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Utilization of Fermented Golden Snail (Pomacea cannaliculata) Flour with Eco Enzymes on Egg Production and Quail Egg Weight

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Abstract. Feed is one of the determining factors for the success of livestock production because it takes up 70-80% of production costs. High-protein feed ingredients are one of the high-priced feed ingredients, so it is necessary to use non- conventional feeds. The golden snail is a pest that interferes with rice growth in agricultural areas. The golden snail has a high protein content so it is very efficient tobe used as a protein source feed ingredient. In this study, fermented golden snails in the form of flour were used as a substitute for fish meal in the rations of laying quail.The design used was a completely randomized design (CRD) using 4 treatments and 5 replications, namely P0 = 8% fish flour, P1 = 4% fermented golden snail flour, P2= 8% fermented golden snail flour, P3 = 12% fermented golden snail flour. The research parameters were feed consumption, egg production, egg weight, feed conversion. The results showed that the utilization of fermented golden snail flour upto 12% had a very significant effect (P<0.01) on feed consumption, egg production and feed conversion with an average of 108.573g/e/week, 33.476%, and 1 ,77. However, it gave an insignificant impact on egg weight with an average value of 10.15g/grain. The highest ration consumption was at P0 of 114,488g/e/week, the highest egg production was at P3 of 40.667% and the best feed conversion was at P3 of 1.06.The results showed that the use of fermented golden snail flour using 12% Eko enzymes was suitable to be used as a substitute for fish meal.

Keywords : eco enzymes, egg production, fish meal, golden snail, quail

1. Introduction

Poultry is a livestock commodity whose products are widely consumed by the community,both in the form of meat and eggs. Quail is one of the poultry commodities as a producer of eggs and meat which supports the availability of cheap and easily available animal protein. Feed is one of the determinants of success in livestock production, the use of non-conventional feed ingredients is needed to reduce production costs. Gold snails have the potential to be used as feed raw materials because they have high protein, but must be boiled for 15-20 minutes to remove anti-nutritional substances in the form of the *thiaminaseenzyme.* The content *thiaminase* in the ration can reduce egg production and inhibit livestock growth [1]. Thiamine deficiency *in* livestock can

cause several symptoms, including loss of body weight and weakness, this is because livestock cannot use feed energy in full [2]. According to [1] golden snail flour has nutritional content, namely crudeprotein (PK) 46.2%, metabolic energy (ME) 1920 Kcal/Kg, calcium (Ca) 2.9%, and phosphorus (P) 0.35%. To meet the basic needs and production of quail eggs required high protein.

Eco-enzymes are the result of fermentation of organic waste originating from kitchen waste(fruit and vegetable waste), sugar (brown sugar, brown sugar, or cane sugar), and water using certain microorganisms such as yeast and bacteria [3]. Eco-enzymes can accelerate biochemical reactions in nature to produce useful enzymes using fruit or vegetable waste [4]. The composition of organic matter in Eco-enzymes produces organic acids, enzymes,and mineral salts that can be used to compose, decompose, convert and catalyze [5].

Fermentation is the process of breaking down organic compounds to produce energy and conversion of substrates into new products by microbes. Fermented products are simpler and easier to digest than the original material and are more durable [6]. Starters are microorganisms that are grown on a substrate for a specific purpose [7]. Organic waste canbe used as a starter for fermented feed because it contains beneficial microbes and acidic products during fermentation and is also easier to find and thus lower prices.

Based on this, a research related to the utilization of golden snail flour (*Pomacea canaliculata Lamarck*) in the ration on the percentage of quail egg production and quail egg weight was interesting to be proceeded.

2. Materials and methods

This research was conducted at the Compost Center, Faculty of Animal Husbandry, University of North Sumatra. Which was carried out from October to December 2021.

The materials used in this study were 100 ready-to-produce quail, golden snails, quail rations (milled corn, rice bran, fish meal, soybean meal, premix, vegetable oil), Rodalon asa disinfectant 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, 20 drinking containers, 1 40 watt incandescent lamp as a source of lighting,analytical scales, stationery and calculators, handsprays, cameras, broomsticks, nets as cagecovers, grinders.

2.1. Methods

design used was a completely randomized design (CRD) consisting of 4 treatments and 5 replications. Each treatment consisted of 5 quails.

The treatments were as follows:

1. P0 = 8% fish meal (control)
2. P1 = 4% fermented gold snail flour in the ration
3. P2 = 8% fermented gold snail flour in the ration
4. P3 = 12% fermented gold snail flour in the ration

2.2 Research parameters

- Ration consumption (g /head/week)
- Egg Production Egg
- Weight
- Conversion Ration

3. Results and Discussion

3.1. Ration Consumption

Average consumption of quail rations during the study can be seen in table 1.

Table 1. Average consumption of quail rations during the study (g/head/week).

Treatment	Replications					Total	Mean±SD
	1	2	3	4	5		
P0	115,20	109,20	114,79	118,15	115,10	572,44	$114,49^{a}$±3,25
P1	103,07	107,38	99,25	98,92	107,60	516,22	$103,24^{c}$±4,21
P2	107,37	112,03	105,75	105,85	106,95	537,95	$107,59^{bc}$±2,58
P3	99,42	110,22	110,10	112,62	112,49	544,85	$108,97^{b}$±5,47
Total						2171,46	
Mean							108,57

Description: Different superscripts indicate a very significant effect (P<0.01)

In “Table 1”, the results obtained that the average ration consumption at P0 was significantlyhigher than the other treatments. This is presumably because the P0 treatment had a high level of feed palatability, thus increasing the amount of feed consumed. Palatability is the delicacy of feed which is determined by the content of certain chemical compounds. Another factor that affects feed consumption at P0 is the low protein content of other treatments, causing an increase in the amount of ration consumed, according to [8] the higher the protein level in the ration can reduce ration consumption as in the P1 P2 and P3treatments. According to [9] that quail consume feed to meet energy needs and other foodsubstances, so that if the energy needs are met, the quail will stop eating. Furthermore, according to [10] that the consumption of rations is influenced by the food substances contained in the ration. The ration given to livestock must be adjusted to the age and needsof livestock, because feed has an important role to ensure the survival of quail and egg production.

3.2. Egg Production

Table 2. Average production of quail eggs during the study (%/head/week).

Treatment	Replications					Total	Mean±SD
	1	2	3	4	5		
P0	38,57	36,19	39,52	38,57	38,57	191,42	$38,28^{a}$±1,24
P1	23,81	28,10	17,62	20,00	30,00	119,53	$23,91^{c}$±5,23
P2	30,48	37,62	22,38	34,76	30,00	155,24	$31,05^{b}$±5,78
P3	37,14	47,14	37,62	43,81	37,62	203,33	$40,67^{a}$±4,55
Total						669,52	
Mean							33,48

Remarks : Different superscripts showed a very significant effect (P<0.01).

The use of 12% fermented golden snail flour (P3) in quail rations showed a very significanteffect on egg production. This is because the protein content of fermented golden snail flouris able to support the protein quality of the ration, due to the completeness of the amino acids in it. Protein is important for growth and plays a role in egg production. According to

[11] that the protein requirement for egg production depends on several factors, namely theenergy level in the ration, the ambient temperature and the quality of the protein in the ration. Because the golden snail is high in protein and has complete amino acids, so it canmaintain the quality of the ration. High quality rations will be able to maintain egg productivity. This is in accordance with the statement [12] which states that the main factoraffecting egg production is the amount of feed consumption and the nutrients contained inthe feed. Protein is one of the most important

components in feed which has a direct impacton body growth and animal reproduction [13]. The protein content, especially the amino acids contained in it, can affect the components of the immune system related to the healthof quail [14].

3.3. Egg Weight

Table 3. The average weight of quail eggs during the study (g/head/grain).

Treatment	Replication					Total	Mean±SD
	1	2	3	4	5		
P0	10,12	9,57	10,49	10,41	10,13	50,72	10,14±0,36
P1	9,92	10,74	10,05	10,05	9,84	50,60	10,12±0,36
P2	10,19	9,72	10,35	10,05	10,13	50,44	10,09±0,23
P3	10,16	10,03	10,30	10,38	10,37	51,24	10,25±0,15
Total						203	
Mean							10,15

In "Table 3" it can be seen that the well fermented golden snail flour is 4% (P1), 8% (P2), and12% (P3) as a source of protein in feed has not been able to significantly increase the weightof quail eggs aged 6 to 12 weeks. The results of this study indicate that the weight of quaileggs produced is still normal. Because the provision of golden snail flour in the ration didnot affect the weight of the eggs, but on the contrary the quality of the eggs produced wasstill good. According to [15] stated that the average weight of quail eggs ranged from 10 to15 grams. Furthermore, according to [16] egg weight is a quantitative trait that can be derived. So, the type of feed, the amount of feed, the environment of the cage, and the sizeof the parent's body greatly affect the weight of the eggs.

3.4. Ration Conversion

Table 4. The average conversion of quail rations containing 0-12% gold snail flour in the rations

Treatment	Replication					Total	Mean±SD
	1	2	3	4	5		
P0	2,629	1,713	0,988	1,761	1,372	8,463	$1,69^{b}$±0,61
P1	3,176	2,938	2,539	1,641	2,940	13,234	$2,65^{a}$±0,61
P2	1,748	1,316	2,434	1,182	1,682	8,362	$1,67^{b}$±0,49
P3	0,999	0,793	1,165	1,019	1,330	5,306	$1,06^{b}$±0,20
Total						35,365	
Mean							1,77

Description: Different superscripts showed a very significant effect (P<0.01)

The use of golden snail flour P0 (0%), P2 (8%) and P3 (12%) gave The very significant effect on

the ration conversion results indicated that the level of use of the ration was moreefficient because the feed used to produce each unit of production was low. The feed conversion value in this study was 1.77.conversion rate in this study was better than the results of the study [17] with a conversion value of 2.72. This shows that the efficiency level of ration consumption is strongly influenced by the energy and protein content of theconsumed ration. [18] reported that feeds with higher protein and energy levels were able to be utilized properly to produce higher weight gain than feeds with lower protein and energy levels.

Conclusion

Giving golden snail flour fermented using Eko Enzyme as much as 12% in the ration can increase ration consumption, egg production, and show a more efficient level of feed use. However, it has not been able to influence the weight gain of quail eggs (*Coturnix-coturnixjaponica*).

REFERENCES

[1] AIAT East Kalimantan. Assessment of Free-range Chicken Cultivation Technology. PAATP Kaltim FY. 2001.

[2] Purnamaningsih. Effect of Addition of Gold Conch Flour (Pomacea canaliculata Lamarck) in the Ration on the Quality of Duck Eggs. Faculty of Agriculture, Sebelas Maret University, Surakarta. 2010.

[3] Thirumurugan P. Production and analysis of enzyme bio-cleaners from fruit andvegetable wastes by using yeast and bacteria. Student project Report (DORC.No.1082/2015A; Project No:28) submitted to Tamil Nadu State Council for Higher Education (TANSCHE). 2016.

[4] Nurzainah Ginting, Hasnudi, Yunilas, Lilik Prayitno. Dilution of Eco Enzyme and Antimicrobial Activity Against *Staphylococcus aureus.* JITRO (Jurnal Ilmu dan Teknologi Peternakan Tropis). 9(1):123-128. 2022.

[5] Ginting, N. 2020. Financal analysis of GE (garbage enzyme) application at Universitas Sumatera Utara campus. Sustainable Campus Effort during the Covid-19 Pandemic. Managing Sustainable Universities During Covid-19 Pandemic. Undip Press. Semarang.

[6] Pamungkas, W. Fermentation technology, alternative solutions in an effort to utilize local feed ingredients. J. Aquaculture Media 6 (1) : 43-48. 2011.

[7] Kusumaningati, AM, Nurhatika, S., and Muhibuddin, A. Effect of Inoculum Concentration of Zymomonas mobilis Bacteria and fermentation time on bioethanol production from Vegetable and Fruit Waste Wonokromo Market Surabaya. Pomits Journal of Science and

Arts. vol. 2, No.2. 2013.

[8] NRC (National Research Council). Nutruent Requirements of Poultry. USA. 1977.

[9] Setiawan, D. Production Performance of Quail (Coturnix coturnix japonica) in Different Comparison of Males and Females. Thesis. Animal Production TechnologyStudy Program, Faculty of Animal Husbandry, Bogor Agricultural University, Bogor. 2006.

[10] Wahyu, J. 5th Printing. Poultry Nutrition Science. Gadjah Mada University Press, Yogyakarta. 2004.

[11] Antony. Different options for weight and yolk precursors in Coturnix coturnix japonica. Sci Poultry. 76:437-444. 2003.

[12] Brand, Z., Brand, TS and Brown, CR. The effect of dietary and protein levels on production in breeding female ostrich. br. Poult. science. 44:589-606. https://doi.org/10.1080/00071660310001618343. 2003.

[13] Permatahati. D., Mutiara R. and Astuti. DA. Effect of Cricket Meal (Gryllus bimaculatus) on Production and Physical Quality of Japanese Quail Egg. Tropical Animal Science Journal, April 2019, 42(1):53-58. 2018.

[14] Abbasi, MA, AH Mahdavi, AH Samie, and R. Jahanian. Effects of different levels of dietary crude protein and threonine on performance, humoral immune responses and intestinal morphology of broiler chicks. R. Braz. ci. Solo 16:35-44. https://doi.org/10.1590/S1516-635X2014000100005. 2014.

[15] Pangestuti. Feasibility analysis of quail farming on three-star quail farm in SituIlir Village, Cibungbulang District, Bogor Regency. Thesis. Department of Agribusiness, Faculty of Economics and Management Bogor Agricultural University,Bogor. 2009

[16] Listiyowati, E. and K. Roospitasari. Quail: Management of Commercial Cultivation. Self-help spreader, Jakarta. 2000.

[17] Vera. Control of golden snails (*Pomacea cannaliculata)* in North Tapanuli Regency by using rations to increase egg production and egg weight of quail. Facultyof Agriculture, University of North Sumatra, Medan. 2020.

[18] Kusnadi, H., Jafendi HPS, Zuprizal, and Heru PW. Effect of protein levels withthe same energy balance on the growth of bald-necked and normal chickens up to 10 weeks of age. Animal Husbandry Bulletin 38 (3): 163-173. 2014.