

# Effect of Supplementation of Combination of Curcuma and BSF Maggot Meal in Rations on Accumulative Weight of Native Chickens

*by Wisje Toar 3*

---

**Submission date:** 29-Jun-2023 01:04PM (UTC+0700)

**Submission ID:** 2124245526

**File name:** Effect\_of\_Supplementation\_of\_Combination\_2019\_IOP\_Conf.pdf (479.76K)

**Word count:** 1877

**Character count:** 9720

**PAPER · OPEN ACCESS**

**3**  
Effect of Supplementation of Combination of Curcuma and BSF Maggot Meal in Rations on Accumulative Weight of Native Chickens

**1**  
To cite this article: W L Toar *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **372** 012009

View the [article online](#) for updates and enhancements.



**ECS** **Connect with decision-makers at ECS**

Accelerate sales with ECS exhibits, sponsorships, and advertising!

▶ Learn more and engage at the 244th ECS Meeting!

3

## Effect of Supplementation of Combination of Curcuma and BSF Maggot Meal in Rations on Accumulative Weight of Native Chickens

W L Toar<sup>1</sup>, L J M Rumokoy<sup>2</sup>, E Pudjihastuti<sup>1</sup>, H Manangkot<sup>1</sup>, B Bagau<sup>1</sup> and I M Untu<sup>1</sup>

<sup>1</sup>Faculty of Animal Science, University of Sam Ratulangi, Manado, Indonesia

<sup>2</sup>Postgraduate School, University of Sam Ratulangi, Manado, Indonesia

E-mail correspondence: wisje\_toar@live.com

**Abstract.** The purpose of this study was to determine the role of the combination of curcuma meal with maggot of insect larvae of *Hermetia illucens* on accumulative weight gain in native chicken. Methods: This study used 60 starter chickens, which were divided into two groups of 30 chickens as control group (P1) and the other one (P2) that received a supplement of combination of curcuma meals of 350gr/100 kg ration and maggot BSF of 150gr/100 kg ration which was maintained for fourth weeks. The ration was distributed ad libitum. Final weight gain was measured at the end of the study at the fourth week. The data obtained were analyzed by using t-test. The results indicated that the average body weight of experimental chicken P2 was 214 gr significantly higher ( $P < 0.01$ ) than in group P1 was 243 gr. This results show that maggot meal of *H. illucens* has an important nutrient content and has a positive effect when combining with curcuma meal which is able to increase consumption palatability which has a direct effect on local chicken weight gain. Conclusion: The combination between BSF maggot and curcuma meals supplementation could be applied to local chickens in supporting organic livestock production.

**Keywords:** BSF, curcuma, insect, native chickens

### 1. Introduction

Native chicken has a relatively slower growth rate compared to purebred chicken, but has the advantage in terms of balance consuming low protein feed to produce meat that tends to be more desirable for consumers. Production of native chickens became an important source to contribute in organic food need. The local chickens are able to use natural resources around the farm, but pure



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

traditional maintenance systems have various limitations in achieving optimal body weight. [3] reported that a conventional protein sources were suitable to completely satisfy the increment of feed production in a sustainable way. The use of local natural resources [13] and [14] such as insects [12] and curcuma plant can give new hope in increasing the productivity of farms native to the organic chickens. Curcuma plants grow well in various humid tropical regions [7].

Various previous studies on a condition of small-scale local chicken farms by traditional maintenance in Minahasa region show that generally these poultry were kept inferior of twenty birds, with a tendency of lack quality [4] and [12]. The constraints faced by local chicken farms, in humid tropical regions were about a low quality nutritious supply for their chickens, consequently in an increasing of health problem in their livestock [8]. The use of BSF maggot is suitable in tropics areas in meeting the nutritional needs of local chickens traditionally maintained because maggot or BSF larvae contain a lot of nutrients needed by livestock such as amino acids and macro minerals and micro minerals [9].

*H. illucens* (BSF) is easy to rear, and its utilization could improve the performance of broiler chickens. [11] stated that protein components have an important role for chicken animals in the growth phase for the formation of body tissues and its nutrition component could actively involve in vital metabolism in relation with enzymes, hormones, and for immuno-nutrient needs [10]. In addition, beside the role of insects, curcuma meal can be added to broiler feed because it can improve the mechanism of the digestive organs, stimulate the release of pancreatic sap which contains the enzyme amylase, lipase and protease.

## 2. Methodology

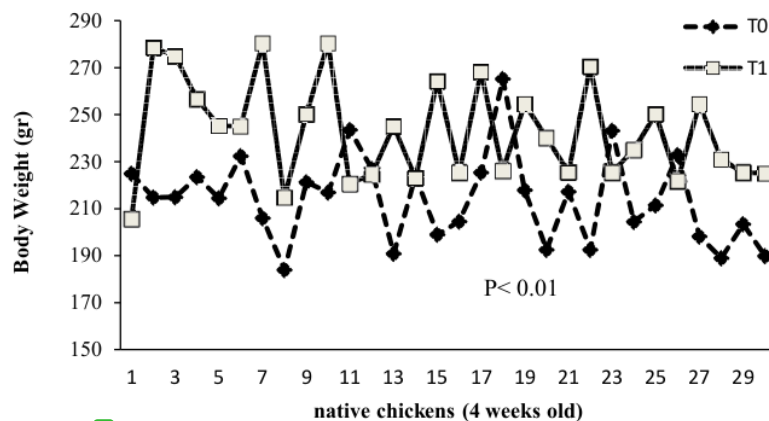
Sixty native chickens were obtained from local poultry farm. The DOC chickens were collectively maintained in a box during the first week of experiment, and divided by group in second week. The animals were divided into two groups: 30 chickens as control group (P1) and the other one (P2) that received a supplementation of combination of curcuma meals of 350gr/100 kg of ration and BSF maggot of 150gr / 100 kg of ration. The final of body weight measured at fourth weeks of age. The ration was distributed *ad libitum*. The protein of ration during first week was 19% crude protein, fat 5%, crude fiber 5%. This complete ration was obtained as a chicken commercial feed (AD1) and then the composition of the ration was gradually changed to be 50% of AD1 mixed with 50% of corn at the end of 3<sup>rd</sup> week until 4<sup>th</sup> weeks of experiment, as a consequence the nutrient composition of ration became: protein 16.1%, fat 4.02%, fiber 3.5%.

Final weight gain was measured at the end of the study at the fourth week. The data obtained were analyzed using t-test.

## 3. Result and Discussion

The data obtained in this experiment is represented in figure 1 indicated that the average of body weight of chickens P2 was 243 gram significantly higher ( $P < 0.01$ ) than in group control P1 which was 214 gram. It was clear that the influence of distribution of combination of curcuma meal and *H. illucens* on chicken's body weight improvement.

This performance could be linked with the maggot meal of *H. illucens* that has a important nutrient content and has a positive effect when combining with curcuma meal which is able to increase consumption palatability which has a direct effect on local chicken weight gain [2]. According to [1], insect meal is rich in protein for about 40 to 50 percent, with a greater concentration of essential amino acids than soybean meal, while BSF meal contains higher levels of threonine, valine, isoleucine and leucine compared to fishmeal.



5 **Figure 1.** The graph of body weight of the experiment animals at fourth weeks of age

In other side, the achievement of body weight in group P1 could be related to the role of curcuma in counteracting pathogenic micro-organisms found in livestock environment as related to the report of [5]. A study [6] also showed a reduction of parasite by treating the experimental animal with curcuma extract in water drinking.

The effect of curcuma flour on weight gain can be attributed to the role of curcumin by assuring animal health based on [7] showed that curcumin in curcuma has an important in the health management through its anti-inflammatory effects although this kind of anti-inflammatory effects are not entirely understood. The curcumin interacts in the body by inhibiting the enzymes of cyclooxygenase-2 and 5-lipoxygenase so its protect against pathogenesis agent.

#### 4. Conclusion

The combination of BSF maggot meal and curcuma meals supplementation in ration could be applied to local chickens feeding in supporting to organic livestock production improvement.

#### References

- [1] Z. Kay. 2014. Feeding insects as protein in poultry feed *WattAgnnet.com*. Animal Feed Additives. <https://www.wattagnnet.com/articles/19381-feeding-insects-as-protein-in-poultry-feed>.
- [2] I. Ruhnke, C. Normant, D. L. M. Campbell, Z. Iqba, C. Lee, G. N. Hinch, and J. Roberts. 2018. Impact of on-range choice feeding with black soldier fly larvae (*Hermetia illucens*) on flock performance, egg quality, and range use of free-range laying hens. *Anim. Nutr.* 4:452–446.
- [3] L. Gasco, I. Biasato, S. Dabbou, A. Schiavone, and F. Gai. 2019. Animals Fed Insect-Based Diets: State-of-the-Art on Digestibility, Performance and Product Quality. *Animals.* 9: 170.

- [4] L. Rumokoy, and W.L. Toar. 2015. The paradox of nutrient fulfillment and immunity challenge on chicken livestock development in tropical humid regions. *Agriculture and Agricultural Science Procedia* 6:259-264. <https://doi.org/10.1016/j.aaspro.2015.08.069>.
- [5] R.U. Khan, S. Naz, M. Javdani, and Z. Nikousefat. 2012. The use of Turmeric (*Curcuma longa*) in poultry feed *World's Poultry Science Journal* 68(1):97-103.
- [6] L. Rumokoy, J. Posangi, W. L. Toar, and J. Lopez-Aban. 2018 An expectation of bio-resource function against parasite infection on animal health. *Scientific Papers. Series D. Animal Science* 61(1):216-219.
- [7] A. H. Rahmani, M. A. Alsahli, S. M. Aly, M. A. Khan, and Y. H. Aldebasi. 2018. Role of Curcumin in Disease Prevention and Treatment. *Adv Biomed Res.* 7:38. doi:10.4103/abr.abr\_147\_16.
- [8] W. Hartel, I. Segars, J. D. Summers, J. V. Collins, A. T. Phillips, and E. Whittle. 2000. Survival of fecal coliforms in fresh and stacked broiler litter. *J. Appl. Poult. Res.* 9:505-512.
- [9] M. F. A. Al-Qazzaz, D. Ismail, H. Akit, and L. H. Idris. 2016. Effect of using insect larvae meal as a complete protein source on quality and productivity characteristics of laying hens *R. Bras. Zootec.* 45 (9). <http://dx.doi.org/10.1590/s1806-92902016000900003>.
- [10] M. Moretó, and A. Pérez-Bosque. 2009. Dietary plasma proteins, the intestinal immuneseystem, and the barrier functions of the intestinal mucosa. *J Anim Sci* 87:e92-e100 <https://doi.org/10.2527/jas.2008-1381>.
- [11] H. J. Manangkot, S. J. Rondonuwu, O. R. Pinontoan, M. Najoan, and L. J. M. Rumokoy. 2014. Black soldier black fly larvae manure degradation as fish meal replacer in native chickens ration. *Lucrări Științifice - Seria Zootehnie*, 62:139-142.
- [12] W. L. Toar, M. Tulung, V. Memah, E. Pudjihastuti, L. Rumokoy, and I. M. Untu. 2018. The presence of insect in animal farm in North Sulawesi *Scientific Papers: Series D, Animal Science* 61:220-224 [http://animalsciencejournal.usamv.ro/pdf/2018/issue\\_1/Art39.pdf](http://animalsciencejournal.usamv.ro/pdf/2018/issue_1/Art39.pdf).
- [13] L. Rumokoy, E. Pudjihastuti, and I. M. Untu, and W. L. Toar. 2016. The effects of Papain Crude Extract Addition in Diets on Broilers Production Performances. *J. Anim. Prod.* 18(1):30-35.
- [14] L. Rumokoy, W. L. Toar, and E. Pudjihastuti. 2016. Effect of Crude Papain Extract Added in Mash and Pellet Form of Diets on Digestibility of Broiler Chickens *Agric. and Agric. Sci. Proc.* 10:318-322.

# Effect of Supplementation of Combination of Curcuma and BSF Maggot Meal in Rations on Accumulative Weight of Native Chickens

## ORIGINALITY REPORT

19%

SIMILARITY INDEX

19%

INTERNET SOURCES

14%

PUBLICATIONS

10%

STUDENT PAPERS

## PRIMARY SOURCES

1	<a href="http://eprints.polsri.ac.id">eprints.polsri.ac.id</a> Internet Source	6%
2	<a href="http://publikasi.undana.ac.id">publikasi.undana.ac.id</a> Internet Source	3%
3	<a href="http://www.animalsciencejournal.usamv.ro">www.animalsciencejournal.usamv.ro</a> Internet Source	3%
4	<a href="http://krishijagran.com">krishijagran.com</a> Internet Source	2%
5	<a href="http://www.uaiasi.ro">www.uaiasi.ro</a> Internet Source	1%
6	<a href="http://www.mdpi.com">www.mdpi.com</a> Internet Source	1%
7	<a href="http://advbiores.net">advbiores.net</a> Internet Source	1%
8	S Y F G Dillak, N P F Suryatni, H T Handayani, S T Temu, H P Nastiti, D B Osa, R Ginting, Yunilas, Y L Henuk. "The effect of fed maggot	1%

meal as a supplement in the commercial diets  
on the performance of finisher broiler  
chickens", IOP Conference Series: Earth and  
Environmental Science, 2019

Publication

---

---

Exclude quotes      On

Exclude matches      Off

Exclude bibliography      On