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Effect of Pineapple Fruit Water (*Ananascomosus (L). Merr*) Bio-supplement on the Carcass and Final Weight of Commercial Broilers

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Abstract

A study was conducted to determine the effect of Pineapple Fruit Water (*Ananascomosus (L). Merr*) Bio-supplements (PFWB) as an alternative drinking water supplement for broilers to achieve the carcass and final weight. Lohman broilers were kept in stage cages were subjected to different treatments, namely, P0 (0% without PFWB), P1 (given 15% PFWB) and P2 (given 30% PFWB). The data on final weight and carcass weight were collected at35 days of age. The results indicate a significant difference ($p<0.05$) in both final weight and carcass weight for each treatment. The results indicated that the pineapple fruit water bio-supplements can serve as a viable and efficient alternative at 15% dosage in drinking water for commercial broilers.

Key words: *Broiler chicken, Body weight, Pineapple fruit water supplement, Agricultural innovation*

Poultry is an agricultural subsector that has an important role in terms of meeting the increasing need for protein sources (Hussain *et al.,* 2015). Chicken meat is one of the sources of animal food that contains quite high nutrients in the form of protein and energy. Broilers have the advantage of rapid growth, enabling them to be slaughtered before reaching 5 weeks of age, with an average body weight of 2.0 kg within 35 days (Dixon, 2020).To achievedesirable performancein broilers,use ofsuperior germplasm, providing quality feed, ensuring access to clean drinking water, and providing comfortable and healthy housing for the poultry are necessary (Glatz and Pym 2013).

Incorporating Pineapple fruit (*Ananas comosus (L.) Merr*) into broilers' diet can aid in meeting their nutritional requirements. Pineapple contains various minerals, both micro and macro, organic substances, water, and vitamins. It is rich in nitrogen, bromelain enzymes, and amino acids, which can help to inhibit bacterial growth (Rahman *and* Yang, 2018).The component in pineapple fruit that plays a crucial role in supplying protein. Proteins are macromolecules composed of amino acids containing nitrogen, carbon, and oxygen atoms, along with various sulfur-containing amino acids (methionine, cystine, and cysteine) linked together by peptide bonds. Within living organisms, proteins serve as the building blocks of cell structures, and certain types of proteins also have essential physiological functions (Tayeb *et al.,* 2013).

The study aims to investigate the potential of using pineapple fruit as a bio-supplement for broilers, intending to facilitate accelerated weekly weight growth, as well as enhance finalweight and carcass weight.

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Materials and Methods

Location and Time

The study was carried out at a confectionary cage owned by Sofyan Farm, under PT. Sinar Unggas Barokah, located in Krajan hamlet, Kedayunan village, Kabat district, Banyuwangi regency, Indonesia. The bio-supplement preparation took place at the Feed and Nutrition Laboratory of the School of Health and Life Sciences, Universitas Airlangga, Indonesia.

Animals

In this study, Lohman strain broilers were employed as the experimental subjects, encompassing a total of 30 chickens. The experiment, encompassing three distinct treatments, each consisting of 10 replications (10 chickens), was carried out over a span of 1 to 35 days. During the treatment, the broilers were fed with Charoen Pokphand CP511B brand feed. Drinking water was given *ad libitum*. The nutritional content of Charoen Pokphand CP511B feed is as follows: Metabolizable Energy (ME): 3025 - 3125 Kcal/kg; Crude Protein: 21.5 - 23.8%; Crude Fat: 5.0%; Crude Fiber: 5.0%; Calcium (Ca): 0.9%; Phosphorus (P): 0.6%. The maintenance of the broilers was carried out in stage cages, each with a height of 1.5 m from the ground level, which had been specially designed for brooding or the early period. The broiler brooding cage size ranges from 0.03 to 0.05 m^2per chicken during the brooding period during this stage. For the final period, in each treatment, recommended broiler cage size ranges from 0.1 to 0.15 m^2 per chicken when the chickens reach their harvest weight.

Bio-supplement preparation

The clean pineapple pieces were then blended or ground until complete homogenization was achieved, with the addition of a small amount of clean water to aid the blending process when necessary. After blending, the resulting pineapple mixture was carefully poured into a fine strainer to effectuate the separation of the extract from the pulp; gentle pressure was applied to the extract using a spoon or spatula to ensure the complete extraction of residual liquid. The pineapple extract was further strained into a clean container, guaranteeing the absence of residual pulp within the extract. The resulting pineapple extract, following the aforementioned procedure, will be subsequently diluted in accordance with the specific experimental treatments employed.

Research Design

The method used in this study is an experimental method. The different treatments received varying amounts of the bio-supplement, with P0 receiving none, P1 receiving 15% PFWB, and P2 receiving 30% PFWB. The bio-supplement was delivered via *ad libitum* drinking water, allowing the broilers to consume the specific dosage intended for each treatment.The data taken are primary data obtained from the results of research that has been carried out during the study. The variables observed were the final body weight andcarcass weight.

Data Analysis

The data obtained were analyzed using the SPSS version 20 application, the test on the analysis used one-way Analysis of Variance and the mean differences were assessed at 5% level ($p<0.05$) using Duncan Test.

Results and Discusion

Final Weight

The results indicate that PFWB supplementation had a significant ($p>0.05$) effect on the final weight. Among the treatments, P1 with 15% PFWB and P2 with 30% PFWB in drinking water obtained the highest average final body weight (Table I). Specifically, P1 achieved a final weight of 2.125 Kg with the administration of 150 mL (15%) of bio-supplements in 1000 mL of water, while P2 obtained a final weight of 1.908 Kg with the administration of 300 mL (30%) of bio-supplements in 1000 mL of water. On the other hand, the lowest final body weight was observed in the P0 treatment, without any bio-supplementation, and it significantly ($p<0.05$) lower from the P1 and P2 treatments. Furthermore, there was a significant ($p<0.05$) difference between the P1 and P2 treatments, with P1 having highest ($p<0.05$) value.

Table I. The mean (±SE) final weight of broilers given different levels of BFWB

Treatment	n	Average ± SD (Kg)
P0 (0% PFWB)	10	1,784[a] ± 0.095
P1 (15% PFWB)	10	2,125[c] + 0.092
P2 (30% PFWB)	10	1,908[b] + 0.101

Means bearing different superscripts within the column differ significantly (p<0.05)

Table II. The mean (±SD)carcasses weight of broilers given different levels of BFWB

Treatment	n	Average ± SD (Kg)
P0 (0% PFWB)	10	1,293 [a] + 0.039
P1 (15% PFWB)	10	1,602 [c] + 0.093
P2 (30% PFWB)	10	1,447 [b] + 0.104

Means bearing different superscripts within the column differ significantly (p<0.05)

Pineapple fruit contains approximately 0.40 grams of protein per 100 grams and is enriched with the enzyme bromelain, which enhances protein digestion in feed by breaking down proteins into simpler compounds (Mohan *et al.,* 2016). The addition of pineapple fruit water bio-supplements to the broilers' drinking water enhances the nutritional content of their feed, resulting in better nutrient digestion and influencing the growth of the final live weight (Mandey *et al.,* 2018). Based on these findings, it is speculated that the administration of pineapple water bio-supplements to the drinking water of broilers in different concentrations may lead to varying growth rates and final live weight.

The higher bio-supplement level in the P2 treatment group led to lower (p<0.05) final weight compared to the P1 treatment. This can be attributed to the increased sugar content in the bio-supplement administered to chickens, providing sufficient energy for broilers and reducing their feed consumption compared to the P1 treatment, which required more energy (Gous, 2010). According to Gómez *et al.* (2020), fresh pineapple fruit contains approximately 14.45% sugar, providing energy to broilers and resulting in lower final weight in the P2 treatment group compared to the P1 treatment group.

Carcass Weight

The results of the study revealed that the biosupplement of pineapple fruit water (*Ananas comosus (L). Merr*) supplementation resulted inmarkeddifference (p<0.05) inthe weight of broiler carcasses. Among the treatment groups, thecarcass weight of broilers P1 treatment group supplemented 15% PFWB in drinking water had highest body weight of 1,602 Kgfollowed by 1,447 Kgin P2 treatment group with 30% PFWB supplementation and 1.293 Kg in P0 treatment without biosupplement administration. Between the P1 and P2 treatment, there is also a noticeable difference, with the highest (p<0.05) valuebeing found in the P1 treatment. The results of the study can be seen in (Table II).

The results indicated a significant difference among the treatment groups (p>0.05). The noticeable differences in carcass yield were observed in P0, (72.4% of the total weight), followed by P1 (75.3%)and P2 (75%). As per Salam *et al.,*. (2013), a carcass yield in broiler chicken usually ranges from 65 to 75% of the live weight, and higher carcass weight results in higher percentages. Jumiati *et al.,*. (2017) supported this, stating that carcass percentage can be influenced by age, live weight, cutting age, and gender.

The P2 treatment, with a higher biosupplement levelyieldedlower carcass weightcompared to the P1 treatment. This difference is attributed to the larger amount of sugar content consumed by chickens in the P2 biosupplementation, resulting in increased energy for broilers and reduced feed consumption compared to the P1 treatment, which required more energy (Gous, 2010).

Conclusion

Based on the results of the research, it can be concluded that the use of pineapple fruit water (*Ananas Comosus (L). Merr*) can be added in the drinking water as a bio-supplement to commercial broilers at the level of 150 mLper liter of drinking water (15%) toget maximum results on final live body weight and carcass weight compared to the additionof 300 mLper liter (30%).

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