Scientific Papers. Series D. Animal Science. Vol. LXV, No. 2, 2022
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

THE EFFECT OF SUPPLEMENTATION OF *PATANGA SUCCINCTA* FLOUR IN RATION ON INDIGENOUS CHICKENS MEAT PRODUCTION

Wisje TOAR[1], Endang PUDJIHASTUTI[1], Santie TURANGAN[1], Geertruida ASSA[1], Florencia SOMPIE[2], Laurentius RUMOKOY[1, 2]

[1]Entomology Studies of Postgraduate School of Sam Ratulangi, Jalan Kampus Unsrat Bahu-Kleak Manado, 95115, Indonesia
[2]Faculty of Animal Science, University of Sam Ratulangi, Jalan Kampus Unsrat Bahu-Kleak Manado, 95115, Indonesia

Corresponding author email: wisje_toar@live.com

Abstract

This study aimed to observed the effect of supplementation of Patanga succincta flour in ration on meat production of local chickens. A total of 48 indigenous chickens were used until eight weeks old. The animals were divided in a same number into two groups: a group as control (CG) and the other group (TG) received a supplementation of P. succincta flour with a concentration of 0.5kg supplemented in 100 kg of ration. The variables observed were: body weight, feed consumption, FCR and carcass percentage. The results indicated that the supplementation of P. succincta flour in ration gave a significant effect (P<0.05) on FCR and body weight, while there was a non-significant effect on carcass percentage and feed intake between chickens in control group and treatment group. We concluded that the supplementation of P. succincta flour up to 0.05% into the basal diet could have a positive effect on a FCR value and carcass percentage of native chickens reared in closed cages

Key words*: indigenous chickens, insect, meat production, Patanga succincta.*

INTRODUCTION

The type of native chickens is a type of livestock that is still cultivated by the farmers, especially in rural areas having biodiversity as a natural source for livestock feed.
The native chickens have fond of hunting various types of insects and other animals as their natural source of feed.
This livestock utilize also fruits and some by-product materials as feed. The insects are scattered and can be found cosmopolitan and to be considered as feed for poultry (Kawasaki et al., 2019). Insects are abundantly available in nature. The use of insects in animal husbandry can be seen as a wise action in anticipating problems in the distribution of animal feed ingredients that compete with human needs for food as linked to the scientific report of Ordoñez-Araque & Egas-Montenegro (2021).
Many of the insects have a great potential to be oriented as animal feed (Toar & Rumokoy, 2021) because their nutrient compounds which are important for livestock production especially in poultry feeding as reported by Sogari et al. (2019), Rumokoy et al. (2020), Van Huis et al. (2013).
The act of using insects for the development of chicken production today is starting to get quite a positive response.
Jagtap et al. (2021) put forward the importance of insects to be used as animal feed while paying attention to the role of the economy and the environment impact.

MATERIALS AND METHODS

Fresh adults of *P. succinta* were obtained from the agriculture environment in Minahasa area.
Swing-Net-trap was used in collecting these insects, and then dried in direct sunlight from 9 AM until 3 PM for five days and then proceed with grinding this material to produce the *P. succincta* flour (PSF). The basal ration was 10% yellow corn of commercial ration The concentration of PSF as 5% mixed in basal ration of native chicken. The basal ration was composed by 90% of commercial ration and 10% of yellow corn.

A total of forty-eight of day-old native chickens were reared until eight weeks in this experiment. The animals were placed in a battery cage with a dimension of (60*60*40) cm. Each unit (a pen) was occupied by six chickens at the beginning until 5th week, after that a pen was placed by four chickens only. The chickens were fed *ad libitum* including their drink water.

Table 1. Nutrien Composition of Basal Ration

Nutrient	comercial ration (90%)	yellow corn (10%)
Protein (%)	20	10.68
Lipid (%)	5	1.78
Fiber (%)	5	0.26
Energy (kcal)	3200	3613
Calsium (%)	0.9	0.02
Phospor (%)	0.5	0.28

The chickens were divided in two groups: control group (Po) and treatment group (P1).
The parameters in this study were: accumulation of feed intake, body weight, FCR and percentage of carcass as a parameter of chicken meat production.
The data obtained were analyse by using t-test to determine the significance different between control group and treatment group by using Microsoft Office Excel software.

RESULTS AND DISCUSSIONS

The average feed intake accumulation of the chickens in control group (Po) was 440 gr as shown in Figure1, tended to be lower consumption then in treatment group (P1) which reached 456 gr although it has recorded a non-significant difference ($P>0.05$) feed consumption between the evaluated groups. The results showed that 0.05% supplementation of PSF in ration could not yet affects the feed consumption of chickens. The use of natural resources in livestock can be provided without having a negative impact on livestock. This is in line with various opinions from various parties that have been previously reported. Thomas et al. (2000) stated that the use of natural resources must be concerned to various aspects for the benefit of life related to natural environment, including the livestock itself (Barlow et al., 2003).
The average body weight shown in Figure 2 has recorded a significant difference ($P<0.05$) between group Po and group P1. These results indicated that the supplementation of *P. succincta* flour up to 0.05% into basal ration did not adversely affect the body weight of the chickens evaluated. Insect flour as feed could be related to some factors that can play a role and affect chicken weight gain: chicken type, sex, level of insect flour applied. The study of Pietras et al. (2021) used different insect larvae meals as protein sources did not significance influenced the body weight of chickens while the results differed to its FCR value as related to the feed conversion ratio which has shown a significant difference ($P<0.05$) between group Po and group P1 as presented in Figure 3.
According Toar and Rumokoy (2020) the interference of the nutrient compound in insect flour could influence the body weight of the chickens.
The average comparison of chicken carcass percentage of the two groups indicated a non-significant difference ($P>0.05$).
Even though the level of *P. succincta* flour supplementation up to 0.05% did not give a different impact, Figure 4 shows that the P1 sample in general tended to have a higher carcass presentation than the control group Po. It is possible to increase the production of meat as measured by carcass percentage by increasing the level of supplementation of this insect meal in the ration.
These results support the expectation of using insect products for livestock development utilizing surrounding natural resources, in addition to contributing to the development of chicken farms which various countries have obtained legality to apply insect as animal feed (Rumokoy et al., 2022).

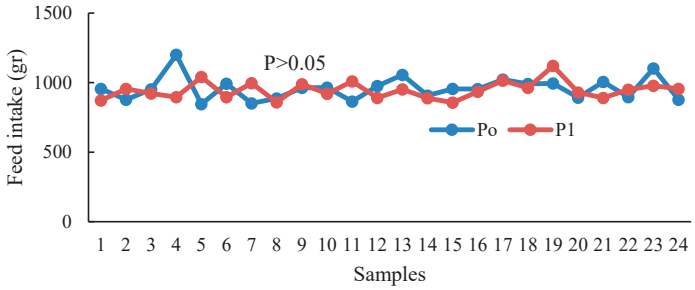

Figure 1. Accumulative of feed consumption of chickens

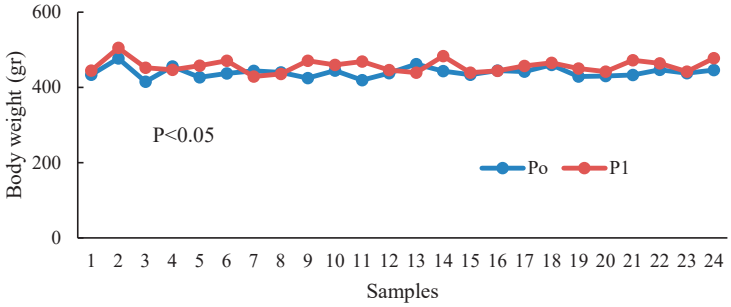

Figure 2. Body weight of experiment chickens

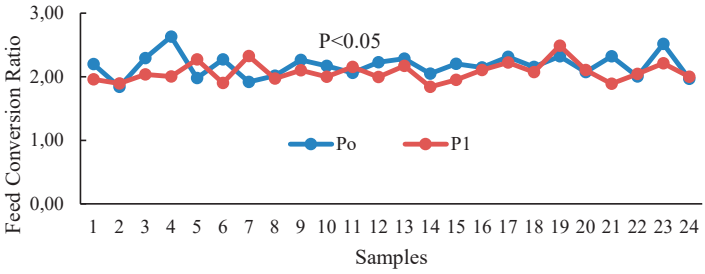

Figure 3. Feed Conversion Ratio value of experiment chickens

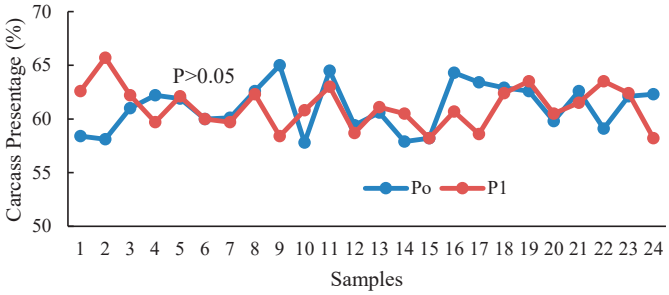

Figure 4. Meat Production of The Evaluated Chickens

CONCLUSIONS

We concluded that the supplementation of *Patanga succincta* insect meal up to 0.05% into the basal diet could have a positive effect on a FCR value and carcass percentage of native chickens reared in closed cages.

RECOMENDATION

Based on the results of this study, we are interested to disclose a possibility next step in exploring the role of this insect substances on the metabolism and immunity effect of chickens.

ACKNOWLEDGEMENTS

We express our gratitude to 'Lembaga Penelitian dan Pengabdian Kepada Masyarakat' of Sam Ratulangi University regarding the financially support to this research work through a PNBP Budget Academic Year 2022.

REFERENCES

Amobi, M. I., & Ebenebe, C. I. (2018). Quality of the carcass and organs of chicken fed with two different insects meals. *Journal of Insects as Food and Feed*, *4*(4), 269-274.

Barlow, R., Ellis, N. J. S., & Mason, W. K. (2003). A practical framework to evaluate and report combined natural resource and production outcomes of agricultural research to livestock producers. *Australian Journal of Experimental Agriculture*, 43(8), 745-754.

Jagtap, S., Garcia-Garcia, G., Duong, L., Swainson, M., & Martindale, W. (2021). Codesign of food system and circular economy approaches for the development of livestock feeds from insect larvae. *Foods*, *10*(8), 1701.

Kawasaki, K., Hashimoto, Y., Hori, A., Kawasaki, T., Hirayasu, H., Iwase, S. I., ... & Fujitani, Y. (2019). Evaluation of black soldier fly (*Hermetia illucens*) larvae and pre-pupae raised on household organic waste, as potential ingredients for poultry feed. *Animals*, *9*(3), 98.

Ordoñez-Araque, R., & Egas-Montenegro, E. (2021). Edible insects: A food alternative for the sustainable development of the planet. *International Journal of Gastronomy and Food Science*, *23*, 100304.

Pietras, M., Orczewska-Dudek, S., Szczurek, W., & Pieszka, M. (2021). Effect of dietary lupine seeds (*Lupinus luteus* L.) and different insect larvae meals as protein sources in broiler chicken diet on growth performance, carcass, and meat quality. *Livestock Science*, *250*, 10453

Rumokoy, L., Toar, W. L., Adiani, S., Kiroh, H., & Kowel, Y. (2022). Legaits Aplikasi Serangga Dalam Peternakan Secara Global. *Prosiding Seminar Nasional Teknologi Agribisnis Peternakan (STAP)* (Vol. 9, pp. 658-662).

Rumokoy, L. J., Untu, I. M., & Toar, W. L. (2020). Peran Serangga Untuk Menunjang Kesehatan Ternak Lokal dalam situasi Pandemi Covid-19. *Dalam: Prosiding Webinar*, 23-27.

Rumokoy, L., Adiani, S., Kaunang, C., Kiroh, H., Untu, I., & Toar, W. L. (2019). The wisdom of using insects as animal feed on decreasing competition with human food. *Scientific Papers: Series D, Animal Science-The International Session of Scientific Communications of the Faculty of Animal Science*, *62*(1).

Sogari, G., Amato, M., Biasato, I., Chiesa, S., & Gasco, L. (2019). The potential role of insects as feed: A multi-perspective review. *Animals*, *9*(4), 119.

Thomas, D. S. G., Sporton, D., & Perkins, J. (2000). The environmental impact of livestock ranches in the Kalahari, Botswana: Natural resource use, ecological change and human response in a dynamic dryland system. *Land degradation & development,* 11(4), 327-341.

Toar, W. L., & Rumokoy, L. J. (2021). Serangga sebagai Bahan Pakan Ternak pada Masa Pandemi Covid-19. *Prosiding Seminar Nasional Fakultas Pertanian UNS,* 5 (1), 818-822.

Toar, W. L., & Rumokoy, L. J. (2020). Sumber Protein Alternatif dari Serangga untuk Pakan Ternak Unggas. *Prosiding Seminar Nasional Fakultas Pertanian UNS,* 4 (1), 491-496).

Van Huis, A. (2013). Potential of insects as food and feed in assuring food security. *Annual review of entomology*, *58*, 563-583.