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The Effect of Giving A Mixture of Indigofera (*Indigofera tinctoria*) Flour In Commercial Feedon The Growth of Quail (*Coturnix-coturnix japonica*)

Jihadul Ullia[1], Mustaqim[2*], Suryani[3]

[1]Student of Animal Husbandry Study Program, Faculty of Agricultural and Animal Science, Universitas Islam Kebangsaan Indonesia, Aceh, Indonesia
[2]Biology Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan, Sumatera Utara, Indonesia
[3]Animal Husbandry Study Program, Faculty of Agriculture, Universitas Al Muslim, Aceh, Indonesia

*Corresponding author. Email: mustaqim@unimed.ac.id

Abstract

This research was carried out at Pak Rusdi's farm, Cot Jabet Village, Gandapura District, Bireuen Regency for 45 days starting in May - July 2023. This research aims to see the effect of a mixture of indigofera flour in commercial feed on the growth of quail. The design used in this research was a Completely Randomized Design (CRD) with 4 treatments and 3 replications P0 : 100 % commercial feed (control), P1 : 80 % commercial feed (192 gr) + 20% indigofera flour (48 gr), P2 : 70 % commercial feed (168 gr) + 30% indigofera flour (72 gr), P3 : 60 % commercial feed (168 gr) + 40% indigofera flour (96 gr). The results of the research can be concluded that the effect of giving a mixture of indigofera flour in commercial feed showed no significant difference (P<0.05) on body weight gain and feed conversion of quail. The highest average body weight gain was seen in treatment P2, namely 2.27 g/head/day and the lowest average was in treatment P3, namely 2.18 g/head/day and the highest average feed conversion was found in treatment P3, namely 10.58 gr/head. /day and the lowest average was in treatment P2, namely 10.18 g/head/day.

Keywords: Commercial Feed, Growth, Indigofera Flour, Quail.

1. Introduction

Quail is a type of poultry that is being developed to increase its production. Quail are a source of diversification for meat and egg products. Quail have small bodies, fast growth, early sexual maturity, relatively high egg production, short generation intervals, and relatively fast incubation periods [1]. The most important factor in raising quail is feed, because 80% of the costs incurred by farmers are used to purchase feed. Mentions that one of the factors in which the quail business is not optimal is inefficient feeding management [2]. The growth of quail is greatly influenced by feed with sufficient nutrition. Feed is a basic need for every livestock [3].

Feed is a single or mixed feed ingredient, both processed and unprocessed, which is given to animals for survival, production and reproduction. Preparing feed for quail needs to pay attention to several things such as nutrient requirements according to the growth phase or age of the quail as well as the availability and quality of the feed ingredients used [4]. Feed consumption can show whether the ration made is liked by the livestock or not. Low feed consumption indicates that the ration is less favorable. Low consumption may also be due to the energy content being too high, while high consumption if not followed by increased production indicates that the ration is of low quality [5]. One of the requirements for alternative raw materials is that their nutritional value is similar to that of the candidate raw materials [6].

One of the feed ingredients that has the potential to be used as quail livestock feed is Indigofera flour, which is a local feed ingredient that is cheap, easy to obtain, available at any time and does not compete with human needs, and has nutritional qualities that can meet livestock needs. *Indigofera zollingeriana* is widely developed because it has quite high biomass production with good benefits as a concentrate substitute in rations [7], [8]said that indigofera fermented feed was able to increase the growth of Arabian chickens (*Gallus turcicus*). [9], [10] Also reported that fermented feed from indigofera was able to improve the sperm quality of Arabian chickens (*Gallus turcicus*). *Indigofera zollingeriana*is a legume that has high nutritional value. Apart from having a high protein content, Indigofera is also tolerant of dry seasons, waterlogging and resistant to salinity, so this legume has great potential to be developed in almost all regions of Indonesia [11], [12], [13]. Indigofera is a forage from the legume group (Family fabaceae) with the genus Indigofera and has 700 species, one of which is *Indigofera zollingeriana*. *Indigofera zollingeriana* can be used as forage and high quality supplement for livestock because of its high nutritional content [14], [15], [16]. Thus, it is necessary to carry out in-depth research on the mixture of indigofera leaf flour, so that it can produce growth in quail.

2. Materials andMethods

Time and Place of Research

This research was carried out from May - July 2023 at Pak Rusdi's quail farm, Cot Jabet Village, Gandapura District, Bireuen Regency

Research Materials and Tools

The materials used in this research included: 120 quail (*Coturnix coturnix japonica*) without distinguishing between gender, 36 years old with an average weight of 80-100 g/day and given commercial feed brand Bravo-311 with a mixture of indigofera. Quail that are 36 days old can consume commercial feed well. Meanwhile, the tools used in this research include: cages, feed containers, drinking water containers, egg storage areas, 75 watt incandescent lamps as heaters, disinfection spray, plastic and cardboard to collect dirt and brooms to clean up all existing rubbish, hoes, scales, strollers, digital cameras cannon EOS 200D, and stationery.

Research design

This research used a Completely Randomized Design (CRD) with 4 treatments and 3 replications. Each replication consisted of 10 quail. This plan was created following previous research with slight changes [17]. The treatment is as follows:

P0 = 100 %commercial feed (control)
P1 = 80 %commercial feed (192 gr) + 20% indigofera flour (48 gr)
P2 = 70 %commercial feed (168 gr) + 30% indigofera flour (72 gr)
P3 = 60 %commercial feed (144 gr) + 40% indigofera flour (96 gr)

Research procedure

a) This research used Pak Rusdi's cage in Gandapura District which was made of wood and equipped with a feeder, drinker and egg shelter. Before the research took place, the research cage was first cleaned. The environment around the research site is also cleaned so that livestock health is maintained and the research process is not disturbed. This research consisted of 4 treatments with 3 repetitions, each consisting of several stages, namely:
   - The adjustment stage lasts 7 days, the aim is to adapt the experimental livestock to the environment and feed provided.

- The preliminary stage, which lasts for 7 days, aims to eliminate the influence of residual previous feed. At this stage, experimental livestock are given experimental rations that are appropriate to each treatment for each period.
- The treatment phase lasted 21 days. At this stage, quail are given rations according to the treatment for each replication.

Data collection stage. At this stage, the amount consumed by quail that have been given rations according to the treatment is calculated, namely by the amount of rations given minus the remaining uneaten feed divided by the length of treatment to obtain the amount of ration consumed by the livestock. After that, the increase in body weight is calculated, namely by means of the final weight of the animal after being given the treatment ration minus the initial weight after the preliminary stage divided by the length of treatment, to obtain the value of increase in body weight.

- Next, the ration conversion value is calculated by dividing the ration consumption value by body weight gain to obtain the ration conversion value.

Measured parameters

a. Increase in Body Weight

Measurement of quail weight was carried out by weighing the quail using a digital scale [18].

$$\text{Incease in Body Weight (g/head/day)} = \frac{\text{Final weight (g)} - \text{Initial weight (g)}}{\text{Research duration (days)}}$$

b. Feed Conversion

Feed conversion is obtained by dividing the amount of feed consumed (g/head) by total weight growth (g/head).

$$\text{Feed Conversion (g/head/day)} = \frac{\text{Feed consumption}}{\text{Increased weight}}$$

3. Results and Discussion

Research result

Data from research conducted on worker quail to see their growth using commercial feed ingredients and indigofer flour obtained results as presented in table 1 below.

Table 1.
Results of average body weight gain and feed conversion

Treatment	Observation Variables	
	Body Weight Gain (g/head/day)	**Feed Conversion (g/head/day)**
P0	$2.21^{a}\pm0.05$	$10.44^{a} \pm 0.22$
P1	$2.25^{a}\pm0.03$	$10.27^{a} \pm 0.14$
P2	$2.27^{a}\pm0.01$	$10.18^{a} \pm 0.06$
P3	$2.18^{a}\pm0.04$	$10.58^{a} \pm 0.21$

Discussion

a. Increase in Body Weight

Body weight gain was obtained by comparing the difference between final weight and initial weight with the length of the study. The results of statistical analysis show that P0 (100% commercial

feed), P1 (80% commercial feed + 20% Indigofera flour), P2 (70% commercial feed + 30% Indigofera flour), and P3 (60% commercial feed + 40% flour Indigofera), there was no significant difference (P<0.05) in the increase in body weight of quail. The highest average body weight gain (grams/head/week) was obtained at P2 (2.27) followed by successive treatments P1 (2.25), P0 (2.21) and P3 (2.18).

The high increase in body weight in this treatment is due to the nutritional content in the feed in P2 can further optimize feed consumption when compared to feed in other treatments so that the body weight gain of the quail also increases. The feed consumed by livestock will affect the growth of the livestock. The increase in body weight of livestock is directly proportional to feed consumption, the higher the increase in body weight, the higher the level of feed consumption, based on research results, the highest feed consumption is also found in P2 (70% commercial feed + 30% Indigofera flour). In line with the opinion of [19] stating that the weight increases the body is influenced by the amount of ration consumed, the higher the level of ration consumption, the higher the resulting increase in body weight and conversely the lower the consumption, the lower the increase in body weight. It is confirmed by the opinion of [20] that the amount of weight gain in livestock is influenced by the amount of ration consumed and the level of ration consumption is closely related to growth.

The lowest average body weight gain for quails seen in P3 is thought to be due to the low consumption of rations in this treatment due to the large use of Indigofera flour so that the nutritional content contained in the rations is not sufficient for the livestock's needs. This is in accordance with the opinion of [21] that body weight gain is influenced by several factors including total protein obtained each day, type of livestock, age, environmental genetic conditions, condition of each individual and management and also regarding the quality and quantity of feed provided. [22] said that in order to obtain good growth, several important factors must be taken into account, such as: good seeds, environmental temperature, ration preparation, and adequate housing.

b. Feed Conversion

Feed conversion is a comparison between the amount of ration consumed and the increase in body weight in a certain unit of time. The results of variance analysis showed that P0 (100% commercial feed), P1 (80% commercial feed + 20% Indigofera flour), P2 (70% commercial feed + 30% Indigofera flour), and P3 (60% commercial feed + 40% Indigofera flour), there was no significant difference (P<0.05) in quail feed conversion. The smaller the ration conversion value, the more efficient the animal is in converting feed into meat. The highest average feed conversion (grams/head/week) was obtained at P3 (10.58) followed by successive treatments P0 (10.44), P1 (10.27) and the lowest feed conversion was at P2 (10.18) The lowest average feed conversion was found in P2, namely 10.18 g/head/day, which means it tends to have a good influence on the amount of feed consumed to produce one egg. The feed conversion ratio for quail is higher than for broiler chickens, namely 3.3–4.9 for quail, while for broiler chickens it is 1.3–2.2 [23]. This is directly proportional to the amount of feed consumed and body weight gain. The higher the feed consumption value, the higher the body weight increase and the lower the feed conversion. A low feed conversion value indicates that the efficiency of feed use is good, because the more efficient the quail consume feed to produce meat and eggs [24]. Whether the quality of the feed is good or not is determined by the balance of nutrients in the feed required by the livestock [25].

The highest average was found in the P3 treatment, namely 10.58 grams/head/day. High feed conversion values can be caused by high temperatures resulting in stress in the quail. If there is continuous stress then egg production will be disrupted so that in the end the feed consumed is not metabolized properly [24]. Disruption of metabolism in the quail's body will make feed use inefficient. [26] that feed conversion rates are influenced by factors such as: age of livestock, breed, nutritional content of feed, temperature and condition of poultry. The feed conversion value reflects

the level of efficiency of feed use, the smaller the feed conversion value, the more efficient the use of the feed by livestock [27].

4. Conclusion

The results of the research can be concluded that the effect of giving a mixture of indigofera flour in Commercial feed showed no significant difference (P<0.05) on body weight gain and feed conversion of quail.

a. The highest average body weight gain was seen in the P2 treatment, namely 2.27 g/head/day and the lowest average was in the P3 treatment, namely 2.18 g/head/day.
b. The highest average feed conversion was found in the P3 treatment, namely 10.58 g/head/day and the lowest average was in the P2 treatment, namely 10.18 g/head/day.

References

[1]. Khalil, MM. (2015). Use of Enzymes to Improve Feed Conversion Effi ciency in Japanese Quail Fed a Lupin-based Diet. Thesis. The University of Western Australia.

[2]. Primacitra, YD., Sjofjan, O., dan Natsir, MH. (2014). *Pengaruh Penambahan Probiotik (Lactobacillus Sp.) dalam Pakan terhadap Energi Metabolis, Kecernaan Protein dan Aktivitas Enzim Burung Puyuh*. *J. Ternak Tropika*, 15(1), 74-79

[3]. Afria, AUE., Sjofjan, O., dan Widodo, E. (2013). Effect of Addition of Choline Chloride in Feed on Quail (*Coturnix coturnix japonica*) Production Performance. Fakultas Peternakan. Universitas Brawijaya. Malang.

[4]. Lokapirnasari W.P. (2017). *Nutrisi dan Manajemen Pakan Burung Puyuh*. Airlangga University Press.

[5]. Setyono, H., Kusriningrum., Nurhajati, T., Sidik, R., Al-Arief, A., Lamid, M., dan Lokapirnasari, WP. (2013). *Buku Ajar Teknologi Pakan Hewan*. Surabaya: Airlangga University Press.

[6]. Sjofjan, O., dan Adli, D. N. (2021). The effect of replacing fish meal with fermented sago larvae (FSL) on broiler performance. Development, 33(2).

[7]. Salman L. B., I. Hernaman, I. Sulistiawati, M. Maisarah, H. Yuhani, R. Salim, & A. Arfiana. (2017). Penggunaan Indigofera zollingeriana untuk menggantikan konsentrat dalam ransum sapi perah. Laporan Penelitian Hibah Internal Unpad.

[8]. Zulkifli, Z., Mustaqim, M., Ulfatulhasanah., Wahyuni., M. (2021). The combination of Indigofera sp. Leaf and Corn as Fermented Feed on the Growth of Arabic Chicken (Gallus turcicus). *SEAS (Sustainable Environment Agricultural Science)*,5(2), 145-150.

[9]. Mustaqim, M., Zulfikar, Z., Jannah, C.R., Salsabila. (2021). The supplementation of Fermented Feed (Indegofera Sp and Eurycoma longifolia) Leaves on Arabic Chicken Semen. *SEAS (Sustainable Environment Agricultural Science)*, 5(2),130-135.

[10]. Fajrona.K, Ciptaan. G, Mirnawati. (2023). Kombinasi Penggunaan Empulur Sagu dan Daun Indigofera zollingeriana dalam Ransum terhadap Performa Produksi Puyuh Petelur (Coturnix coturnix japonica). *Jurnal Peternakan Indonesia*,25(2),233-239

[11]. Evitayani. (2023). *Teknologi Pakan Ternak Berbasis Indigofera Zollingeriana Terhadap Nilai Gizi Pada Kambing Peranakan Etawah Secara In Vivo*. Skripsi. Program Studi Pendidikan Profesi Insinyur. Sekolah Pasca Sarjana. Universitas Andalas. Padang.

[12]. Arniaty. S, Rizmi. A, Ubaidatusslihat. (2015). Daya Tahan Tanaman Indigofera Sp. Yang Ditanam Pada Lahan Kritis Pada Musim Kering Sebagai Sumber Pakan Ternak Ruminansia. *Jurnal Ilmiah Peternakan*. 3 (2), 44-47

[13]. Surtaryono. Y.A, Mastura. H, Putra. R.A. (2021). Pertumbuhan Dan Produksi Hijauan Legum Pohon Indigofera Zollingeriana Sebagai Hijauan Pakan Strategis Di Pulau Lombok. *Pastura*, 11 (1), 1-7

[14]. Prayoga, I.K, Fathul, F, Liman. (2018). Pengaruh Perbedaan Umur Panen Terhadap Produktivitas (Produksi Segar, Produksi Bahan Kering, Serta Proporsi Daun Dan Batang) Hijauan *Indigofera Zollingeriana*. *Jurnal Riset dan Inovasi Peternakan*. 2 (1), 1-7

[15]. Nadir.M, Hendrawan, Rinduwati. (2023). Produksi Indigofera Di Musim Kemarau Pada Umur Panen Yang Berbeda. *Buletin Nutrisi dan Makanan Ternak*. 17 (1), 15-27

[16]. Tirajoh. S, Tiro. B.MW, Usman, Soplanit. A. (2022). Pemanfaatan Tepung Daun Indigofera sp. Terhadap Penampilan Produksi Ayam Kampung Unggul. *Jurnal Ilmu dan Industri Peternakan*. 8 (1), 45-57

[17]. Daud.M,Yaman.M.A, Zulfan, Latif. H. (2020). Penggunaan Tepung Daun Indigofera Sp Terfermentasi Dalam Ransum Terhadap Performan Ayam Lokal Pedaging Unggul (Alpu). *Pastura*, 10 (1), 37-41

[18]. Sudrajat, D., Kardaya, D., Dihansih, E. and Puteri, S. F. S., (2018). *Performa produksi telur burung puyuh yang diberi pakan mengandung kromium organik*. *JITV*, 19(4), 257-262.

[19]. Budi, H., (2018). *Pengaruh Penggunaan Full Fat Soya (FFS) Sebagai Substitusi Bungkil Kedelai Terhadap Performa Broiler.* Skripsi. Jurusan Ilmu Peternakan. Fakultas Sains Dan Teknologi. Universitas Islam Negeri Alauddin. Makassar.

[20]. Arianti. dan Ali, A., (2017). *Performans Itik Pedaging (Lokal X Peking) pada Fase Starter yang Diberikan Pakan dengan Persentase Penambahan Jumlah Air yang Berbeda. Jurnal Peternakan*, 6(2), 71-77.

[21]. Herlina, A., (2018). *Pertambahan Bobot Badan Kambing Marica Jantan Dengan Pemberian Pakan Komplit Pada Taraf Protein Yang Berbeda*. Skripsi. Program Studi Produksi Ternak. Fakultas Peternakan. Universitas Hasanuddin. Makassar.

[22]. Nanda, D. D., (2018). *Konsumsi Ransum Dan Pertambahan Bobot Badan Sapi Bali Yang Diberi Silase Daun Pelepah Kelapa Sawit Sebagai Substitusi Rumput Gajah*. Skripsi. Program Studi Peternakan. Fakultas Pertanian Dan Peternakan. Universitas Islam Negeri Sultan Syarif Kasim Riau. Pekanbaru.

[23]. Khalil, MM. (2015). Use of Enzymes to Improve Feed Conversion Efficiency in Japanese Quail Fed a Lupin-based Diet. Thesis. The University of Western Australia.

[24]. Sulastri., (2022). *Pengaruh Penambahan Tepung Daun Glodokan Tiang Terhadap Pertambahan Bobot Badan Dan Konversi Ransum Puyuh Fase Grower*. Skripsi. Fakultas Peternakan. Universitas Jambi. Jambi.

[25]. Pratama, M. R., (2018). *Pengaruh Pemanfaatan Tepung Daun Indigofera (Indigofera Zollingeriana) Dalam Pakan Terhadap Penampilan Produksi Puyuh (Coturnix Coturnix Japonica) Periode Bertelur*. Skripsi. Fakultas Peternakan. Universitas Brawijaya. Malang.

[26]. Zuidhof, M. J., Scheider, B. L., Carney, V. L., Korver, D. R. and Robinson, F. E., (2018). *Growth, efficiency and yield of commercial broilers from 1957, 1978 and 2005. Poulry Science*. 93 (12)

[27]. Mahendra, R., (2022). *Performa Puyuh (Coturnix japonica) Yang Diberi Pakan Komersial Dengan Penambahan Tepung Kunyit (Curcuma longa L.).* Skripsi. Program Studi Peternakan. Fakultas Pertanian Dan Peternakan. Universitas Islam Negeri Sultan Syarif Kasim Riau. Pekanbaru.