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Effects of Dietary Inclusion of Oil Palm Seed Meal in The Diet on the Production Performance of Growing Native Chickens

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ABSTRACT
An experiment was conducted for 12 weeks to determine the effects of dietary inclusion of oil palm seed meal in the diet on the production performance of growing native chickens. 60 unsexed native chicks used in this study. They were randomly allotted into receive four dietary treatments with five replicates of three chicks/replicate. Dietary treatments were formulated according to NRC (1994) recommendations, and the four dietary treatments consisted of T0, T1, T2, and T3 supplemented with 0%, 25%, 50% and 75% of dietary inclusion of oil palm seed meal in the commercial diet supplied by Sinta Prima Feed Mill Indonesia, and they contained 3000, 2688, 2375 and 2063 kkal/kg of metabolisable energy and 21, 17, 13, and 9% crude protein respectively. The parameters measured were feed intake, feed conversion, body weight gain, body weight, carcass percentage and income over feed cost (IOFC). Dietary inclusion of oil palm seed meal in the diet for native chickens resulted highly significant (P <0.01) feed intake, feed conversion ratio, body weight gain, body weight and IOFC. While dietary inclusion of oil palm seed meal in their diets produced no significant effect (P> 0.05) on their percentage of carcasses. In conclusion, dietary oil palm seed meal can be included up to 50% in the diet of native chickens until the age of 12 weeks, and resulted in their weight gain were relatively similar to the control diet with their feed conversion ratio was the lowest compared with other treatments.

Keywords: oil palm seed meal, native chickens, production performance, IOFC

1. INTRODUCTION

Indigenous/native breeds of chickens are playing an important role in rural economies in most of the developing and underdeveloped countries. They play a major role for the rural poor and marginalised section of the people with respect to their subsidiary income and also provide them with nutritious chicken egg and meat for their own consumption (Henuk¸ 2015; Padhi¸ 2016).

Native chickens are commonly raised in many areas of Indonesia and play a major role in food production, often providing the main source of dietary protein in the diet of Indonesian people. They are often called "non-breed chickens"— ("or "ayam kampung" or "ayam buras") to differentiate local chickens from commercialized chicken breeds such as widely known strains of Cobb, Hubbard, Hybro, Isa, Hyline and Hisex (Henuk et al.¸ 2015; Henuk¸ 2016). Backyard farming has over the years contributed to a great extent to the agrarian economy of different countries. In the same way, rural backyard poultry production plays a vital role in the rapidly growing economy. It provides livelihood security to the family in addition to securing the availability of food. Unemployed youth and women can also earn an income through poultry farming. Indigenous breeds are well known for their tropical adaptability and disease resistance, while their plumage colour helps in protecting themselves against predators (Henuk¸ 2015; Padhi¸ 2016).

Native chickens therefore supply meat that has a specific texture and taste and contains lower fat and thus is not only preferred by most consumers in Indonesia, but also their meat commands a higher market price than the broiler meat. Eggs from native chickens are also more expensive than from commercial chicken eggs sold in the supermarket and are used as part of traditional medicine called "Jamu" which is popular in Indonesia (Henuk et al., 2015; Henuk¸ 2016; Muliany¸ 2015). The special quality of the native chicken meat such as smell, taste, and chewiness of the meat as generally accepted by consumers has caught the attention of some commercial producers. But most of the native chicken populations remain on rural farm households (Hidayat and Yahya, 2013; Henuk, 2016; Henuk et al.¸ 2016). Nowadays, consumers are becoming more health conscious and want to consume meat with lesser chemical residues. With this, meat from native chickens could meet this demand since they are generally raised with lesser or no input of synthetic chemicals. Native chickens are also used for religious purposes and traditional ceremonies. This is why consumers are willing to pay for their higher price when compared to intensively reared broiler meat (Henuk et al., 2015; 2016).

In general¸ feed poultry holds an important role in chicken farm. The existence of feed influences significantly on the success of a farm business. The price of feed poultry keeps increase all the time nowadays as a result of dependency on imported raw ingredients that also keep rising, today about 70% of raw ingredients in Indonesia (e.g. soybean meal and fish meal) is still imported. This has caused poultry farmers still considered as a volatile industry because it does not depend on local. The cost of feeding in poultry business has the largest portion or reaching 70-80% of the total cost production (Irmasusanti et al.¸ 2013).

According to Padhi (2016)¸ performance of native chickens can be improved by change in husbandry, feeding, and better health cover. As regards feeding¸ improved nutrition is critical for increasing egg and meat production in native chickens in Indonesia, which are hardier than imported breeds on free range when little or no food is supplied by the owner (Dewi et al., 2010; Henuk and Bailey, 2014). The nutritional requirements of commercial chickens, turkeys, pheasants and related poultry stock have been estimated (NRC, 1994). However, information on the nutrients requirements of native chickens are limited and most of the works done on local poultry used local ingredients are based mainly on nutrient requirement of exotic breeds (Dewi *et al*., 2010). Optimal response in growth rate, feed conversion ratio, nutrient digestibility, and protein intake in native chickens during the starter phase (0 – 8 weeks) increase with an increased in dietary energy and protein level except feed intake, initial body weight, the digestibility of dry matter and protein digestibility (Dewi et al.¸ 2015). Economically, as feed costs are generally very high about 60 – 70 % of the total cost of production, therefore, taking advantage of local feed ingredients are cheap, easily available and do not compete with humans is a good choice as food native chickens. Our field observation and interviewed with farmers of native chickens kept around oil palm plantation areas in Solok¸ West Sumatera indicated that native chickens always directly consume cracked oil palm seeds felt down under the oil palm trees and they performed well. This study was conducted to determine the effects of dietary inclusion of oil palm seed meal supplementation in the diet on the production performance of growing native chickens.

2. MATERIALS AND METHOD

This study was carried out for 12 weeks and used 60 unsexed native chicks. Dietary treatments were formulated according to NRC (1994) recommendations, and the four dietary treatments consisted of T0, T1, T2, and T3 supplemented with 0%¸ 25%¸ 50% and 75% of dietary oil palm seed meal in the commercial diet supplied by Sinta Prima Feed Mill Indonesia¸ and their diets contained 3000, 2688, 2375 and 2063 kkal/kg of metabolisable energy and 21, 17, 13, and 9% crude protein respectively (Table 1).

Table 1. Composition and chemical characteristics of experimental diets for native chickens.

Ingredients	Treatments			
	T0	T1	T2	T3
Commercial diet (%)	100	75	50	25
Oil palm seed meal (%)	0	25	50	75
TOTAL	100.0	100.0	100.0	100.0
Calculated chemical composition				
Metabolisable Energy (kcal/kg)	3000	2688	2375	2063
Crude protein (%)	21.0	17.0	13.0	9.0
Fat (%)	6.0	9.2	12.3	15.5
Crude fiber (%)	4.0	3.3	2.5	1.8
Dry matter (%)	88.0	85.0	82.0	79.0

All diets were fed in meal form and feed and water were provided *ad libitum*. Feed intake and body weight for individual chicks were recorded weekly. Feed conversion ratio was obtained by dividing weekly feed intake by weekly body weight gain. At 12 weeks of age, after fasting for 12 hours before slaughter, all birds in each replication were individually weighted (total of 60 birds), stunted and killed by hand using conventional neck cut for bleeding. Scalding was operated and manually eviscerated.. The carcass weight was calculated by removing the feathers, blood, head, feet, and organs. The carcass yield was expressed as a percentage of live weight (Promketa et al., 2016).

Income Over Feed Cost (IOFC) is the difference of total income with total cost of feed using during the raising period of layer. According to Prawirokusumo (1990), formula that can be used is: IOFC = income - total feed cost. IOFC in this study can be calculated using the following formula: price of chickens sold (Rp) - (rations cost + chicks cost). The data collected in this study were subjected to the standard analysis of variance technique (Steel and Torrie, 1995), and Duncan's Multiple Range test was used to detect differences among the means.

3. RESULTS AND DISCUSSION

Effects of dietary treatments on the production performance of native chickens during growing period (1 – 12 weeks) is summarized in Table 2. Feed intake, feed conversion ratio and body weight gain, body weight were highly significantly (P<0,01) decreased by the increased inclusion of oil palm seed meal in the diet. While supplementation of oil palm seed meal in their diets produced no significant effect (P> 0.05) on their percentage of carcasses.

Table 2. Effects of Dietary Treatments on The Production Performance of Native Chickens During Growing Period (1 – 12 Weeks)

Parameters	Treatments			
	T0	T1	T2	T3
Feed intake (g)	4.896,40^{a}	3.771,60^{b}	3.831,15^{b}	3.762,60^{b}
Feed conversion ratio (g/g)	5,30^{a}	4,68^{a}	4,33^{b}	4,66^{a}
Body weight gain (g)	921,65^{a}	805,40^{b}	885,80^{a}	808,30^{b}
Body weight (g)	1.121,65^{a}	1.005,40^{b}	1.085,80^{a}	1.008,30^{b}
Carcass percentage (%)	66,04^{a}	67,23^{a}	68,87^{a}	66,08^{a}
Income Over Feed Cost (Rp)	24.906,00-^{a}	24.496,00-^{a}	21.580,00-^{b}	20.754,00-^{b}

Notes: Means with different superscript within a column are highly significant different (P<0,01).

Energy and protein are the main nutrients that affect the growth of chickens. Decrease consumption of these nutrients will cause a decrease in the growth of chicken (Nieto et al., 1997). Thus, native However, decreasing dietary energy and protein level tends to reduce final body weight gain. Such improved in feed efficiency has been reported by Dewi et al. (2010), who found that diets with high energy and protein tends to accelerate growth and improve feed conversion ratio of native chickens. Our results were higher than the findings of Iskandar et al. (2000)¸ who found that body weight of native chickens at the age of 12 weeks was 860 to 900g. In general¸ all native chickens in Indonesia has an average body weight of less one kg per bird at the age of 12 weeks (Cresswell and Gunawan¸ 1982). Feed conversion ratio in this research¸ particularly T1 – T3¸ is lower than that obtained by Suryana and Hasbianto (2008)¸ who found that the chickens' feed conversion ratio of intensively reared ranged from 4.90 to 6.90. Yunilas (2005) reported that the smaller the resulting feed conversion ratio means the ration used by native chickens is better.

chickens fed T3 receiving the lowest energy and protein level (2063 kcal/kg and 9%) recorded the lowest body weight gain as compared to them fed T0, T1 and T2

Carcass percentage of native chickens in this study during the growing period ranged from 66.04 – 68.87% were within the normal range of 65 – 75% of broiler chickens recommended by Jull (1992). Our results were higher than the findings of Iskandar (1994)¸ who reported that native chickens kept under intensive management for 12 weeks consumed feed of 3500g/bird¸ weighed 798g/bird and had a carcass percentage of 63% with their market demand from 750 to 1000g of live weight is usually preferred by consumers in Indonesia. The difference in carcass percentage between our study are attributed to low body weight of native chickens (Choo et al.¸ 2014) and indeed their diets. Our results in line with the findings of Brakle *et al*. (1993)¸ who reported that the percentage of carcasses in broilers related to their age and body weight. According to Ardiansyah et al. (2013)¸ IOFC greatly influenced by feed intake, final weight, feed prices, and the selling price of chicken. Thus, IOFC of native chickens fed T3 pricing the lowest IOFC (Rp. 20.754¸00-) compared to them fed T0, T1 and T2. Interesting to note that native chickens in the group T2 consumed more feed¸ produced more body weight gain¸ heavier body weight and thus produced higher carcass percentage with higher IOFC compared to other three treatments¸ Therefore¸ our findings is in agreement with Rasjaf (2006)¸ who reported that the more efficient of native chickens in converting food became meat means that they produced the best feed conversion ratio with the highest value of its IOFC.

4. CONCLUSION

Dietary oil palm seed meal can be included up to 50% in the diet of native chickens until the age of 12 weeks, and resulted in their body weight gain were relatively similar to the control diet with their feed conversion ratio was the lowest compared with other treatments.

REFERENCES

Ardiansyah, F., Syahrio, T. & Khaira¸ N. 2013. Perbandingan performa dua strain ayam jantan tipe medium yang diberi ransum komersial broiler. *Jurnal Ilmiah Peternakan Terpadu*¸ 1(1): 158-163.

Brakle. J., Haverstain¸ G.B.¸ Scheideler, S.E.¸ Terket¸ P.R.¸ & Rivers¸ D.V. 1993. Relation of sex, age and body weight to broiler carcass yield and offal production. *Poultry Science*¸ 72: 1137-1145.

Choo, Y.K.¸ Kwon, J.¸ Oh, S.T.¸ Um,J.S.¸ Kim, B.G.¸ Kang, C.W.¸ Lee, S.K.¸ & An¸ B.K. 2014. Comparison of growth performance, carcass characteristics and meat quality of Korean local chickens and silky fowl. *Asian-Australas Journal Animal Sci*ence¸¸ March; 27(3): 398–405.

Cresswell¸ D.C. & Gunawan¸ B. 1982. *Indigenous chicken in Indonesia: Production characteristics in an improved environment*. Research

Institute for Animal Production, Bogor, Indonesia.

Dewi, G.A.M.K, Astiningsih, I.K.¸ Indrawati, R.R.¸ Laksmiwati, I.M. & Siti¸ I.W. 2010. Effect of balance energy-protein ration for performance of kampung chickens. In: *Proceedings of Bioscience and Biotechnology Conference*¸ pp. 23 – 24. University of Udayana, Bali.

Dewi¸G.A.M. K., Mahardika, I.G.¸ Sumadi,I.K.¸ Suasta, I.M.¸ Wirapartha,M.¸ & Henuk¸ Y.L. 2015. Effect of dietary energy and protein level on growth performance of native chickens at the starter phase. In: *Proceedings of The 1st International Conference on Native Chicken*, pp. 206 – 210, 23-25 February 2015, Centara Hotel, Khon Kaen, Thailand.

Hidayat, T. & Yahya, M. 2013. *Beternak Ayam Kampung di Lahan Sempit*. Penerbit Infra Pustaka¸ Jakarta.

Henuk, Y.L., Bale-Therik,J.F.¸ Dewi¸G.A.M.K., & Bailey¸ C.A. 2015. Native chickens and their production systems in Indonesia. In: *Proceedings of The 1st International Conference on Native Chicken*, pp. 20 – 24, 23-25 February 2015, Centara Hotel, Khon Kaen, Thailand.

Henuk, Y.L. & Bailey¸ C.A. 2014. Husbandry systems for native

Henuk. Y.L**.** 2015. The role of family poultry production systems in developing countries. In: *Proceedings of The 1st International Conference on Native Chicken*, pp. 249 – 253, 23-25 February 2015, Centara Hotel, Khon Kaen, Thailand.

Henuk, Y.L. 2016. Benefits of keeping native chickens and their farming systems in Indonesia. In: *Proceedings of the XXV World's Poultry Congress– Abstracts*, p. 630. September 5 – 9, 2016¸ Beijing¸ China.

chickens in Indonesia¸ pp. 759 – 762. In: *Proceedings of The 16th AAAP Animal Science Congress*, November 10 – 14, 2014. University of Gadjah Mada, Yogyakarta.

Henuk, Y.L., Bakti, D.¸ Duangjinda, M.¸ & Bailey¸ C.A. 2016. Consumers erroneously perception on nutrition of free range eggs. In: *Proceedings of the XXV World's Poultry Congress – Abstracts*, p. 640.

September 5 – 9, 2016, Beijing, China.

Irmasusanti, Isbandi, Prasetiyono, B.W.H.E., & Siregar, A.R. 2013. Productivity and profitability layer chicken farm using small scale feed mill production in Sidrap Regency, South Sulawesi, Indonesia. *International Journal of Poultry Science*, 12 (11): 660-665.

Iskandar, S. 1994. Efisiensi pemeliharaan ayam buras di kandang batere dan teknologi alternatif pembibitan di tingkat kelompok tani. (The efficiency of keeping kampung chickens in individual cages, and alternative breeding techniques for farmer groups.) Application of Technology meeting, Mataram, West Nusa Tenggara. Bogor, Centre for Library and Research Communication, Agency for Agricultural Research and Development.

Iskandar, S., Resnawati, H. & Pasaribu, T. 2000. Growth and carcass responses of three line of local chickens and its crossing to dietary lysine and methionine. In: *Proceddings of the 3nd International Seminar on Tropical Animal Production and Total Menegement of Local Resources*. Faculty of Animal Science Gadjah Mada University.

Jull, M.A. 1992. *Poultry Husbandry*. 3rd Edition. McGraw-Hill Book Publishing Co. Ltd., New Delhi.

Muliany, H.P. 2015. *Outlook Komoditas Pertanian Subsektor Peternakan Daging Ayam*. Pusat Data dan Sistem Informasi Pertanian, Sekretariat Jenderal – Kementerian Pertanian. Jakarta.

National Research Council. (1994). *Nutrient Requirements of Poultry*. 9th Revised Edition. National Academy Press. Washington, D.C.

Nieto, R., Anguilera,J.F., Fernandez-Figares, I. & Prieto, C. 1997. Effect of low-protein diet on the energy metabolism of growing chickens. Archiv für Tierernährung, 50: 105-109.

Padhi,M.K. 2016. Importance of indigenous breeds of chicken for rural economy and their improvements for higher production performance. *Scientifica*, 2016 : 1 – 9.

Prawirokusumo, S. 1990. *Ilmu Gizi Komparatif*. BPFE¸ Yogyakarta.

Promketa, D., Ruangwittayanusorna, K.¸ & Somchana¸ T. 2016. The study of carcass yields and meat quality in crossbred native chicken (Chee). *Agriculture and Agricultural Science Procedia*¸ 11: 84 – 89.

Rasjaf, M. 2006. *Beternak Ayam Kampung*. Penerbit Penebar Swadaya¸ Jakarta.

Steel, R.G.D. & Torrie¸ J.H. 1995. *Principle and Procedures of Statistics*. 2nd. Edition. McGraw-Hill International Book Company, London.

Suryana & Hasbianto, A. 2008. Usaha tani ternak ayam buras di Indonesia permasalahan dan tantangan. Balai pengkajian teknologi pertanian Kalimantan Selatan, *Jurnal Litbang Pertanian*¸ 27(3): 75 – 83.

Yunilas. 2005. Performans ayam broiler yang diberi berbagai tingkat protein hewani dalam ransum. *Jurnal Agribisnis Peternakan*, 1: 1.