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Growth and Productivity of Kampung Chicken Fed with Different Protein Levels

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Abstract

This research aimed to study the growth and productivity of kampung chicken fed with different protein level. Kampung chickens were randomly assigned to a completely randomized design with 4 treatments and 10 replications. The treatments were Ration with 14% protein content (A), Ration with 16% protein content (B), Ration with 18% protein content (C) and Ration with 20% protein content (D). The variables observed were body weight, weight gain, consumption, FCR, digestibility, egg production, percentage of hatched eggs and income over feed. Data were analyzed by variance and if there was a significant difference between treatments ($P<0.05$), it was continued with Duncan's multiple distance test. The results showed that the protein level of the diet 18% significantly ($P<0.05$) increased weight gain, egg production, and better feed use efficiency. The provision of 20% protein gave the same effect ($P>0.05$) on growth, production. Income over feed costs tended to be lower in the protein level of the 20% than 18%. It can be concluded that kampung chickens reared in enriched cages with a ration protein level of 18% and metabolic energy of 2850 kcal/kg showed the best performance in terms of growth, production, hatch percentage, and income over fee cost.

Contents

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1 Introduction

Kampung (non-breed) chickens have a large enough potential to be improved, considering that their potential is quite high and their distribution has spread to all corners of the country. The advantage of this kampung chicken is that it is a dual-purpose type that can be used for egg and meat production (Steelet al., 1991). The weakness of this chicken is the activity of brooding and parenting for a long time and low egg production of around 39-130 eggs/head/year (Sartika, 2005). High adaptability and the ability to find their own food causes native chickens to still exist in the community. Efforts to provide kampung chicken (4-6 weeks old) for special purposes for ritual purposes in Bali have never existed. The need for chickens with special colors is very high because they are needed in various types of ceremonies, rituals among Balinese people, so the need for chickens with special colors is very much and continues almost all the time (Bali Post, 2010).

Due to variations in body weight and egg production of kampung chickens, until now there is no standard for nutritional needs for kampung chickens. The nutritional standard that is commonly used is the recommendation of Scott et al. (1982). Metabolized energy requirements of light type chickens at the starter phase according to Scott et al. (1982), between 2600-3100 kcal/kg and feed protein between 18% - 21.4%.

Differences in protein and energy levels will affect differences in growth and production of native chickens. The high protein and energy content in the ration will increase the palatability of the feed so that feed consumption increases and in the end will increase growth and production (Galal & Radwan, 2020; Katano et al., 2011). On the other hand, increased growth and production will also increase feed consumption so that protein and energy intakes also increase. A diet with a narrow protein calorie balance gave the highest egg and yolk weight (Bintang, 1988). The growth of kampung chicken was higher in chickens that received 3100kcl/kg energy and 22% protein than kampung chickens that received rations with 3000 kcal/kg energy and 18% protein or 2900 kcal/kg energy and 16% protein (Ariesta et al., 2015). Dietary nutrient digestibility (crude protein) from rations with a protein level of 16.5% was higher than those given a protein level of 14.5% or 15.5% (Sugiarta et al., 2018) in kampung chickens fed iso-energy rations. Takdir et al. (2019), investigated the decrease in the protein content of the ration on the response of KUB chickens aged 7-12 weeks from 20% to 10%. It was found that the decrease in ration protein had no maximal effect on the growth of KUB chickens aged 7-12 weeks and had an impact on the low efficiency of the use of rations with the FCR values obtained ranging from 3.7 to 4.4. Mahardika et al. (2013), gave free-range chicken rations containing 3100 k.cal ME/kg and 22% protein, rations containing 3000 K.cal ME/kg and 20% protein, rations containing 2900 K.cal ME/kg and 18% protein and ration containing 2800 K.cal ME/kg and 16% protein. Free-range chicken rations aged 10-20 weeks with energy content at the level of 2,900 kcal/kg and 18% protein rations further increased the ration conversion value between 7.43-9.39

Improvements in maintenance management will greatly affect the productivity of native chickens. A comparison of the three rearing systems and their effect on the performance of native chickens was reported by Hadiyanto et al. (1994). What is interesting from this report is the length of time after incubation to return to laying eggs from 73 days in traditional rearing to 22 days in semi-intensive rearing and 18 days in intensive care. There is no complete explanation of what and how good the type of chicken is used, the feed and management of its maintenance.

The growth rate of hens in the period of reproductive growth to sexual maturity decreases (Kartasudjana & Suprijatna, 2006). When the body's growth rate decreases and hens have not yet produced eggs, their protein needs have not been maximized. The growth of free-range chickens that received higher protein-energy at 3100 kcal of energy and 22% protein was better than that of free-range chickens that received rations with lower energy and protein. Different results were shown by Saputra et al. (2019), that Kampung Super chickens given protein levels of 16%, 17%, and 18% showed the same performance of ration consumption, sex maturity, sex adult weight, first egg weight, egg production, egg weight and ration

conversion as Kampung Super chickens (KUB). The Kampung Super chickens given protein levels of 16%, 17%, and 18% showed the same performance of ration consumption, sex maturity age, sex maturity weight, first egg weight, egg production, egg weight and ration conversion (Faradila et al., 2020; Fitasari et al., 2016).

Kampung chickens have a free-living behavior and agile movements foraging for food in the wild, this causes the use of protein and energy high so that the rate of growth and production becomes slower. Increasing protein and energy levels will improve the physiological performance of livestock so that it will increase livestock production (Mayora et al., 2018; Morrison, 1961). Free-range chickens have a habit of incubating after laying a certain number of eggs. Incubating behavior slows egg laying and reduces chicken body weight. Increasing the provision of protein and energy will increase the production of heat (heat increment) so that it can shorten the hatching period or period. Thus egg production after the incubation period can be accelerated to increase egg production. Increasing the protein and energy content in the ration will increase the price of protein and energy source feed ingredients. Increased growth and production of native chickens can also be achieved by increasing the protein and energy content (Capra et al., 2001; Fang et al., 2002).

Based on the problems above, the objectives of this study were: (1) to obtain the optimal protein level for the growth of kampung chickens, (2) to obtain the optimal protein level in the ration for egg production and (3) the protein level of the ration affects the speed of body weight recovery and spawning after brooding. Income Over Feed cost of increasing the growth and production of free-range chicken is higher than the cost of increasing protein and energy in the ration (Mubaraket al., 2018; Prasadet al., 1996).

2 Materials and Methods

Research Design

The design used in this study was a completely randomized design with 4 treatments and 10 replications and in each replication there was 1 female kampung chicken. The treatments were free-range chickens given a ration with a protein level of 14% (A), a ration with a protein level of 16% (B), a ration with a protein level of 18% (C) and a ration with a protein level of 20% (D). The ration contains the same metabolic energy, which is 2850 kcal/kg. The constituent materials and nutritional content of the treatment rations are listed in Tables 1 and 2

Table 1
Composition of ingredients for treatment ration

Ingredient composition (%)	Treatment			
	A	B	C	D
Corn dent yellow	60.70	55.10	49.00	42.72
Fish meal	7.80	10.20	13.80	17.20
Rice brnad	13.70	10.70	10.20	10.30
Soybean meal	6.90	10.60	13.70	17.00
Coconut meal	3.90	5.55	5.10	5.15
Wheat pollard	3.65	4.50	4.85	4.28
Salt	0.15	0.15	0.15	0.15
Premix	0.20	0.20	0.20	0.20
Grit	3.00	3.00	3.00	3.00
Quantity	100	100	100	100

Table 2
Nutritional Content of Treatment Rations and Prices

Nutrient content	Treatments[1)]				Scott *et al.* 1982[2)]
	A	B	C	D	
Metabolic energy(Kkal/kg)	2,850	2850	2,850	2850	2850
Crude protein (%)	14.00	16.00	18.00	20.00	17
Crude fat (%)r (%)	6.31	6.65	7.23	7.88	6,6[3)]
Crude fiber ($)r (%)	4.23	4.30	4.28	4.31	6,0[3)]
Ca av (%)	1.80	1.99	2.28	2.54	1
Pav (%)	0.43	0.53	0.67	0.80	0,41
Prices(Rp/kg)	5.311	5.671	6.058	6.435	

Explanation:
1) Treatment: A: ration with 14% protein level; B: ration with 16% protein level; C: ration with 18% protein level and D: ration with 20% protein level.
2) Standard Scott et al. (1982)
3) Morrison's Standard (1961)

Maintenance management

The cages for each treatment were made postal "enrich cage" (a cage with a dirt floor so that the chickens had the opportunity to scavenge) for 40 cages. The cage is equipped with a place to eat and drink, a perch and an egg laying place made of wood. This cage is a simulation of the condition of the chickens on display. Each cage measures 1m × 1m with a height of 1m (Figure 1). All cage plots are in a cage building with an asbestos roof and bamboo walls. The female kampung chickens used in this study were obtained from the results of breeding or research of "Upakara" chickens whose parents originally came from farmers in Singaraja, especially Penglatan Village which were deemed untouched by upgrading.

Figure 1. Enrich cage

Chickens are vaccinated with ND and Al vaccines. Chickens were weighed every 4 weeks to determine changes in body weight, feed consumption and FCR. Digestibility was taken after the adult chickens were carried out at 18 weeks. After the age of 20 weeks the chicken will show readiness to be mated (Salameh & Jaber, 2000; Shahidi et al., 1995). The rooster will be put into the coop. One male is used to marry 5 females. The mating system is arranged so that every day a parent is kept together with the male in the hope of mating, the next day the male is transferred to another parent so that on the seventh day the first parent can be bred again and so on until the parent begins to incubate. Correction of feed consumption is carried out when the rooster is put into the hen's cage by looking at the average daily consumption of the male.

Observable digestibility variables

Digestibility of dry matter, organic matter and protein was calculated based on data on ration consumption and dry matter, organic matter and protein content of excreta. The dry matter content was determined by the AOAC method (1990). Dry matter digestibility (KcBK) was calculated based on the total collection method (Tillman et al., 1989; Puger et al., 2019). Feces were collected for 7 days, dried in the sun and then dried in an oven at 70oC for 24 hours. KcBK is calculated by the formula:

$$KcBK = \frac{(A-B)}{A} \times 100\%$$

Where: KcBK= Dry matter digestibility
A=Feed consumption (DM)
Where A= Feed consumption (DM), B= Excreta production (DM)

Digestibility of organic matter (KcBO) was calculated by looking for the ash content of the ration and feces. The organic matter content was obtained by reducing the dry matter content and ash content. Digestibility of organic matter (KcBO) is determined by the formula:

$$KcBK = \frac{(A-B)}{A} \times 100\%$$

Where KcBO is the digestibility of organic matter, A is the level of organic matter in the ration consumed, B is the level of organic matter in feces.
Protein digestibility (KcPK) was calculated based on the total collection method (Prasad et al., 2010). Protein content was determined by the semi-micro Kjeldahl method according to Ivan et al. (1974).
KcPK is calculated using the formula:

$$KcBO = \frac{(A-B)}{A} \times 100\%$$

Where: KcPK is crude protein digestibility (%), A is protein consumption (g/day), B is feces protein content (g/day).

Variables Observed

Variables observed during growth:

1. Body weight, body weight is determined by weighing the chicken during the weighing period (every 4 weeks) during the growth period (until the 20th week), the beginning of egg production, early incubation, at hatching and 21 days after the eggs hatch (DOC are separated)
2. Weight gain, measured by subtracting the weight at the time of weighing with the weight at the time of the previous weighing.
3. Consumption of rations, measured by reducing the ration given to the remaining ration. Weighing of rations is done once a week.
4. Feed conversion ratio: or FCR is determined by dividing ration consumption by weight gain.

Variables observed during production

1. Egg production in weight is calculated by weighing the eggs produced.
2. Egg weight per egg is calculated by dividing the egg weight by the number of eggs produced.
3. FCR or feed conversion ratio is calculated by the amount of consumption divided by weight gain. In the production phase, it is calculated by the amount of ration consumption divided by the amount of weight gain and egg production.
4. The percentage of hatched eggs is calculated by dividing the number of eggs hatched by the number of eggs produced or incubated.
5. Income over feed cost is calculated from the selling price minus the feed price. The selling price is obtained from the number of eggs multiplied by the price of eggs per egg (assuming the price of kampung chicken eggs is 3000 rupiah per egg) plus the weight before incubating multiplied by the parent price of 30000 per kg. The cost of feed is calculated from the amount of feed consumed until the time of incubation multiplied by the price of the ration for each treatment.

3 Results and Discussions

3.1 Digestibility

The dry matter (DM) digestibility of the diet of treatment B, C, D was highly significantly different (P<0.05) compared to the diet of treatment A. The dry matter digestibility of the rations between treatments B, C and D was not significantly different (P>0.05) (Table 3). The digestibility of organic matter and protein digestibility was higher with the increase in the protein content of the ration. Digestibility is closely related to crude fiber content in the ration (Tillman et al., 1989). The rations of treatment A, B, C and D were arranged with crude fiber content that was not much different, namely 4.23; 4.39; 4.28 and 4.31. The real difference between treatments A and B, C and D may be due to the ingredients of the rations. In treatment A, consumption was low because the rice bran component was quite high.

Table 3
Digestibility of rations with different protein level

Variables	Treatments[1)]				SEM [2)]
	A	B	C	D	
DM digestibility (%)	72.19b[3)]	73.03a	73.41a	73.87a	0.28
Organic matter digestibility (%)	82.46b	83.3ab	83.74ab	83.86a	0.36
Protein digestibility (%)	87.88b	90.28a	90.87a	91.64a	0.60

3.2 Performance of kampung chickens during the growing period (20 weeks)

The body weight of chickens fed protein level rations of 16%, 18% and 20% significantly increased compared to the level of 14%, namely 4.5%, 13.64%, 14.6%, respectively. Meanwhile, the body weight of free-range chickens was given a protein level ration of 18% which was not different from the level of 20%. The situation is similar with weight gain. The additional body weight of native chickens fed a protein level ration of 16%, 18% and 20%, respectively, 4.9%, 14.6% and 15.5% was significantly higher (P<0.05) compared to the protein level of 14%. Similar results were presented by Mahardika et al. (2013), Ariesta et al. (2015) that the best performance of free-range chicken is at a protein level of 18% with an energy of 2900kcal/kg or 3000 kcal/kg. There is a close correlation (relationship) between protein level and weight gain of native chickens (Figure 2) with R2=0.9338 with Y = 531.56 ln X - 291.28.

Table 4
The Performance of kampung chickens is given rations with different levels during the growth period (20 weeks)

Variable	Treatments [1)]				SEM[2)]
	A	B	C	D	
Weight 20 weeks (g)	1,186.90 c[3)]	1,240.90 b	1,348.90 a	1,360.40 a	13.92
Consumption	4,908.50 b	4,833.30 b	5,095.00 a	5,147.20 a	32.86
Weight gain 20 weeks (g)	1,112.30 c	1,166.90 b	1,275.60 a	1,285.50 a	14.18
FCR	4.42 a	4.15 a	4.00 b	4.01 a	0.05

Description:
1) Treatment: A: ration with 14% protein level; B: ration with 16% protein level; C: ration with 18% protein level and D: ration with 20% protein level.
2) SEM: Standard error of the treatment means
3) Numbers in the same row followed by the same letter are not significantly different (P>0.05)

The consumption of chicken rations in treatment B was not significantly different (P>0.05) compared to A, but the administration of treatments C and D significantly increased feed consumption (P<0.05) respectively 3.8% and 4.8% compared to treatment B. with treatment A. Between treatments C and D gave the same effect (P> 0.05) on feed consumption. The FCR of chickens given treatment B was not different (P>0.05) compared to treatment A, but treatments C and D caused the FCR to be significantly lower (P<0.05) 9.5% and 9.2%, respectively, than treatment. A. Between treatments C and D, the FCR did not differ (P>0.05). Feed consumption is increasing with better digestibility, causing better feed use efficiency so that weight gain is higher and body weight is also higher. The growth of free-range chickens given a 20% protein level ration began to show a downward trend and was no different from the 18% protein level treatment and even the FCR began to increase. This may be due to limitations in the genetic potential of native chickens to receive high protein in the diet.

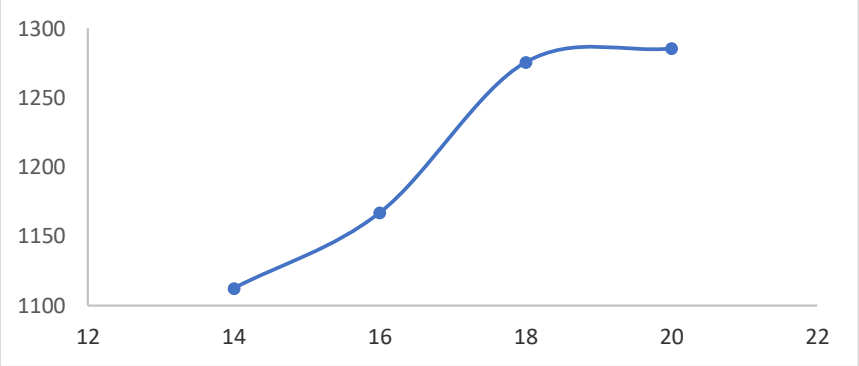

Figure 2. Graph of the relationship between protein levels and weight gain

Description Y = 531.56 ln X - 291.28
R^2 = 0.9338

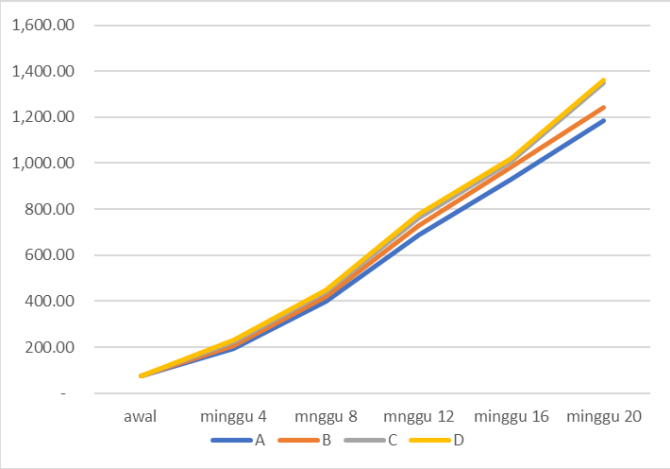

Figure 3. Growth of native chickens during the growth phase (20 weeks)

3.3 Performance of kampung chickens in the production phase

Performance of kampung chickens in early laying eggs

The body weight of kampung chickens in early laying that were given a ration with a protein level of 14% (treatment A) was 1321.3g (Table 5). The body weight of chickens fed a ration with a protein level of 16% (treatment B) was not significantly different (P>0.05) compared to treatment A, but the ration with a protein level of 18% (treatment C) and a level of 20% (treatment D) respectively 8.2% and 11.4% significantly higher (P<0.05) than treatment A.

The weight gain of the kampung chicken laying eggs in treatment A was 209g (Table 5). The weight gain of laying hens in treatments B and D tended to be lower although statistically not different (P>0.05) with A, while treatment C was significantly lower (P<0.05) i.e. 26.3% than A. Chicken ration consumption in treatment B was not significantly different (P>0.05) with treatment A, while treatment C and D were significantly higher (P<0.05) 14.3% and 7.9% respectively compared to A.

The FCR of the early free-range chickens that were given treatment A was 5.73. The FCR of chickens fed treatment B was not statistically different (P>0.05) with treatment A, but was significantly higher (P<0.05) in C and D, 58.2% and 28.1%, respectively, compared to A. The appearance of chickens at the time of laying eggs follows the same pattern as the pattern at 20 weeks of age. This is related to the chicken has not laid eggs so that nutrients are still retained in the body

Table 5
The performance of kampung chickens in early laying eggs (3 weeks before incubating) given rations with different protein levels

Variable	Treatments [1)]				SEM[2)]
	A	B	C	D	
Weight in early laying (g)	1321,3 c[3)]	1356,1 c	1429,5 b	1472,1 a	13,05
Weight gain (g)	209 a	189,2 a	153,9 b	186,6 a	15,13
Consumption (g)	1151,6 b	1077,6 b	1316,5 a	1243,5 a	35,28
FCR	5,73 c	5,88 c	8,76 a	7,34 b	0,48

Description:
1) Treatment: A: ration with 14% protein level; B: ration with 16% protein level; C: ration with 18% protein level and D: ration with 20% protein level.
2) SEM: Standard error of the treatment means

3) Numbers in the same row followed by the same letter are not significantly different (P>0.05)

The Performance of kampung chickens at the end of laying eggs or early incubating

At the time of incubating, the body weight of kampung chickens was given a protein level ration of 14% (treatment A) which was 1268.9 g (Table 6). The body weight of kampung chickens given B and C treatments was statistically (P>0.05) no different from treatment A, while the kampung chickens given D treatment had 6.9% body weight significantly higher (P<0.05) compared to A. The weight gain of treatment A during the laying period was minus or there was a decrease in body weight, namely -52.4 g (Table 6). The weight loss of treatment B chickens was not statistically different (P>0.05) compared to A. Chickens in treatment C and D significantly (P<0.05) experienced a higher weight loss or minus weight gain, namely -26.3 % and -10.7% higher than treatment A.

Table 6
Performance of kampung chickens at the end of laying eggs or early incubating

Variables	Treatmens[1)]				SEM[2)]
	A	B	C	D	
Weight at the end laying (g)	1268,9b[3)]	1293,9b	1325,1ab	1356,9a	17,93
Weight gain (g)	-52,4b	-62,2b	-104,4a	-115,2a	15,52
Consumption (g)	1145,2b	1190,5b	1355,6a	1362,3a	23,29
Total egg weight (g)	257,2c	318,9b	363,8a	390a	13,99
Egg numbers	7,1c	8,8b	9,8ab	10,2a	0,39
Egg weight (g)	36,00b	36,4b	37,2ab	38,3a	0,56
FCR	6,63a	4,77a	5,54a	5,17a	0,56
Income over feed cost	31059,96b	35587,36a	36037,54a	35937,77a	1378,68

There is a close relationship or correlation R2 = 0.9238 increasing the level of ration protein with a decrease in additional body weight during the egg-laying period with regression Y = -193.34 ln.

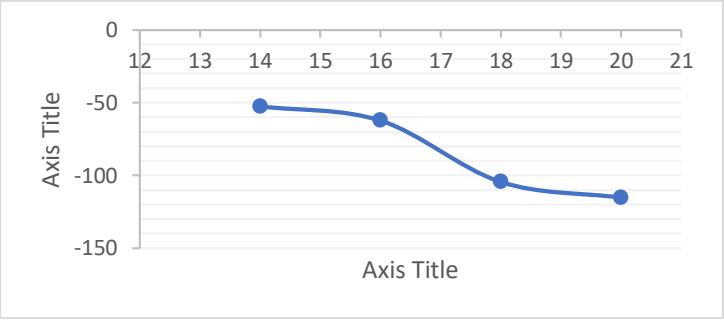

Figure 4. Graph of the relationship between protein levels and weight gain when laying eggs

$Y = -193.34 \ln X + 462.54$
$R^2 = 0.9238$

The consumption of the chicken in treatment B was not significantly different (P>0.05) compared to treatment A. The consumption of chicken in treatment B and C was significantly higher (P<0.05) respectively 18.9% and 18.3% compared totreatment A. Consumption of chickens in treatment C and D was not significantly different (P>0.05). There is a close correlation R^2 = 0.893 with a line Y = 688.18 ln X - 680.71 between the increase in ration protein and feed consumption during the egg-laying period (Figure 5).

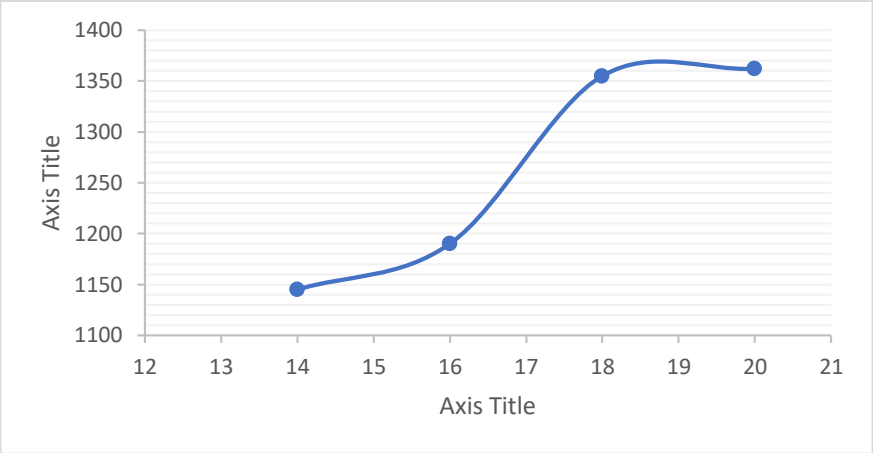

Figure 5 Relationship between protein level and egg consumption

$Y = 688.18 \ln X - 680.71$
$R^2 = 0.893$

The total egg weight of treatment B, C, and D was significantly higher (P<0.05) 23.9%, 41.4% and 51.6%, respectively, compared to treatment A. The total egg weight of treatment C and D was not statistically significantly different (P>0.05). The number of chicken eggs in treatment B, C and D was significantly higher (P<0.05) 23.9%, 38.0% and 43.7%, respectively, compared to treatment A. The number of eggs in treatment C and D statistically not significantly different (P>0.05). Egg weight per egg from treatment B and C chickens was statistically not significantly different (P>0.05) compared to treatment A, while egg weight per chicken from treatment D was significantly higher at 6.38% (P<0.05) compared to with treatment A.

The presence of broodiness means that the number of eggs produced in one laying is still low. This opinion is in accordance with Sartika's (2005), statement which states that due to chickens still incubating and raising children, egg production ranges from 39-130 eggs/head/year. Furthermore, Rajab et al. (2012), stated that the production of free-range chicken eggs in Ambon City was around 41.27 43.74 eggs/head/year. Suryana et al. (2014) found that native chickens fed protein with levels of 11%, 13% and 15% had the same effect on body weight, egg production and feed conversion. FCR (consumption/(weight gain + total egg weight)) of treatment A chickens was 6.63. FCR of chickens treated B, C and D tended to be lower, namely 28%, 16.4% and 22% but statistically not different (P>0.05) compared to treatment A.

The results of the study were somewhat different, shown by Trisiwi (2017), who gave all treatments with an isoenergy feed of 2600 kcal ME/kg. In the early laying period (21-27 weeks), chickens were given the same feed with PK 11.79% and 2718 kcal ME/kg (P4). The results showed that the protein level of feed during growth had no significant effect (P>0.05) on feed consumption, egg production, egg weight, egg mass, feed conversion, protein consumption, egg components, shell thickness, fertility, and hatchability at the laying period of 21-27 weeks, but the level of feed protein has an effect.

The income over feed cost of treatment A is Rp. 31,059,96. The income over feed cost of treatments B and C and D was significantly different (P<0.05) compared to treatment A. The income over feed cost of treatments B, C and D was not different (P>0.05). This was due to the significantly lower consumption of treatment A chickens and the low efficiency of feed use, resulting in lower body weight and egg production even though the prices for B, C and D rations continued to increase. The income over fed cost of treatment D began to decrease compared to treatment B. This may be due to the fact that the high protein intake was not matched by its genetic potential, so that the high protein intake did not affect the appearance of the livestock and actually reduced the income over feed cost (Cohen, 1992; Mittag & Forman-Kay, 2007).

The performance of kampung chickens when the eggs hatch

The body weight of the chickens in treatment A when the eggs hatched was 1069.9g (Table 7). The body weight of native chickens in treatment B, C and D at hatching time were 9.1%, 11.5% and 13.1%, respectively,

and was statistically significantly different (P<0.05) compared to A. Weight the body of native chickens when the eggs hatched between treatments C and D were not statistically significantly different (P>0.05). The weight gain during incubation for treatment A was -126.7g (Table 5.10). The weight gain of treatment B, C and D, respectively 15.5%, 57.1%, and 4.2% significantly higher reduction (P<0.05) than treatment A. The weight gain of chickens in treatment B, C and D were not statistically significantly different (P>0.05). The ration consumption during incubation for treatment A chickens was 1128.5g (Table 5.10). Consumption of ration during incubating for chickens treatment B, C and D tended to be lower by 6.2%, 4.0% and 4.3%, respectively, than treatment A but not statistically significant (P>0.05).

Table 7
Performance of kampung chickens fed rations containing different proteins when the eggs hatch

Variables	Treatments[1)]				SEM[2)]
	A	B	C	D	
Weight at the eggs hatch (g)	1069,9c[3)]	1167,2b	1193,1ab	1210,6a	15,52
Weight gain (g)	-126,7a	-146,3b	-199b	-132b	15,96
Feed consumption (g)	1128,5a	1059,1a	1083,1a	1079,6a	26,77
FCR	-6,54a	-8,95a	-9,73a	-8,27a	1,16
Hatch number	6,3b	8,00a	8,90a	9,30a	0,36
Hatch procentage (%)	89,56b	91,44a	91,40a	91,79a	3,42

Description:
1) Treatment: A: ration with 14% protein level; B: ration with 16% protein level; C: ration with 18% protein level and D: ration with 20% protein level.
2) SEM: Standard error of the treatment means
3) Numbers in the same row followed by the same letter are not significantly different (P>0.05)

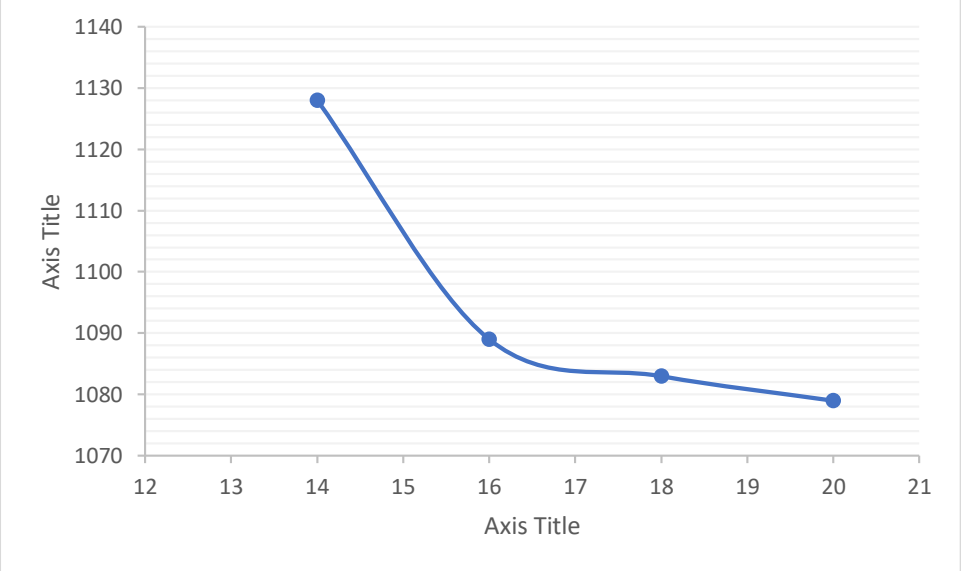

Figure 6. Relationship between protein level and consumption during incubation

$Y = -303.95 \text{ Log } X + 1467.6$
$R^2 = 0.8085$

The FCR of treatment A was -6.54 (Table 7). The FCR of chickens in treatment B, C and D was not significantly different (P<0.05) compared to treatment A. The number of eggs hatched in treatment B, C and D tended to be

higher, respectively 26.9%, 41.3% and 47, 6% but not statistically significant (P>0.05). The percentage of eggs hatched from treatment B, C and D was significantly higher (P<0.05) 2.1%, 2.1% and 2.5% respectively than treatment A. There was no difference (P>0, 05) in terms of hatch percentage for treatments B, C and D.

Performance of kampung chickens 21 days after hatching eggs (chickens are separated from the mother)

The body weight of chickens 21 days after hatching eggs fed a protein level of 14% (treatment A) was 1036g (Table 8). The body weight of treatment B, C and D were 16.1%, 21.3% and 22.8%, respectively, significantly higher (P<0.05) compared to the body weight of treatment Treatments C and D was not significantly different (P>0.05). The weight gain of treatment B, C and D was 35.9g, 63.8g and 61.6 g, respectively, and was significantly different from treatment A (P<0.05). The egg production of treatment B, C and D, respectively, was 250.7%, 519.1% and 567.1% significantly higher (P<0.05) compared to treatment A. There was no difference in egg production between treatments C and D. (P>0.05).

Weight gain and egg production of treatment B, C and D were significantly higher (P<0.05), 3544%, 6342% and 6689% respectively compared to treatment A. Weight gain and egg production of treatment C and chicken eggs D there was no difference (P>0.05). The consumption of the chicken in treatment B, C and D were 15.1%, 32.2% and 34.8%, respectively, significantly higher (P<0.05) compared to treatment A. There was no difference in consumption (P>0 0.05) of the chickens were treated with C and D.

Table 8
Appearance of native chickens 21 days after hatching (DOC separated)

Variables	Treatments[1)]				SEM[2)]
	A	B	C	D	
Weight 21 days after hatching eggs (g)	1036c[3)]	1203.1b	1256.9a	1272.2a	16.31
Weight gain (g)	-33.9b	35.9a	63.8a	61.6a	11.46
Eggs production (g)	38.6c	135.4b	239 a	257.5a	24.10
Weight gain+ eggs production (g)	4.7c	171.3b	302.8 a	319.1a	29.55
Feed consumption(g)	1187.2c	1366.6b	1569.4 ab	1600.1a	72.96
FCR	-41.73b	4.28a	5.82 a	5.49a	11.63

Description:
1) Treatment: A: ration with 14% protein level; B: ration with 16% protein level; C: ration with 18% protein level and D: ration with 20% protein level.
2) SEM: Standard error of the treatment means
3) Numbers in the same row followed by the same letter are not significantly different (P>0.05)

The FCR (consumption/(Weight gain + egg production) of treatment A was -41.73. FCR of treatment B, C and D were 4.28, 5.82 and 5.49, respectively and statistically significantly different (P < 0.05). Between treatments, C and D there was no difference in FCR (P> 0.05). Recovery of body weight to its original weight for chickens that received a higher protein level ration was faster (Figure 7). Kampung chickens that received a protein ration of 14% (treatment A) were unable to return their body weight to its original position after 21 days of hatching the eggs (Jones, 2005; Rodrik, 2005).

The weight recovery of native chickens after the eggs hatch and the chicks are separated is highly dependent on the protein content of the ration. The higher the protein content, the faster the return to the initial weight. This can be seen in the speed of weight gain in treatments B, C and D. The results of this study are in line with those proposed by Saputra et al. (2014), that chicken body weight will increase faster if the protein ration is increased from 11% to 15%

4 Conclusion

From this study it can be concluded that the growth of kampung chickens can be increased by providing a protein content ration of 18% with a metabolic energy of 2850 kcal/kg. Egg production is increased by increasing the protein ration by 18%. Recovery of body weight after incubation can be increased by giving the ration a protein content of 18%. Income over feed costs can be increased by providing a protein content ration of 18%.

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