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The Potential of Sago Larva as Insect Meal for Poultry Feed: Preliminary Study

Danung Nur Adli
[1)] Department of Animal Nutrition, Faculty of Animal Science, , University of Brawijaya

Abstract

Indonesia is an island countries which is had a huge biodiversity. The one of potential were to produce the insect meal as an alternatives source of protein in Indonesia. The research purposes to determine of possibility of sago larvae meal as insect meal for poultry feed. A review and materials were sago warm meal from Moluccas and Papua determined using proximate analysis. The data were analyzed using SAS Version Red hat University 64-bit. The result showed the sago larva were significant differences on ($p < 0.05$) on protein and metabolizable energy. It can be concluded sago larva meal has positive result on as poultry feed in the future..
Keywords : *insect meal, poultry, sago worm meal*

Introduction

Intensive poultry production systems demand a supply of high protein- and easy available in development countries (Sjofjan and Adli, 2020). However, during the last decade, dietary protein sources for livestock have become tremendously expensive and difficult to access, challenging researchers and farmers globally to seek alternative protein sources, and increase the quality and availability of alternative poultry feeds (Adli et al., 2019). The massive utilization in animal feeding of soy or fishmeal poses severe environmental issues. Feed was identified as the major contributor to land occupation, primary production use, acidification, climate change, energy use, and water dependence (Adli and Sjofjan, 2018). Currently, insects are being considered as a new protein source for animal feed. Some insect species can be grown on organic side streams, reducing environmental contamination and transforming waste into high-protein feed that can replace increasingly more expensive compound feed ingredients, such as fish meal. Then, from an environmental point of view, insect cultures are sustainable; culturing insects is usually performed in warehouses, with no need for large areas or much water, particularly when compared with crops especially in tropical condition like Indonesia (Adli et al., 2019). In addition, culturing insects contributes to the recycling of waste. Nowadays, sago larvae meal were had potential as insect meal in future. This insect were larvae from red beetle in deep forest of Moluccas and Papua. It local tribe eat them alive to fulfill the scarcity of staple food in thus current area. According to Sago planting area in Moluccas reaching 31.360 ha spread across seven districts (Bustaman, 2008). Based on Agroecological Zone Maps Maluku scale 1: 250.000, total area sago can still be developed up to 649,938 ha (Bustaman, 2008).

Sago is a clump plant and multiply by forming tillers. Sago stems contain starch (carbohydrates), and usually harvested after 8-10 years old. But if a plant well cultivated, sago can be harvested at the age of 6-7 years (Bustaman, 2008). Potential of sago trees ready to harvest at Maluku is estimated to reach 86 trees / ha / year). This analyses the potential use of insect meal in animal feeding, studying the nutritive values, currently, with help analyses of proximate and it potential as feed for poultry production.

Material and Method

The materials used were sago larva worm in powder from Moluccas and Papua. The larvae weight at collection ranged between 25 and 100 mg. The collected larvae were dried for 4 h in an oven at low temperature (60^oC) and grinded to a powder. Both insect larval meals were full-fat and produced from the larval stage of insects. Before the digestibility trial, representative samples of the two insect larval meals were analyses in Duplo, for dry matter (DM), crude protein (CP) ether extract (EE) for analyses proximate and gross energy (GE).

Data were statistically analysed using GLM procedure of SAS University version 4.0 red hat (64-bit) with code encryption algorithm http://localhost:10080/SASStudio/38/index license owned by Danung adli and the differences among treatment means ($p < 0.05$) were determined using Duncan's multiple range test according to Adli and Sjofjan (2020) and SAS (2014) method.

Code algorithm in SAS as follows:

```
Data Q1;
Set pre.Q1;
Run;
Proc anova data=Q1;
Title'one way anova with a sago larva on one factor';
Class calib;
Mode shape_1shape_2 shape_3 shape 4= "Run"
```

Results and Discussion

However, the people of Papua and Moluccas which is seeking processing sago as a source of income, take advantage sago caterpillar for consumption. In areas with resources animal protein is hard to come by, sago larvae can be an alternative source of food high protein. Sago larvae are also prospective as source of protein in animal feed for replace fish meal. Making poultry and fish feed usually uses fish meal as a source protein. Proportion of fish meal in feed about 5% poultry and for fish feed (shrimp) 15%. If feed production poultry reaches 5 million t / year and feed fish (shrimp) 2 million t / year then at least it takes 0.25-0.75 million tons of fish meal every year.

Table 1. Analyses proximate of sago larvae from across different island

Parameter	Sago larvae from Moluccas	Sago Larvae from Papua	SEM
Metabolizable energy (kcal/kg)	3.043	3.012	132
Dry matter	92.33	91.34	84.22
Crude protein	17.65	18.35	1.22
Ether Extract	3.44	4.55	0.4
Fat	6.55	5.44	0.35

Based on the table shown the metabolize energy of larvae of sago from Moluccas more high than papua (3.043 kcal/kg vs. 3012 kcal/kg). The crude protein were higher from Moluccas it condition were compared with experiment from Sauvant et al., (2004) the which is insect meal has shown a similar CP content to some plant protein sources, such as sunflower meal, lupines or faba beans, but also a higher fat content. The use of insects as an alternative source of protein in animal feeds is becoming more globally appealing. Invertebrates constitute a raw material that is included in the European Union Feed Material Register, and although they are currently authorized only for fish and pets, insect-derived feeds could also represent a suitable ingredient for feed manufacturing for pigs and poultry in the near future (De Marco et al., 2015).

There were curvilinear responses in crude protein and ether extract as the sago larvae meal were taken from different site. For the crude protein (17.65 vs. 18.35) and ether extract were (3.44 vs. 4.55) this aspect could be a first step towards combating the severe challenges of the global capacity to supply sufficient food. In this context, insects have captured the interest as a complementary source of protein, AA, fat, carbohydrates, vitamins and trace elements. The compositional data have shown that the two insect larval meals are good sources of protein and fat. In particular, the sago larvae meal from Papua has shown a higher CP content than soybean meal which is close to that of meat bone meal, however it has a higher fat content. This result indicates how this insect larval meal could be used as both a protein and an energy ingredient for feeds (Sauvant et al., 2004). The CP and EE determined for the insect meal was within the range reported by other researchers. The fat content reported in the HI meal was consistent with previous findings, while the protein content was slightly lower (Sánchez-Muros et al., 2014). This may be due to the substrate where the larvae were raised, which can influence variability in the amount of CP, EE composition.

Conclusion

It can be concluded sago larva meal has positive result on as poultry feed in the future.

References

Adli, D. N., O. Sjofjan, and M. Mashudi. 2017. Dried of Poultry Waste Urea-

Molasses Block (dpw-umb) as Potential for Feed Supplementation. J. of Agr. 17(2), 144-149. DOI: https://doi.org/10.17969/agripet.v17i2.8391.

Adli, D. N., and O. Sjofjan. 2018. Nutrient content evaluation of dried poultry waste urea molasses block (DPW-UMB) on In-vitro analysis. Sains Pet. 16(2), 50-53. DOI: 10.20961/sainspet.16.2.50-53.

Adli, D. N., Sjofjan, O., and M. Mashudi. 2018. Nutrient content evaluation of dried poultry waste urea-molasses block (dpw-umb) on proximate analysis. JIIP. 28(1), 84-89. DOI: 10.21776/ub.jiip.2018.028.01.09.

Adli, D. N., O. Sjofjan, and M. Mashudi. 2019. Nutrient content evaluation of dried of poultry waste urea-molasses block (dpw-umb) on proximate analysis. JITP. 6(2), 72-76.

Adli, D. N., Y. Chi, J.W. Lee, and Sjofjan, O. 2019. Supplementation Mannan-Rich Fraction (MRF) and/or Combination with Probiotic-Enhanced Water Acidifier on Dietary Female Broiler at 28 days as Natural Growth Promoters (NGPs). Research Journal of Advanced Engineering and Science. 4(3): 427-429. DOI: 10.5281/zenodo.3459284.

Adli, D. N., and Sjofjan, O. Growth performance, serum blood biochemistry, and intestinal properties of Arbor Acres Broiler fed diets containing mannan-riched fraction (MRF) and probiotic-enhanced liquid acidifier. Buletin Peternakan, 44(2).

Bustaman, S. 2008. Potensi ulat sagu dan prospek pemanfaatannya. Jurnal Litbang Pertanian. 27(2):50-54.

De Marco, M., Martínez, S., Hernandez, F., Madrid, J., Gai, F., Rotolo, L., and Kovitvadhi, A. 2015. Nutritional value of two insect larval meals (Tenebrio molitor and Hermetia illucens) for broiler chickens: apparent nutrient digestibility, apparent ileal amino acid digestibility and apparent metabolizable energy. Animal Feed Science and Technology, 209, 211-218.

Sánchez-Muros, M.J., Barroso, F.G., Manzano-Agugliaro, F., 2014. Insect meal as renewable source of food for animal feeding: a review. J. Clean Prod. 65, 16–27.

Sauvant, D., Perez, J.M., and Tran, G., 2004. Tables of Composition and Nutritional Value of Feed Materials: Pigs, Poultry, Cattle, Sheep, Goats, Rabbits, Horsesand Fish. Wageningen Academic Publishers

SAS Institute. 2014. SAS/STAT user's guide; version 9.4. Cary. SAS University. New York

Sjofjan, O., D. N. Adli, P. K. Hanani, and D. Sulistiyaningrum. 2019. The utilization of bay leaf (SyzygiumpolyanthumWalp) Flour in feed on carcass quality, microflora instestine of broiler. International Journal of Engineering Technologies and Management Research. 6(11), 1-9. DOI: 10.5281/zenodo.3563042.

Sjofjan, O., D.N. Adli, M.H. Natsir, and A. Kusumaningtyaswati. 2020. Pengaruh kombinasi tepung kunyit (Curcuma domestica Val.) dan probiotik terhadap penampilan usus ayam pedaging. JNTTIP, 2(1), 19-24. DOI: 10.24198/jnttip.v2i1.26587

Sjofjan, O., and Adli, D. N. (2020, April). Effect of Dietary of Supplementation Mannan-Riched Fraction (MRF) and Probiotic-Enhanced Liquid Acidifier on the Growth Performance, Serum Blood Biochemistry, and Intestinal Properties of Broilers. In IOP Conference Series: Earth and Environmental Science (Vol. 478, No. 1, p. 012066). IOP Publishing.

Widiyawati, I., O. Sjofjan, and D.N. Adl. 2020. Peningkatan kualitas dan persentase karkas ayam pedaging dengan subtitusi bungkil kedelai menggunakan tepung biji asam (Tamarindus indica L) fermentasi. JNTT, 3(1), 35-40. DOI: 10.21776/ub.jnt.2020.003.01.7