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The effect of giving boiled betel leaves (*Piper betle* Linn) and red guava leaves (*Psidium guajava* l.) in drinking water on broiler performance

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Abstract

Broiler chickens are one type of livestock that is widely cultivated by Indonesian people because they have high productivity. However, broiler chickens have a weakness, namely being susceptible to disease. This study aims to determine the effect of adding boiled water of betel leaves and red guava leaves on broiler performance. The research was conducted in Nyitdah Village, Kediri District, Tabanan Regency, Bali. The study lasted for 35 days, starting from July to August 2024. The design used was a completely randomized design (CRD), consisting of four treatments and seven replications. Each replication contained three broilers, so that the total broilers used were 84, with an average weight of 42,06 ± 2,103 g. Treatment without giving boiled water of betel leaves and red guava leaves (P0), the addition of boiled water of betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of 1: 1 (P1), 2: 1 (P2), and 1: 2 (P3). The variables observed were feed consumption, drinking water consumption, final body weight, body weight gain, and feed conversion ratio. The results showed that the addition of boiled water of betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of 1:1, 2:1, and 1:2 did not have a significant effect (P>0.05) on feed consumption, drinking water consumption, final body weight, body weight gain, and feed conversion ratio. Based on the results of this study, it can be concluded that the addition of boiled water of betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of 1:1, 2:1, and 1:2 through drinking water has not been able to improve broiler performance.

Keywords: Broiler; Betel leaf; Red guava leaf; Performance

1. Introduction

Broiler chickens are livestock that are widely used as a business by Indonesian people, one of which is broilers (*Gallus domesticus*). According to Murtidjo [1], the weakness of broilers is that they are difficult to adapt and are easily attacked by disease infections, so they require an intensive maintenance system.

The addition of feed additives such as Antibiotics Growth Promoters (AGP) in feed and drinking water is widely done with the aim of increasing immunity and improving broiler performance. In fact, the government has prohibited the use of AGP in feed and drinking water for livestock, because it will leave residues in products produced by livestock, be it eggs, meat, or milk and this will also have an impact on humans who consume it. Therefore, the replacement of AGP can use natural feed additives such as betel leaves and red guava leaves. Feed Supplements is believed to be able to improve and enhance the health of the digestive organs so that livestock productivity becomes better and can be a substitute for the use of AGPs which have been banned [2,3]. Betel leaves contain phenolic compounds like betel leaves that dominate, which is as much as 1.4-2% [4]. Betel leaves contain several active compounds, namely flavonoids, alkaloids, tannins, saponins and essential oils betephenol and kavikol which act as antibacterial agents [5]. According to Winarto [6],

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Essential oils can stimulate pancreatic juice containing amylase, lipase and protease enzymes to improve the digestion process of feed ingredients that also affect meat production in chickens.

The polyphenol compounds that dominate guava leaves are flavonoids (>1.4%) and tannins [7]. According to Firdaus *et al.* [8] Guava leaf extract can inhibit the growth of small intestine pathogenic bacteria (Escherichia coli O78) that infect chickens. Flavonoid compounds function as antibacterials so that they can inhibit the growth of pathogenic bacteria in the digestive tract, which in the end can increase the digestibility and utilization of nutrients in the body [9].

2. Materials and Methods

2.1. Cages

This study utilized 28 colony cages, Each unit has a size of 85 cm x 95 cm, each compartment is filled with 3 chickens. Each partition is made of plywood and each cage compartment is equipped with a feeder with a maximum capacity of 5 kg and drinking water with a maximum capacity of 3 liters. The cage uses lighting with a power of 15 watts and a heater (gasolec) which functions to maintain the temperature in the cage to keep it warm. The floor of the cage is coated with lime and covered with rice husks then covered with newspaper and removed after one day of use. Turning or replacing the husks is done every three days.

2.2. Broiler

This study used DOC (Day Old Chick) produced by PT. Japfa Comfeed Indonesia Tbk, Lohmann MB 202 strain as many as 84 chicks with a body weight of 42.06 ± 2.103 g and did not differentiate gender (Unsexing).

2.3. Experimental Design

This study used a completely randomized design (CRD) consisting of 4 treatments and 7 replications, each replication using 3 broilers. The four treatments were: P0 (0% betel leaves and red guava leaves), P1 (5% mixture of boiled water of betel leaves and guava leaves from weekly body weight with a ratio of 1:1), P2 (5% mixture of boiled water of betel leaves and guava leaves from weekly body weight with a ratio of 2:1), P3 (5% mixture of boiled water of betel leaves and guava leaves from weekly body weight with a ratio of 1:2).

2.3.1. Randomization of broiler

Chicken randomization was done by weighing 100 chickens to find the average weight and standard deviation. The DOC used in this study was a DOC that fell within the average weight range of 42.06 ± 2.103 g.

2.4. Feed and Water Provision

Table 1 Nutrient content of broiler rations G-10 and G-11

Nutritional content[1)]	**Ration Type**			
	G-10	**SNI Standards 8173-2:2022[2)]**	**G-11**	**SNI Standards 8173-3:2022[2)]**
Water Content (%)	12.0%	13.0%	14.0%	12.0%
Crude Protein/CP (%)	22.0%	20.0%	19.0%	20.5%
Crude Fat/LK (%)	5.0%	4.0%	5.0%	5.0%
Crude Fiber/SK (%)	4.0%	5.0%	6.0%	5.0%
Ash %	7.0%	9.0%	8.0%	7.0%
Calcium (Ca)(%)	0.8-1,10%	0.7-1.2%	0.8-1.1%	0.8-1.10%
Fofor (P)(%)	0.50%	0.5%	0.45%	0.50%
Aflatoxin (µg/kg)	40 µg/Kg	50 µg/Kg	50 µg/Kg	50 µg/Kg

Note: [1]Broiler feed brochure PT. Japfa Comfeed Indonesia Tbk.; [2]Nutrient standards according to National Standard of Indonesia (abbreviation in Indonesian; Standar Nasional Indonesia/SNI (2022))

The ration given was a commercial ration produced by PT. Japfa Comfeed Indonesia Tbk. with the code G-10 (age 1-20 days) and G-11 (age 21-35 days) and was given ad libitum. The nutrient content of the ration can be seen in Table 1.

Drinking water provided in this study came from a local well and was provided ad libitum. The addition of boiled betel leaves and guava leaves was given according to the treatment during the day from 11:00 WITA to 14:00 WITA to maximize the broilers drinking all the treatments given.

2.5. Observed Variables

The variables observed in this study were:

- Ration consumption (g)= rations given - Remainder of rations
- Drinking water consumption (ml) = Amount of drinking and treatment water − remaining water
- Final body weight = Final body weight was calculated by weighing the chickens at the end of the study
- Weight gain (g) = Final body weight − Initial body weight

$$\text{FCR (feed conversion ratio) (g)} = \frac{Amount\ of\ ration\ consumption}{Weight\ gain}$$

2.6 Data analysis

The data from this study were analyzed using analysis of variance and if there was a significant difference between the treatments (P<0.05), then the calculation was continued using Duncan's multiple range test.

3. Results and discussion

The results of the study on the effect of treatment on the performance of 35-day-old broilers given water with the addition of boiled betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of betel leaves and red guava leaves as much as 1:1 (P1), 2:1 (P2), and 1:2 (P3) can be seen in Table 2.

Table 2 Effect of treatment on the performance of 35-day-old broilers given water with the addition of boiled betel leaves and red guava leaves

Variable	**Treatment[1)]**				**SEM[2)]**
	P0	**P1**	**P2**	**P3**	
Ration consumption (g/chicken)	3321.76[a3)]	3262.57[a]	3322.67[a]	3295.86[a]	33.15
Drinking water consumption (ml/chicken)	9422.90[a]	9173.67[a]	9312.10[a]	9386.47[a]	184.65
Final body weight (g/chicken)	2262.86[a]	2315.86[a]	229214[a]	2353.43[a]	32.47
Weight gain (g/chicken)	2220.48[a]	2274.19[a]	2249.90[a]	2311.48[a]	32.63
feed conversion ratio	1.50[a]	1.44[a]	1.48[a]	1.43[a]	0.03

Notes: P0: 0% betel leaf and guava leaf**;** P1: 5% mixture of boiled water of betel leaf and guava leaf from weekly body weight with a ratio of 1:1**;** P2: 5% mixture of boiled water of betel leaf and guava leaf from weekly body weight with a ratio of 2:1**;** P3: 5% mixture of boiled water of betel leaf and guava leaf from weekly body weight with a ratio of 1:2**;** Standard Error of the Treatment Means**;** Values with the same letter in the same row indicate no significant difference (P>0.05).

The results of the study showed that the average consumption of rations (P0) without the addition of boiled water of betel leaves and red guava leaves in drinking water was 3321.76 g/head (Table 2.). In treatment (P2) the provision of boiled water of betel leaves and red guava leaves in drinking water with a ratio of 2:1 was 0.03% higher in broilers without the provision of boiled water of betel leaves and red guava leaves (P0) but statistically there was no significant difference (P>0.05). In the treatment of providing boiled water of betel leaves and red guava leaves with a ratio of 1:1 and 1:2 (P1 and P3) the results were 1.78% and 0.78% there was no significant difference (P>0.05) lower compared to (P0). This is influenced by the conditions during maintenance which are relatively the same and also the provision of commercial rations with nutritional content that has met the standard needs of the broiler body. In addition, the temperature, body weight, and genetics of the chickens are relatively the same so that the consumption of rations from the treatment has no significant effect (P>0.05).

The results showed that the average consumption of drinking water (P0) without the addition of boiled water of betel leaves and red guava leaves in drinking water was 9422.90 ml/head (Table 2.). The average consumption of drinking water added with boiled water of betel leaves and guava leaves with a ratio of 1:1, 2:1, and 1:2 (P1, P2, and P3) were 2.64%, 1.18%, and 0.39% respectively, there was no significant difference (P>0.05) lower compared to the control (P0). This is because there are many factors that influence drinking water consumption in livestock, including the levels of sodium and potassium salts in the ration, enzymes, water odor, additional complementary foods, water temperature, disease, gender and type of drinking water source.

The results of the study showed that the average final body weight of broilers without the addition of boiled water of betel leaves and red guava leaves in drinking water (P0) was 2262.85 g/head (Table 2.). In the treatment of giving boiled water of betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of 1:1, 2:1 and 1:2 (P1, P2 and P3) were respectively 2.34%, 1.29% and 4% higher than broilers without giving boiled water of betel leaves and red guava leaves (P0), but statistically there was no significant difference (P>0.05). The absence of significant differences is due to uniformity in maintenance and also the provision of tested commercial rations so that the nutritional needs of the livestock's body can be met properly. In addition, during maintenance, no broilers were affected by disease, causing the growth of broilers from all treatments to experience the same weight increase.

The results of the study showed that the average weight gain (P0) without the addition of boiled water of betel leaves and red guava leaves in drinking water was 2220.48 g/head (Table 2.). In the treatment of giving boiled water of betel leaves and red guava leaves as much as 5% of weekly body weight with a ratio of 1:1, 2:1 and 1:2 (P1, P2 and P3) were respectively 2.42%, 1.32% and 4.10% higher than broilers without giving boiled water of betel leaves and red guava leaves (P0), but statistically there was no significant difference (P>0.05). There is no significant effect on weight gain because boiled water of betel leaves and guava leaves is a mixture of herbs that cannot directly affect the weight gain of broilers. In addition, the provision of feed that has good nutritional content, maintenance, and relatively the same initial body weight makes the weight gain of these broilers not have a significant effect.

The results of the study showed that the average feed conversion ratio that was not given additional boiled water of betel leaves and red guava leaves in drinking water (P0) was 1.5 (Table 2.). The average feed conversion ratio in the treatment given boiled water of betel leaves and red guava leaves in drinking water 1:1 (P1), 2:1 (P2), and 1:2 (P3) were 4.0%, 1.33%, and 4.67% respectively, not significantly different (P>0.05) lower compared to (P0) without giving boiled water of betel leaves and red guava leaves in drinking water. This is due to the provision of relatively the same feed and relatively the same initial body weight, so that the growth and feed consumption of broilers have insignificant differences. According to [10] Factors that influence feed conversion value are DOC (day old chick) quality, feed nutritional quality, maintenance management, and cage quality.

4. Conclusion

Based on the research results, it can be concluded that the addition of boiled betel leaves and red guava leaves as much as 5% of weekly body weight in drinking water with a ratio of 1:1, 2:1, and 1:2 has not been able to improve broiler performance.

Compliance with ethical standards

Disclosure of conflict of interest

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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