than treatment P3 and treatment P4. Treatment P3 was also not significantly different from treatment P4. In treatment P1, the crude fiber content was high so that the tannin content was high. The high value of feed conversion in treatment P1 compared to other treatments was also caused by the unbalanced nutritional content in the feed.

Table 3. Feed Conversion

Treatment	Average
P1	6.5600a
P2	6.3367a
P3	6.4633a
P4	6.4967a

Description: a. No significant difference

Livestock really need good nutrition so that their feed consumption is good and their weight gain is also good, thus if their feed consumption and weight gain are good, then the conversion value will also be good. According to [20] the biological nature of poultry whose digestive system has difficulty digesting crude fiber because the fermenter organ is located at the end of the poultry digestive tract, poultry do not have the cellulase enzyme that can break down the crude fiber component in the form of cellulose. The lowest value for feed conversion is seen from the P2 treatment where the value is 6.3367a. Thus the P2 treatment is the treatment with the best feed conversion value from the other treatments. According to [21], a low feed conversion value indicates that the efficiency of feed use is good, because the more efficient the poultry consumes feed to produce meat. According to [22], [23],[24],[25] a high feed conversion indicates less efficient feed use.

Conclusions

The results of the study showed that there was an effect of giving fermented sago dregs in the ration in the form of no significant effect (P>0.05) on ration consumption, giving a very significant effect (P<0.05) on daily body weight gain, and not giving a significant effect (P>0.05) on ration conversion. The provision of fermented sago dregs in bran in Peking ducks showed that treatment A (Control) gave the best value on ration consumption, Treatment D (25% Bran + 75% Fas) gave the best value on daily body weight gain and treatment B (75% Bran + 25% Fas) gave the best value on ration conversion.

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