

## Effect of garlic powder (*Allium sativum*) as feed additive on native chicken performances

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**Abstract.** The aim of this research was to evaluate the effect of Garlic Powder as feed additive on native chickens performances. A total number of 300 native chickens were divided into 5 treatments; there were 5 replications in every cage has 12 birds per replications. Native chicken were fed with 5 experimental diets, basal diet and diets with 0.25%, 0.30%, 0.35% and 0.40% of Garlic Powder. The respective native chickens performance were determined every week. Data were collected every week consist of feed consumption, daily body weight, and Feed conversion ratio (FCR). The data was analyzed using GLM in a windows-based software package, SAS version 9.1. The differences were tested by LSM. Significant level used in the group comparisons was set at  $p < 5\%$ . The addition of garlic powder as feed additive has significantly effect ( $P < 0.05$ ) on average body weight and feed conversion ratio. However, the addition of garlic powder as feed additive did not significantly affect ( $P > 0.05$ ) on feed consumption. The addition of 0.35% of garlic powder improves performances of native chickens including average body weight and feed conversion ratio.

### 1. Introduction

Recently, chemicals substance is commonly used as feed additive in livestock. However, the addition of chemicals substance in feed would bring a high risk to health [1]. The addition of chemical substances will not only have negative effect in animals, however will also have negative impact on livestock production. The use of plant herbs as a natural supplement in livestock feeds has beneficial effect on the healthy animals [4]. Natural herbs have no risk on accumulated residues of chemical substances in livestock product and it has no harmful effect in animal health [3].

Garlic (*Allium sativum*) is a herbal plants that combines into large and white tuber usually used as a cooking spices. *Allium sativum* contains bioactive compound of *allicin*, *allil*, and *diallyl sulfide*. It was commonly used as antimicrobe and antibacterial. The important natural substance of *allium sativum* has increased immunity of animals. Garlic contains of phytochemical compounds has beneficial effect to increase feed intake. In addition, phytochemical compounds can inhibit the growth of microorganisms in the gastrointestinal tract of chicken. The utilization of feed intake can be optimal and increased body weight. The bioactive compounds of garlic extracted contains of *allicin*, *allyl*, and *diallyl sulfide*. *Allicin* is the most widely combined phenolic that can inhibit the growth of several types of microbes. In addition, the bioactive components contained in garlic that can be used for pathogenic bacteria and decreased infections, so it is expected to provide health effects and improve the immune system.

Native chicken “JOPER” is the crossbreed of the Indonesian native chicken “KAMPUNG” with laying hens. Innovation of the native chicken caused by the slowly growth of the Kampung chicken. The growth of native chickens is more quickly than kampung chicken and also can be converted feed become meat.

## 2. Material and Methods

### 2.1. Material

The materials were used in this experiment native day old chicken (DOC), basal diet from PT. Japfa Comfeed,Tbk., garlic powder, cages, feeder, bootle drinker, brooder, and scales.

### 2.2. Methods

2.2.1. *Experimental design.* The experiment was carried out at the Poultry Research Farm, Department of Animal Husbandry, University of Tribuana, Malang, East Java. Three hundred (300) Native Chickens were divided into 5 treatments in which each treatments had 5 replications with 12 birds per replications. Every cage (100 x 100 x 70) cm was used and equipped with feeder and bottle drinker. In this experimental were used 5 treatments, consist of control (basal diet), T1 (basal diet + 0,25 % of garlic powder), T2 (basal diet + 0,30 % of garlic powder), T3 (basal diet + 0,35 % of garlic powder) and T4 (basal diet + 0,40 % of garlic powder). All treatments were measured into analysis of laying performances consist of feed consumption, daily body weight, and feed conversion ratio (FCR).

2.2.2. *Statistic.* The data was analyzed by GLM (General Linear Model) in a windows-based software package, SAS version 9.1. Data was obtained from different level of the addition of garlic powder. The different levels were tested by least squares mean. Significant level used among treatment comparisons was set at  $P < 5\%$ .

## 3. Results and Discussion

The data was obtained from the research including feed consumption, average body weight, and feed conversion ratio shown in the Table 1. Feed consumption is an important aspect to evaluate the quality of feed. Feed consumption can be calculated by amount of feed consumption and residue. The results showed that the addition of garlic powder has no significant effect ( $P > 0.05$ ) on the feed consumption. The highest feed consumption for each treatment shown, respectively T3 ( $2365,71 \pm 132,54$ ), T2 ( $2319,17 \pm 71,96$ ), T1 ( $2313,29 \pm 91,79$ ), T0 ( $2282, 20 \pm 102.57$ ), and T4 ( $2277,01 \pm 125,06$ ). The addition of 0,25% to 0,35% garlic powder as feed addition improved feed consumption compared with control. According to [5] the physical appearance of garlic especially aroma and color can increase palatability.

The results showed that the addition of garlic powder as feed additive has significantly difference ( $P < 0,01$ ). The addition of 0,35% garlic powder as feed additive increased body weight gain compared to control. The addition of garlic powder as feed additive has impact to increased feed consumption. Feed consumption has increased the daily body weight. Digestive tract of poultry has the pathogenic microbial such as *Escheria Coli*, *Salmonella* and *Clostridium Perfringens*. Where is the pathogenic bacteria can be inhibit the absorbtion process on digestive tract. The used of garlic powder improved the daily body weight of native chicken. It caused garlic contains of bioactive compound such as *alicin*. *Alicin* is bioactive compounds as antibacterial to prevented pathogen bacteria.

Feed conversion (FCR) is the ratio between weight and feed consumption. The result of statistical analysis showed that the addition of garlic powder has significantly affected ( $P < 0.05$ ) of feed conversion. *Alicin* as bioactive compounds that act as antimicrobials. The addition of garlic powder as feed additive is able to reduce pathogenic bacteria in the gastrointestinal tract of chicken. The low number of pathogenic bacteria in the digestive tract is able to efficiently feed in the gastrointestinal tract [2]. Feed will be more easily absorbed by the small intestine and converted into meat. The addition of 0.35% garlic powder can decrease the feed conversion ratio compared to control.

**Table 1.** The different level of addition garlic powder on feed consumption, body weight, and feed conversion ratio of native chickens

Treatment	Feed Consumption (g/bird)	Body Weight (g/bird)	Feed Conversion Ratio
T0	2282.20±102.57	688.02±29.81 <sup>b</sup>	3.32±0.08 <sup>ab</sup>
T1	2313.29± 91.79	677.47±55.77 <sup>bc</sup>	3.43±0.20 <sup>ab</sup>
T2	2319.17± 71.96	678.04±41.83 <sup>bc</sup>	3.43±0.20 <sup>ab</sup>
T3	2365.71±132.54	804.40±60.83 <sup>a</sup>	2.96±0.36 <sup>a</sup>
T4	2277.01±125.06	682.36±65.43 <sup>bc</sup>	3.35±0.20 <sup>ab</sup>

<sup>a-c</sup> Means within row with different superscripts were significantly different (P<0.05).

#### 4. Conclusion

The addition of 0.35 % garlic powder did significantly improve on native chickens performances including average body weight and feed conversion ratio, however did not improve on feed consumption.

#### References

- [1] El-Sheikh, H. M. M. 2006. Effect of probiotic supplementation to broiler chicken diets on its performance, carcass characteristics and blood constituents, M. Sc. Thesis, Fac. of Agric. (Saba Basha), Alexandria Univ., Egypt.
- [2] Hernandez, F., J. Madrid, V. Garcia, J. Orengo, and M. D. Megias. 2004. Influence of two plant extracts on broilers performance, digestibility and digestive organ size. *Poult. Sci.* 83:169-174.
- [3] Malekizadeh, M., M. M. Moeini, and S. Ghazi. 2012. The effects of different levels of ginger (*Zingiber officinalis*) and turmeric (*Curcuma longalinn*) rhizomes powder on some blood metabolites and production performance characteristics of layer hens. *J. Agr. Sci. Tech.* 14:127-134.
- [4] Radwan, N. L. 2003. Effect of using some medicinal plants on performance and immunity of broiler chicks. Ph.D. Thesis. *Poult. Nutr. Dept. Fac. Agric. Cairo University.*
- [5] Radwan, N. L., R. A. Hassan, E. M. Qota, and H. M. Fayek. 2008. Effect of natural antioxidant on oxidative stability of eggs and productive and reproductive performance of layer hens. *Int. J. Poult. Sci.* 7:134-150.