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Utilization Of Golden Snail Flour (GSF) on Ration of Quail

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Abstract : Feed is one of the critical factors for the success of livestock production because it contributes 70-80% of production costs. High protein feed ingredients are expensive, so it is necessary to use non conventional feed. Golden snail are pests that interfere to rice growth in agricultural areas, one of which is in North Tapanuli Regency. Golden snail have a high protein content so they are very efficient to use as a source of protein feed. In this study, golden snail in the form of flour was used as a substitute for fish meal in laying quail rations. The research used Completely Randomized Design (CRD) with 4 treatments, namely P0 = 8% fish meal, P1 = 4% GSF, P2 = 8% GSF, P3 = 12% GSF with 5 replications. The research parameters were feed consumption, egg production, egg weight, feed conversion and over feed cost income. The results showed a significant effect of P2 on egg production as much as 31.71% and income over feed cost IDR 2602.15/ head compare to other treatments of quail eggs. However, giving GSF did not show a significant effect on egg weight, feed consumption and ration conversion. The results showed that the use of GSF was suitable as a substitute for fish meal on quail feed an application of 8% GSF for quail feed was a novelty finding.

Keywords: egg production, feed, golden snail, quail

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1. Introduction

Poultry is one of the largest providers of animal protein sources. Poultry meat contributes about 1.9 million tons and egg production about 2.0 million tons [1]. Quail is a type of bird that cannot fly high, is relatively small and has short legs. Quail is one of the poultry commodities that produce eggs and meat which supports the availability

of cheap and easy animal protein. Production of quail eggs in one year ranges from 200- 300 eggs/head/period [2].

Feed is one of the critical success factors in livestock production. Feed accounts for 70-80% of production costs. Therefore, the use of unconventional feed ingredients is needed to reduce production costs. Poultry feed must contain nutrients in accordance with the needs and the maintenance phase.

Golden snails have the potential to be used as raw material for feed because of their abundant availability, high protein content and no price. Without proper processing, the content of anti nutrient substances in golden snail meat will limit its use. The use of GSF should be boiled first for 15-20 minutes to remove anti-nutritional substances in the form of the enzyme *thiaminase* found in the mucus of golden snails. The content *thiaminase* in the ration can reduce egg production and inhibit growth. This enzyme destroys *thiamin* (vitamin B1), a compound important in energy metabolism and makes *thiamin* inactive [3].

Golden snails are pests that interfere with rice growth in the agricultural industry. Especially in the North Tapanuli area, the snail population is quite abundant, the rice farmers in the North Tapanuli area use pesticides to kill snails because the presence of snails in agricultural land is quite unsettling for farmers. Judging from the nutritional quality of golden snails, especially the protein content is high enough so that it is very efficient to use as an animal feed substitute for fish meal as a source of protein in rations. Golden snail meal has a crude protein content of 51.8%, crude fat 13.61%, crude fiber 6.09%, ash content 24%, and metabolic energy 2094.98 Kcal/kg [4]. To meet the basic needs and production of quail eggs, high protein is needed. Golden snails are very potential to be used in quail animal feed because giving 10% golden snails in the form of flour to the ration increases egg production by up to 80% of total egg production [5]. This research aimed to investigate GSF (*Pomacea canaliculata Lamarck*) in rations on the percentage of consumption feed, egg production, egg weight, feed conversion, and income over feed cost.

2. Materials and Methods

Materials

The materials used in this research was 100 ready to produce quails, quail rations (milled corn, rice bran, fish meal, soybean meal, golden snail flour, premix, vegetable oil), Rodalon as a disinfectant for cages and equipment. The tools used in this study were 20 litter cages with a size of 50 cm x 50 cm x 30 cm, 20 feed containers, and 20 drinking containers.

Methods

The research design used Completely Randomized Design (CRD) consisting of 4 treatments and 5 replications. Each replication consisted of 5 quails.

The treatments were as follows:

PO = 8% fish meal (control) P1 = 4% GSF in rations

P2 = 8% GSF in rations P3 = 12% GSF in rations

The parameters were observed in this study consumption feed, egg production, egg weight, feed conversion, and income over feed cost. The data obtained were analyzed using diversity analysis. If the results of the analysis of diversity show differences, further testing will be carried out using the Duncan method.

3. Result and Discussion

Consumption Ration

Consumption ration was calculated from the number of rations given (g) minus the remaining rations for a week. The average consumption of quail rations during the study is presented on "Table 1".

Table 1. Average consumption of quail rations by GSF application (g/quail/week).

Treatments	Replications					Total	Mean
	1	2	3	4	5		
P0	146.68	147.30	154.30	148,03	156.30	752.61	150.52[a]
P1	142.88	148.83	150.63	143,37	158.29	744.00	148.80[a]
P2	147.67	144.33	143.10	150,47	146.33	731.90	146.38[a]
P3	146.87	140.50	161.02	148,53	150.87	747.79	149.56[a]

Note: the same superscript in the same column shows no significant difference (P> 0,05).

"Table 1" showed the highest average ration consumption was found at P0 (use of 8% fish meal and 0% GSF) which was 150.52 g/quail/week and the lowest was in P2 (use of 0% fish meal and 8% GSF), namely 146.38 g/quail/week.

The absence of a significant effect on ration consumption indicated that the use of GSF which was 0-12% of quail rations was accepted by quail. This is because the energy content of the feed for each treatment was relatively the same. Quails consume feed to meet energy needs and other food substances, so that if energy needs are met, the quails will stop eating [6].

In fact, the effect of treatment on ration consumption is influenced by the age and the needs of quail. The ration given must be in accordance with the age and needs of the quail because feed has an important role in ensuring the survival of quail and egg production. In addition, energy and protein content of feed were relatively the same, because they were factors that influenced the level of ration consumption [7]. Quail tends to choose energy source feed ingredients then continued with protein source feed ingredients [8].

Ration consumption is also influenced by the level of animal preference for feed. The decline (not significantly) in ration consumption is influenced by the smell and taste of GSF which is different from fish meal, which causes it to be less *palatable* (less preferred) [9].

Egg Production

Egg production was calculated from the ratio of the number of eggs produced in one week to the total number of quails multiplied by 100%. Egg production was calculated at 7-12 weeks of age. From the research results obtained data on the average production of quail eggs as in “Table 2”.

Table 2. Average production of quail eggs by application of GSF(% / quail / week).

Treatment	Replications					Total	Mean
	1	2	3	4	5		
P0	25.24	21.43	34.76	19.05	30.48	130.96	26.19^{ab}
P1	18.57	24.29	25.24	21.43	21.90	116.43	23.29^{b}
P2	30.95	32.38	26.67	38.57	30.00	158.57	31.71^{a}
P3	24.76	25.71	26.19	31.90	27.62	136.18	27.24^{ab}

Note: Different superscripts show a significant effect ($P<0.05$)

From the egg production data, it can be seen that the highest average quail egg production was in P2 (the use of 0% fish meal and 8% GSF) which was 31.71% /quail/week and the lowest average was in P1 (using 0% fish meal and 4% GSF) which was 23.29%/quail/week. Duncan's further test results showed a different superscript in the egg production of P2 (using 8% GSF), namely 31.71% with P1 (using 4% GSF) with an average of 23.29%.

Egg production in P2 (8% GSF) increased, while in P3 (12% GSF) egg production decreased again. The decrease in egg production was caused by the increasing content of the GSF, so that the Thiaminase enzyme content in it increases as well. Thiaminase enzyme in golden snails results in decreased egg production. Golden snails have mucus in which there are anti nutritional substances such as thiaminase which can reduce egg production and inhibit livestock growth [10]. So it needs to be minimized by boiling before applying it to livestock. Research by [5] stated that giving 10% GSF (eather meat and shell) in the form of flour to the ration can increase of egg production by up to 80% of the total egg production.

Egg production is also influenced by feed protein and the content of amino acids in feed. The effect of giving GSF on egg production is due to the protein in GSF which being able to increase the production of quail eggs. Protein in feed can increase the production *follicle stimulating hormone* (FSH) which plays a role in the formation of ovarian follicles [11].

Egg weight

Egg weight is calculated every day based on the ratio of the total egg weight in one week with the number of eggs/plot in the calculation of one week. From the research results obtained data on the average egg weight as in “Table 3”.

Table 3. Average weight of quail eggs by application of GSF (g/quail / egg).

Treatments	Replications					Total	Mean
	1	2	3	4	5		
P0	10.26	10.40	10.11	10.10	9.72	50.59	10.12^{a}
P1	9.87	10.18	9.77	9.78	10.09	49.69	9.94^{a}
P2	9.98	10.19	10.23	10.15	10.30	50.85	10.17^{a}
P3	10.15	10.43	10.00	10.06	10.41	51.05	10.21^{a}

Note: the same superscript in the same column shows no significant difference (P> 0.05).

“Table 3” showed the highest average egg weight was found in P3 (using 0% fish meal and 12% GSF) which was 10.21g/head/egg and the lowest average egg weight was found in P1 (using 0% fish meal and 4% GSF.) which was 9.94g/head/grain.

Provision of GSF in quail rations produces a good egg weight. Giving 10% GSF as a substitute for fish meal in laying quail rations produces a good index of egg yolk, egg shell, yolk color and egg weight equal to 9-10g/head/egg [12]. Provision of relatively the same level of protein in each treatment was a factor that caused the weight of quail eggs to be relatively the same. Quails that get protein according to their needs will produce optimal egg weight [13]. From this research, it was known that application GSF caused the same egg weight as application of fish meal. This was a good finding because fish meal is expensive while GSF is free and harmful rice farmers.

Ration Conversions

Ration conversions were calculated based on the number of rations spent in a certain period of time compared to the weight of eggs at the same time which was calculated every week. From the research results obtained the ration conversion results as shown in "Table 4".

Table 4. Average conversion of quail rations containing 0-12% GSF in the ration.

Treatments	Replications					Total	Mean
	1	2	3	4	5		
P0	2,95	2,34	1,53	5,69	2,42	14,93	2,99[a]
P1	4,20	2,27	1,47	2,17	4,55	14,66	2,93[a]
P2	3,69	1,81	2,46	2,33	1,80	12,09	2,42[a]
P3	3,96	2,05	2,33	2,62	1,69	12,65	2,53[a]

Note: the same superscript in the same column shows no significant difference (P> 0.05).

"Table 4" showed the largest average ration conversion found at P0 (use of 8% fish meal and 0% GSF) which was 2.99 while the lowest average ration conversion was found at P2 (the use of 0% fish meal and 8% GSF) was 2.42.

Based on the smaller feed conversion value on the use of GSF on P2 and P3, it means that the use of feed were more efficient than the P1 and P0 treatments. The high rate of ration conversion indicates the inefficient level of ration usage [14]. Quail aged 56-69 days was more efficient in utilizing rations containing 10% GSF without fish meal compared to using 10% fish meal without GSF [9]. This shows that the use of GSF as a substitute for fish meal can be given to the quail egg production.

Income Over Feed Cost (IOFC)

IOFC obtained from the ratio of income and ration costs. IOFC was obtained based on the overall selling price of quail eggs minus the cost of rations consumed. The IOFC average of quails during the study can be seen in "Table 5".

Table 5. Average Income Over Feed Cost by application of GSF (Rp / quail). Treatments

	Replications					Total	Mean
	1	2	3	4	5		
P0	1844,32	1395,25	2898,31	1112,22	2383,31	9633,41	1926,68
P1	1095,08	1717,08	1848,44	1424,75	1368,37	7453,72	1490,74
P2	2503,61	2695,28	2037,86	3371,50	2402,50	13010,75	2602,15
P3	1787,39	1946,25	1847,93	2608,22	2090,72	10280,51	2056,10

"Table 5" showed the highest IOFC average found in P2 (use of 0% fish meal and 8% GSF) which was Rp. 2,602.15/quail and the lowest IOFC average was found in P1 (using 0% fish meal and 4% GSF) which was Rp. 1,490.74/quail. The research results of IOFC were lower compere to IOFC by [15] which was range of Rp. 5,083/quail - Rp. 5,427/quail. [15] Get that amount of IOFC because the data was taken at the time of peak production which is 15 weeks, while the research data was obtained when the quails were 7-12 weeks old.

The results of further tests with duncan showed that P2 (using 0% fish meal and 8% GSF) treatment had significantly different results to treatment P1 (using 0% fish meal and 4% GSF). The low IOFC value in the study was due to the higher feed prices. Based on the research results, the use of 8% GSF gave a profit of Rp. 700/quail compared to the use of fish meal. This was due to the decrease in feed costs in the utilization of GSF waste. Factors that can reduce production costs and have a positive effect on IOFC are the use of non conventional feed such as waste and pests (GSF). To overcome the high cost of feed it is necessary to reduce costs by providing cheap feed, using alternative ingredients such as GSF. Low production costs and high egg sales prices result in increased income over feed cost (IOFC) for quails [16].

4. Conclusion

Provision of GSF in quail rations by 8% can increase egg production, and Income Over Feed Cost, reduce feed conversion and affect consumption but did not affect the weight gain of quail eggs. Increased egg production and income over feed cost (IOFC) explains that the use of GSF by 8% was suitable for use as a substitute for fish meal in laying quail rations.

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