Growth Response of Improved Breeds of Native Chicken to Diets Differed in Energy and Protein Content

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ABSTRAK

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Penelitian ini bertujuan untuk mengetahui respon pertumbuhan galur ayam lokal hasil seleksi terhadap ransum dengan kadar energi metabolis dan protein ransum berbeda.. Tiga kelompok anak ayam hasil perkawinan galur ayam lokal terseleksi, yaitu Line 1 (♂KUB dengan ♀KUB), Line 2 (♂SenSi dengan ♀KUB) dan Line 3 (♂Gaok dengan ♀KUB), diberi tiga ransum perlakuan berbeda, yang terdiri dari ransum Diet 1 (2800 kkal ME/ kg dengan 17,81% protein kasar), Diet 2, (2950 kkal ME/ kg dengan 18,61% protein kasar) dan Diet 3 (3100 kkal ME/ kg dengan 19,25% protein kasar). Percobaan ini menggunakan rancangan percobaan faktorial 3x3. Setiap kombinasi perlakuan diulang sebanyak 7 kali dengan jumlah anak ayam umur sehari (DOC) sebanyak 5 ekor/ulangan, yang dipelihara sampai dengan umur 10 minggu. Hasil penelitian menunjukkan bahwa galur Line 2 (♂SenSi x ♀KUB) menunjukkan bobot hidup umur 10 minggu yang lebih tinggi (P<0,05), feed conversion ratio (FCR) yang rendah dan European Production Efficiency Factor (EPEF) yang tinggi, dibandingkan dengan kedua galur lainnya. Ransum yang optimum untuk galur Line 2 adalah ransum Diet 2, maka diambil kesimpulan bahwai galur ayam hasil perkawinan ♂SenSi dengan ♀KUB berpotensi untuk dimanfaatkan sebagai ayam lokal tipe pedaging komersial di Indonesia dengan menggunakan ransum optimum yang mempunyai kadar energi 2950 kcal ME/kg dengan 18,61% protein kasar.

Kata Kunci: Ayam KUB, Ayam SenSi, Ayam Gaok, Ransum

ABSTRACT

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The aim of doing this experiment was to observe the growth response of improved native breeds of chicken under diets differed in energy and protein content. Three groups of improved native breeds, obtained from mating of ♂KUB to ♀KUB (Line 1), of ♂SenSi to ♀KUB (Line 2) and of ♂Gaok x ♀KUB (Line 3), were subjected to three experimental diets, differed in metabolizable energy (ME) and crude protein (CP) content. The experimental diets consisted of Diet 1 (2,800 kcal ME/ kg with 17,81% CP), Diet 2 (2,950 kcal ME/ kg with 18,61% CP) and Diet 3 (3,100 kcal ME/ kg with 19,25% CP). The experiment was designed as factorial 3 x 3 with 7 replications of each treatment combination, consisted of 5 birds per treatment combination. The chickens were raised up to 10 weeks of age. Results of the experiment showed that Line 2 (♂SenSi mated to ♀KUB) had highest body weight at 10 weeks of age (P<0.05), lowest feed conversion ratio (FCR) and highest European Production Efficiency Factor (EPEF), compared to other two lines. The appropriate diet for Line 2 was Diet 2. It could be concluded the crossbred line that was resulted from crossing of ♂SenSi to ♀KUB (Line 2), had potential to be used as improved native chicken for the industry in Indonesia supported by appropriate diet containing 2,950 kcal ME/kg with 18.61% crude protein.

Key Words: KUB Chicken, SenSi Chicken, Gaok Chicken, Diets

INTRODUCTION

The increase in demands of native chicken meat in the last decade in Indonesia has been followed by the finding of native KUB chicken as moderately improved native chicken breed. The KUB chicken was selected for egg production subjected to be female line in supporting the production of native day old chick (DOC) for national meat production (Iskandar & Sartika 2014; Hidayat et al. 2011; Hidayat et al. 2014). To create KUB as female line, the IRIAP (Indonesian Research Institute for Animal Production) has also produced SenSi-chicken (Iskandar et al. 2012; Hidayat et al. 2014) and Gaok-chicken (Sartika et al. 2007) as the candidate of male lines in the IRIAP's research project to create grand parent or parent stocks of improved meat type of native chicken.

In order to have an optimum performance as an expression of genetically improved breed, the appropriate supports, such as optimum and appropriate feeding management, including nutrient requirements, is needed to increase biological and economic efficiency. As strongly stated by Leeson (2011), the changing in commercial goals impinge on nutrient needs and feeding programs. Applegate & Angel (2014) reported that scientific community has begun to embrace the concept of return on investment of nutrient used for compositional growth or egg production. The concept has inspired our experiment to find out the optimum level of dietary energy and protein for new improved breeds of native chicken (KUB, SenSi, and Gaok chickens).

Therefore this experiment was aimed to observe the growth response of improved breeds of native chicken raised with rations differed in dietary energy and protein content.

MATERIALS AND METHODS

Experimental animal

Three hundred and fifteen day old chickens (DOC) of improved native breeds obtained from mating of ♂KUB-1 to ♀KUB-1 (Line 1), of ♂SenSi-1 to ♀KUB-1 (Line 2) and of ♂Gaok to ♀KUB-1 (Line 3), were subjected to three experimental rations, differed in dietary ME and dietary CP contents. Each treatment combination was replicated by seven and the experimental design used was randomized complete design in factorial arrangement 3 x 3. In each treatment combination there were five unsexed-DOCs, randomly picked and confined in a colony wire cage with floor space of 35 cm x 35 cm and height of 40 cm. Heating light bulb was constructed to provide proper heat during brooding age. Feed in mash form and drinking water were provided *ad libitum*.

Health programs such as vaccination with proper vaccines and cage sanitation were also applied following the health and sanitations programs for modern broiler, up to ten weeks of age. Immunization program consisted of: i) At four days old the DOC were vaccinated against NDIB (new castle disease and infectious bronchitis); ii) At seven days old the chickens were vaccinated against IBD (gumboro); iii) The IBD vaccine was repeated in day 21; iv) Newcastle disease vaccine was repeated at the age of 28 days. There was no more vaccination applied afterward until the experiment was ended when the chicks were 10 weeks of age.

Table 1. Experimental diets given to the unsexed improved breeds of native chicken up to 10 weeks of age

Ingredients	Diet 1 [3)]	Diet 2	Diet 3
Fish meal, (%)	5.00	5.00	7.83
Corn, (%)	44.65	41.16	57.15
Soybean meal, (%)	16.07	18.66	19.61
Rice bran, (%)	30.00	30.00	10.00
Vegetable oil, (%)	1.00	2.17	3.00
CaCO3, (%)	1.51	1.19	0.99
Dicalcium Phosphate, (%)	0.68	0.67	0.39
NaCl, (%)	0.25	0.25	0.20
Top Mix[1)], (%)	0.30	0.30	0.30
L-Lysine, (%)	0.17	0.19	0.13
DL-Methionine, (%)	0.17	0.21	0.20
Chlorin Cloride, (%)	0.10	0.10	0.10
Sodium bicarbonate, (%)	0.10	0.10	0.10
Total, (%)	100	100	100
Nutrient content:			
Crude protein, (%)	17.81	18.61	19.25
Energy, (kcal ME [2)]/kg)	2800	2950	3100
Energy/protein ratio, (kcal ME/kg protein)	15.72	15.85	16.10
Calcium, (%)	1.31	1.12	1.24
Total phosphorous, (%)	0.72	0.89	0.62
Calcium/Phosphorus ratio	1.82	1.26	2.00
Lysine, (%)	0.36	0.36	0.38
Methionine, (%)	0.19	0.16	0.17
Crude fiber, (%)	4.99	5.13	4.42

1) Every kg of pack of Top Mix contained 1,200,000 iuVit.A; 200,000 iu Vit.D3; 800 iuVit.E; 200 mg Vit.B1; 500 mg Vit.B6; 1,200 mcg Vit.B12; 200 mg Vit. K; 2,500 mg Vit.C; 600 mg CaD-phantothenate, 4,000 Niacine; 1,000 mg Choline Chloride; 3.000 mg Lysine; 12,000 mg Mn; 2,000 mg Fe; 20 mg I; 10,000 mg Zn; 20 mg Co; 400 mg Cu; 1,000 Santoquin (antioxidant) dan 21,000 mg Zn-bacitracin

2) ME: Metabolizable Energy.

Experimental rations consisted of common ingredients (Table 1) and formulated to contain 2,800 kcal ME/kg with 17.81% CP (Diet 1), 2,950 kcal ME/kg with 18.61% CP (Diet 2) and 3,100 kcal ME/kg with 19.25% CP (Diet 3). The experimental diets were given in mash form throughout the experimental period.

Live weight and feed consumption were measured every week from each group of replication. Mortality was recorded at any time when the loss happened. At the age of ten weeks from each replication, one male and one female were taken randomly for carcass and carcass cuts analysis. Slaughter process applied was with the Islamic slaughter method (Hafiz et al. 2015; Ali et al. 2011). Feed conversion ratio was calculated by feed consumed divided by the total live weight gain of bird (g feed consumption/ g live weight gain). European Production Efficiency Factor (EPEF) was calculated using the following formula (Marcu et al. 2013):

Viability: Percent of the number of chickens that live in each replication.
Body live weight: Body live weight at the time of measurement (g/bird).
Age: Age at the time of observation was stopped (day)
FCR: Feed Conversion Ratio

$$\text{EPEF} = \frac{\text{Viability (\%) x Body Live Weight (kg) x 100}}{\text{Age (day) x FCR}}$$

Data were subjected to ANOVA (analysis of variance) using the SAS 9.13 statistical software, after tested their normal distribution using quadratic or inverse transformations. The mean values of the treatments were then tested using Duncan's multiple range tests at the 5% degree of confident.

RESULTS AND DISCUSSION

Body live weight

Performance responses of body live weight, feed consumption, and mortality are presented in Table 2. ANOVA results on these variables did not show any significant interaction effect (P>0.05). Therefore the analysis was applied separately on each treatment factors.

Significantly (P<0.05) higher body live body weight of Line 2 (830 g/bird) than the other two lines showing that the increase of about 8.07% higher than its female parents of Line 1 (♂KUB-1 x ♀KUB-1), which was genetically selected for egg production. Crossing between SenSi (of the sixth generation) as male line and KUB-1 as female line lead us to find prospective formula of parent stock to produce meat type of Indonesian native chicken. While crossing Gaok chicken as male line to female KUB-1 (Line 3) did not show improvement. This might be due to lower (third) generation of Gaok chicken compared to SenSi chicken.

This early attempt of studying of crossing two selected native chickens (SenSi-1 and KUB-1 chickens) was the promotion of the concept in developing National native chicken industry. The attempt might inspire Indonesian breeder in developing the concept of modern chicken breeding that can be applied appropriately in Indonesian native chickens. Selection criteria for KUB-1 chicken was based on egg production resulted in GGP (Great Grand Parent) for female line, while SenSi-1 and Gaok chicken which was selected based on live weight for GGP has to be further observed to find out more effective even more efficient breeding program to create the meat type of native chicken. These three GGP candidates have to be further built up to find out more effective and more

Table 2. Body live weight, feed consumption and mortality of unsexed improved breeds of native chicken given experimental diets up to 10 weeks of age

Factors	Body live weight (g/bird)	Feed consumption (g/bird)	Mortality (%)
Lines (L)			
Line 1 (♂KUB-1 x ♀KUB-1)	768^{b} 3)	2517^{a}	4.76^{a}
Line 2 (♂SenSi-1 x ♀KUB-1)	830^{a}	$2,502^{a}$ 1)	0.95^{a}
Line 3 (♂Gaok x ♀KUB-1)	732^{c}	2341^{b}	1.90^{a}
SE 1)	27	68	3.24
Diets (D)			
Diet 1 2)	771^{x}	$2,429^{y}$	0.95^{x}
Diet 2	840^{y}	$2,560^{x}$	0.95^{x}
Diet 3	720^{z}	$2,372^{y}$	5.71^{x}
SE	25	70	3.07
Interaction			
L x D	NS 4)	NS	NS

1) SE = Standard Error
2) Dietary treatment consist of; Diet 1 contained 2,800 kcal ME/kg with 17.81% crude protein (CP), Diet 2 contained 2,950 kcal ME/kg; with 18.61 % CP; Diet 3 contained 3,100 kcal ME/kg with 19.25 % CP
3) Values in the same column and factor, with difference superscript are significantly different (P<0.05)
4) NS: Not statistically significant (P>0.05).

efficient breeding program in order to produce final lines for improved meat type of native chicken.

In the purpose of improving performance of Indonesian native chicken, although it does not have a high body weight especially at early age like modern broiler, the native chicken is the breed with tolerance to hot and humid climate. Attempts of breeding the birds with tolerance breed to specific nutritional deficiencies as indicated by Pym (2011) may considerably be overcome by the use of available commercial feed ingredients and complete feed for modern chicken industry.

Live weight at 10 weeks of age was influenced by nutrition as shown in Table 2. Diet 2 containing 2,961 kcal ME/kg with 18.61% crude protein, offered better feed to chicks with the highest (P<0.05) live weight (840 g/bird) compared to Diet 1 (771 g/bird or Diet 3 (720 g/bird). Lowest (P<0.05) live weight of the chicken in Diet 3, containing 3,100 kcal ME/kg with 19.25% crude protein, showing that this diet was not much suitable for the chicken. The dietary energy of Diet 3, somehow may probably increase in order to balance the appropriate ratio, however, Diet 2 with lower crude protein and energy would be more efficient.

Feed consumption and efficiency

There was no effect of interaction of breed and nutrition (P>0.05) on feed consumption. Line 3 (♂Gaok x ♀KUB-1) consumed less feed (2,341 g/bird; P<0.05) compared to the other two breeds (2,502 g/bird for Line 2 and 2,517 g/bird for Line 1) (Table 2). It seemed that improving performance of native chicken decreased feed consumption as it was shown by the early selected Sentul chicken, which is the grand parent of SenSi chicken, consumed the same quality feed more (2,602 g/bird) at the same age (Iskandar et al. 2012), however, it was slightly more when compared to SenSi chicken fed with different quality of ration (2,400 g/bird, Iskandar et al. 2015).

There was significant effect (P<0.05) of interaction between breeds and quality of experimental rations on feed conversion ratio (FCR). Table 3 show that chicken in ration Diet 2 significantly (P<0.05) had the best FCR than the other two experimental diets. Feed formulation of Diet 2, containing 2,950 kcal ME/kg with 18.61 % crude protein was probably the optimum for all lines. Line 2 (♂SenSi-1 x ♀KUB) feed utilization was more efficient than the Line 1 or Line 3, although the value of feed conversion ratio slightly higher (3.09 kg/kg) than that of reported by Iskandar et al. (2015) of about 2.5 kg/kg. In term of FCR Line 2 converted feed more efficiently into body on Diet 1, which contained 2800 kcal ME/kg with 17.81% CP, while the other two lines were on Diet 2. Chicken of the Line 1 would actually be expected to consume more feed to grow a kilo gram of its live weight than other lines, as it was selected for egg production.

Economic efficiency in term of EPEF (European Production Efficiency Factor) suggested by Marcu et al. (2013) was also used to measure the economic efficiency. There was significant (P<0.05) effect of interaction between lines and diets. Table 3 shows inverse pattern of FCR and confirms that line S2 chicken was more efficient than that of other two lines fed diet Diet 2. The highest value (EPEF of 411) was achieved by Line 2 (♂SenSi-1 x ♀KUB) on diet Diet 2, while the lowest (EPEF of 296) was achieved by Line 1 on Diet 3. So, in term of EPEF young chicks of crossbred of ♂SenSi-1 x ♀KUB-1 (Line 2) would perform much better on Diet 2.

Mortality

Mortality values were presented in Table 2, there was not any significant (P>0.05) difference between

Tabel 3. Feed Conversion Ratio (FCR), European Production Efficiency Factor (EPEF) of unsexed improved breeds of native chicken given experimental diets up to 10 weeks of age

Variable	Line 1 (♂KUB-1 x ♀KUB-1)			Line 2 (♂SenSi-1 x ♀KUB-1)			Line 3 (♂Gaok x ♀KUB-1)			SE [3)]
	Diet 1 [1)]	Diet 2	Diet 3	Diet 1	Diet 2	Diet 3	Diet 1	Diet 2	Diet 3	
FCR (kg feed consumption/ kg live weight gain)	3.44^{b} [2)]	3.14^{cde}	3.74^{a}	3.02^{e}	3.0^{de}	3.29^{bcde}	3.41^{bc}	3.28^{bcde}	3.34^{bcd}	0.03
EPEF	319^{c}	387^{ab}	237^{d}	385^{ab}	411^{a}	332^{bc}	296^{c}	332^{bc}	296^{c}	8.63

1) Dietary treatments consisted of; Diet 1 contained 2,800 kcal ME/kg with 17.81% crude protein (CP), Diet 2 contained 2,950 kcal ME /kg with 18.61 % CP; Diet 3 contained 3,100 kcal ME /kg with 19.25 % CP
2) Values in the same row with difference superscript are significantly different (P<0.05)
3) SE = Standard Error.

experimental factor either breeds factor nor diets factor. It could not be concluded as it had higher standard error of mean. The high mortality of 4.76% happened in Line 1 compared to 0.95% in line Line 2. There was no satisfactory explanation why such mortality figures appeared in the experiment.

Nutrients consumed

Nutrients consumption in term of g/kg body live weight (BLW) was presented in Table 4. The nutrients consumption was affected by the interaction (P<0.05) of breeds and diets. Therefore, the figures show that each breed of chicken should have its own optimum level, depended on the genetic capacity.

Dietary ME (metabolizable energy) consumed by the birds, varied with breeds and diet factors. Dietary ME was utilized efficiently to a kilo gram (kg) of BLW was by crossbred ♂SenSi-1 x ♀KUB-1 on Diet 1 (8,150 kcal ME/kg BLW), meanwhile ♂Gaok x ♀KUB-1 (9,147 kcal/kg BLW) was on Diet 1, which was not significantly (P>0.05) from the other two lines on the same diet. The figures, which are the amount of energy consumed per kg BLW, could be interpreted as efficiency of particular nutrient in part of formation one kg BLW of chicken. The lower dietary energy consumed, the more efficient the bird in utilizing diet.

From point of genetic capacity, all lines did not show response of increasing consumption of dietary energy when fed low energy diet. It is unlike the old concept which stated that bird will consumed more diet on low energy density diet. This phenomenon was also discussed by Mbajiorgu et al. (2011) on native Venda chicken, due to the loss sensitivity to regulate feed intake according to dietary energy level, although the physiological explanation was not clear and merited further investigation.

The pattern of crude protein and lysine consumptions (g/kg LW) followed pattern of their energy consumption (Table 4), leading to indication that crossbred ♂SenSi-1 x ♀KUB-1 chicken was more efficient in utilizing protein and amino acid lysine in Diet 1, whilst all breeds utilized dietary protein and energy of Diet 2 was fairly similar. Diet 3 was not quite appropriate in having energy, protein and lysine levels available for supporting the maximum growth of the three breeds. As a result of that occurs in Diet 3 allegedly associated with an imbalance of nutrients that occurs on Diet 3. Dairo et al. (2010) revealed that increase of energy content of the experimental diets indicated to a large extent adequacy of supply of other nutrients even at the minimal dietary level, hence formulation of animal feed must take into consideration the nutrient density with energy as the prime factor of the particular feed to facilitate production objectives.

Methionine and calcium consumptions were having much the same pattern, showing that all lines utilized amino acid methionine and calcium more efficient on Diet 2 in comparison to the other two experimental diets. However, contrary to the response of lines to those two nutrients, phosphorus consumption was more on Diet 2 compared to other two diets. This case is likely due to the ratio of Ca/P are different ratio of Ca/P in all three treatment diets and not ideal for chicken since the ideal ratio of Ca/P is 3 : 1.

Table 4. Nutrients consumed of unsexed improve breeds of native chickens given experimental rations up to 10 weeks of age

Consumption	Line 1 (♂KUB-1 x ♀KUB-1)			Line 2 (♂SenSi-1 x ♀KUB-1)			Line 3 (♂Gaok x ♀KUB-1)			SEM [5)]
	Diet 1 [3)]	Diet 2	Diet 3	Diet 1	Diet 2	Diet 3	Diet 1	Diet 2	Diet 3	
Energy, (kcal ME [1)]/ kg BLW [2)])	9,251^{bc} [4)]	8,931^{c}	11,073^{a}	8,150^{d} [4)]	8,818^{cd}	9,796^{b}	9,147^{bc}	9,295^{bc}	9,910^{b}	125
Crude Protein, (g/kg BLW)	588^{bcd}	563^{cde}	687^{a}	518^{e}	556de	608^{bc}	581^{bcd}	586^{bcd}	615^{b}	7.41
Lysine, (g/Kg BLW)	11.89^{b}	10.90^{cd}	13.57^{a}	10.48^{d}	10.76^{d}	12.01^{b}	11.76^{bc}	11.34^{bcd}	12.14^{b}	0.14
Methionine, (g/kg BLW)	6.27^{a}	4.84^{d}	6.07^{a}	5.53^{b}	4.78^{b}	5.37^{bc}	6.20^{a}	5.04^{cd}	5.43^{bc}	0.08
Calcium, (g/kg BLW)	43.28^{a}	33.90^{d}	44.29^{a}	38.13^{bc}	33.48^{d}	39.18^{b}	42.79^{a}	35.29^{cd}	39.64^{b}	0.58
Phosphorus, (g/kg BLW)	23.78^{b}	26.94^{a}	22.14^{bc}	20.95^{cd}	26.60^{a}	19.59^{d}	23.52^{b}	28.04^{a}	19.82^{d}	0.41

1) ME : Metabolizable Energy
2) BLW : Body Live Weight
3) Dietary treatments consisted of; Diet 1 contained 2,800 kcal ME/kg with 17.81% crude protein (CP), Diet 2 contained 2,950 kcal ME/kg with 18.61 % CP; Diet 3 contained 3,100 kcal ME/kg with 19.25 % CP
4) Values in the same row with different superscript are significantly different (P<0.05)
5) SEM : Standard Error of Mean.

The phenomenon also mentioned by Mbajiorgu et al. (2011) in their discussion paper that chickens will increase intake in response to marginal level of first limiting feed nutrient and independent of dietary energy level (Boorman 1979) since appetite was assumed to depend on nutrient requirements of the animal and the contents of those nutrients in the feed (Emmans & Fisher 1986). However, contrary to the fact that phosphorus level in Diet 2 was higher than that level in Diet 1 or Diet 3. The increase in feed consumption was not clearly due to phosphorus level in the diet. Adamu et al. (2012) reported that dietary Ca : P ratio of 3 : 1 was favorable for finishing broiler chickens under semiarid environment. In this experiment Ca : P ratios were 1.86, 1.26 and 2.00 respectively for Diet 1, Diet 2 and Diet 3, which might not at proper ratios. The finding suggested us to do further investigation, particularly with native chickens.

Carcass

Carcass in term of dressing percentage and carcass cuts are presented in Table 5. There was no significant (P>0.05) effect of the interaction between breeds and quality of experimental diets on carcass. The data were analyzed according to each factor. Line 1 chicken had slightly higher (P<0.05) dressing percentage (64.94%) compared to the other two breeds performing only up to about 63% dressing percentage. There were no significant (P>0.05) different in breast, gizzard and fat pad percentage among the three breeds. Slightly higher thighs percentage (10.58%) and liver percentage (2.43%) of Line 1 chicken revealed in the experiment. The carcass performance of the all lines of the chicken for some extent was not much different from other Indonesian native chicken as reported by Iskandar et al. (2012) on Sentul native chicken of having dressing percentage of 62% for female and 71% for male, and of having breast percentage of about 17% for both female and male at 10 week of age. There was obviously, lower than dressing breast, thighs percentage of exotic broiler chickens (Beg et al. 2016).

However, it is interesting to note in native that the abdominal fat pad was much lower, showing that the native chicken meat would be much healthier than exotic broiler chicken for human consumption (Ewald 2015). Furthermore, Guan et al. (2013) reported that native chickens produced better quality meat as far as inosine-5’ monophosphate (IMP) content, fiber diameter, and shear forces were concerned.

Table 5. Percentage of dressing, breast, thighs, drumstick, liver, gizzard, abdominal fat pad of 10 weeks old of unsexed improved breeds of native chicken given diets differed in nutrients content.

Factors	Dressing (%) 3)	Breast (%)	Thighs (%)1)	Drumstick (%)	Liver (%)	Gizzard (%)	Abdominal fat pad (%)
Lines (L)							
Line 1 (♂KUB-1 x ♀KUB-1)	63.00^{b} 4)	16.06^{a}	11.06^{b}2)	10.19^{b}	2.38^{b}	2.62^{a}	0.52^{a}
Line 2 (♂SenSi-1 x ♀KUB-1)	63.18^{b}	15.44^{a}	11.34^{ab}	10.49^{a}	2.56^{a}	3.72^{a}	0.42^{a}
Line 3 (♂Gaok x ♀KUB-1)	64.94^{a}	16.06^{a}	11.58^{a}	10.42^{ab}	2.43^{ab}	2.85^{a}	0.17^{a}
SE 1)	0,86	0,39	0,25	0,16	0,09	0,50	0,22
Diets (D)							
Diet 1 2)	63.93^{x}	15.59^{y}	11.47^{x}	10.40^{x}	2.45^{xy}	2.85^{x}	0.24^{x}
Diet 2	64.07^{x}	16.26^{x}	11.27^{x}	10.23^{x}	2.36^{y}	2.86^{x}	0.38^{x}
Diet 3	63.12^{y}	15.71^{xy}	11.24^{x}	10.47^{x}	2.56^{x}	3.48^{x}	0.48^{x}
SE	0.92	0.39	0.26	0.17	0.09	0.52	0.23
Interaction							
L x D	NS 5)	NS	NS5)	NS	NS	NS	NS

1) SE = Standard Error
2) Dietary treatments consisted of; Diet 1 contained 2,800 kcal ME/kg with 17.81% crude protein (CP), Diet 2 contained 2,950 kcal ME/kg with 18.61 % CP; Diet 3 contained 3,100 kcal ME /kg with 19.25 % CP
3) As the ratio to live weight
4) Values in the same column and factor with difference superscript are significantly different (P<0.05)
5) NS = Not Significant (P>0.05).

The influence of experimental diets on carcass percentage was statistically significant ($P<0.05$), showing that Diet 2 facilitated better to produce more dressing, and breast percentage. Whilst the other carcass cuts, except liver, were not influenced by the level of dietary energy and protein. Abdominal fat pad varied from 0.24% to 0.48% with varying in protein or energy content of the diets. The gap of figures was actually wide, but it was not any statistically different. This was due to the high SEM (0.23%) as the result of high variation of the individual bird fat pad and constant energy/protein ratio (about 158 kcal ME/kg crude protein). However, the level of fat pad of the native chicken breeds was again much lower than of exotic broiler chicken (Azizi et al. 2011). The absence of effect on dressing percentage and cut carcass composition associated with the similar protein energy ratio among all treatment diets, Rosa et al. (2007) said that some of the results of the experiment showed that the content of energy and protein in the diet had no influence on the composition of cut carcass composition of chicken.

CONCLUSION

It is concluded that Line 1 (♂KUB-1 x ♀KUB-1) and its crossbreeds, Line 2 (♂SenSi-1 x ♀KUB-1) and Line 3 (♂Gaok x ♀KUB-1) had slightly difference biological response to rations differ in nutrient content. Meanwhile, indigenous crosses breed ♂SenSi-1 x ♀KUB-1 potential for commercial native meat chicken in Indonesia with diet contained 2,950 kcal ME/kg with 18.61% crude protein raised up to 10 weeks of age.

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