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# Commercial part of broiler carcass given boiled water of betel leaves (*Piper Betle* Linn) and red guava leaves (*Psidium Guajava* L.)

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## Abstract

The phytochemical content of betel leaves, especially essential oils and guava leaves, especially flavonoid compounds, can increase nutrient absorption in the intestinal villi, thereby increasing livestock productivity, including commercial carcass production. This research aims to evaluate the effect of giving boiled betel leaves and red guava leaves 5% of body weight in broiler drinking water on commercial carcass sheds. In addition, this research also aims to examine the optimal comparison between betel leaves and red guava leaves. The research was conducted for 35 days in Banjar Suda, Nyitdah Village, Kediri District, Tabanan Regency. Using Complete Random Design (RAL) with 4 treatments and 7 repetitions. Each repetition consists of 3 broilers. Treatments include P0 (without the addition of betel leaves and red guava leaves), P1 (1:1 ratio of 5% body weight in drinking water), P2 (2:1), and P3 (1:2). The observed variables include carcass weight, chest percentage, wing percentage, upper thigh percentage, lower thigh percentage, and back percentage. The results of the study showed that the administration of 1;1, 2;1 and 1;2 boiled water of betel leaves and red guava leaves in the chest presentation was 5,14%, 41,2% and 4.23% lower than P0 but there was no real difference (P>0,05), in line with the percentage of the wings, the percentage of the upper thighs, the percentage of the lower thighs, the percentage of the back that were not significantly different (P>0,05). Based on the results of this research, it can be concluded that giving boiled water from betel leaves and red guava leaves as much as 5% of the weekly body weight with a ratio of 1:1, 2:1, and 1:2 through drinking water has not been able to increase the commercial breakdown of broiler carcass optimally.

**Keywords:** Boiled Water; Betel leaves; Red guava leaves; Commercial part; Broiler

## 1. Introduction

Broilers are meat chickens produced from crossbreeding high-yielding chicken breeds, especially in meat production, and can grow rapidly in a relatively short time so that they can produce meat faster with better carcasses than other types of meat chickens. According to Murtidjo [1], success in broiler livestock farming can be measured by increasing carcass weight [2]. The higher the carcass weight, the better the quality and quantity of carcass fragments.

Broilers have the disadvantage of being difficult to adapt and susceptible to disease, so they require intensive care. The addition of antibiotics for growth promoters (AGP) in feed and drinking water is often done with the aim of increasing immunity and improving the performance of broiler chickens. In fact, the use of AGP can cause residues in livestock products and cause antibiotic resistance in people who consume them, which has a negative impact on health, so the government prohibits the use of AGP in feed. With this prohibition, it is necessary to find a way out, namely by utilizing herbs such as boiled betel leaves and boiled red guava leaves as natural ingredients to replace AGP.

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Betel leaves contain essential oils of 1 - 4.2% [3]. Essential oils in betel leaves are in the form of volatile oils (bettle phenol), sisqui terpenes, starch, diastase, sugar and fatty substances and kavikol which have the ability to kill germs, antioxidants and fungicides [4]. According to [5] antimicrobial compounds by damaging the cytoplasmic membrane and cell membrane, while flavonoid compounds will damage the cell walls of bacteria consisting of lipids and amino acids then react with alcohol groups and flavonoid compounds so that the cell walls will be damaged and cause these compounds to enter the bacterial cell nucleus,).

Red guava leaves contain saponins, flavonoids, tannins and essential oils. Polyphenol compounds that dominate red guava leaves are: flavonoids (>1.4%) [6]. Indonesia Food and Drug Supervisory Agency [7] stated that flavonoid compounds can increase the height of intestinal villi in poultry which has an impact on the absorption process of nutrients to be maximized, so that the slaughter weight of livestock increases and the quality and quantity of carcass fragments also increase.

## 2. Material and methods

This study was conducted for 35 days, starting from 19 to 23 August 2024 using 84 broilers (unsexing). They were kept in a box cage made of plywood measuring 85 cm x 95 cm and filled with 3 broilers equipped with a feeder and a drinker. The floor of the cage was coated with lime and sprinkled with rice husks then covered with newspaper. The feed given was a commercial ration produced by PT Japfa Comfeed Indonesia Tbk. With the coded G-10 (age 1-20 days) and G-11 (age 21-35 days) and given ad libitum. The nutrient content of the ration can be seen in Table 1

**Tabel 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))

### 2.1. Experimental design and randomization

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).

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.

### 2.2. Observed Variables

Carcass weight (g/head) is obtained by subtracting the slaughter weight from the weight of blood, feathers, head, feet and internal organs.

*2.2.1. Chest Percentage*

The chest percentage is obtained by weighing the chest weight, then calculated using the formula:

$$\text{Chest Percentage (\%)} = \frac{\text{Chest Weight (g)}}{\text{Carcass weight (g)}} \times 100\%$$

*2.2.2. Wing Percentage*

The wing percentage is obtained by calculating the wing weight, then calculated using the formula:

$$\text{Wing Percentage (\%)} = \frac{\text{Wing Weight (g)}}{\text{Carcass weight (g)}} \times 100\%$$

*2.2.3. Upper Thigh Percentage*

The percentage of the upper thigh is obtained by weighing the weight of the upper thigh, then calculated using the formula:

$$\text{Upper Thigh Percentage (\%)} = \frac{\text{Upper Thigh Weight (g)}}{\text{Carcass weight (g)}} \times 100\%$$

*2.2.4. Lower Thigh percentage*

The lower thigh percentage is obtained by weighing the lower thigh, then calculated using the formula:

$$\text{Lower Thigh Percentage (\%)} = \frac{\text{Lower Thigh Weight (g)}}{\text{Carcass weight (g)}} \times 100\%$$

*2.2.5. Back Percentage*

The back percentage is obtained by weighing the back weight, then calculated using the formula:

$$\text{Back Percentage (\%)} = \frac{\text{Back Weight (g)}}{\text{Carcass weight (g)}} \times 100\%$$

### 2.3. Data analysis

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

## 3. Results and discussion

The results of the research on carcass weight, percentage of chest, percentage of wings, percentage of upper thigh, percentage of lower thigh and percentage of back of broilers given water with the addition of boiled betel leaves and red guava leaves as much as 5% of body weight with a ratio of betel leaves and guava leaves as much as 1:1 (P1), 2:1 (P2), 1:2 (P3) can be seen in Table 2.

The results of the study showed that the carcass weight of broiler P0 (Drinking water without adding betel leaves and red guava leaves) was 1704.29 g/head. The treatment of Drinking water added with a mixture of boiled betel leaves and red guava leaves with a ratio of one to one of 5% body weight (P1); Drinking water added with a mixture of boiled betel leaves and red guava leaves with a ratio of two to one of 5% body weight (P2); and Drinking water added with a mixture of boiled betel leaves and red guava leaves with a ratio of one to two of 5% body weight (P3) were respectively higher by 2.43%, 2.18%, 5.03%, but statistically showed no significant effect ($P> 0.05$), compared to P0. ). This is influenced by the feed used during the study which is a commercial ration that does have good and balanced nutritional content and with the amount of ration consumption and drinking water consumption that is relatively the same so that it will provide the same nutrient supply in each treatment so that it will produce a relatively the same carcass weight with the level of ration consumption and drinking water for the four treatments showing the same value causing the final weight and cutting weight not to be much different so that the carcass weight is also not much different from all treatments.

**Table 2** The effect of treatment on carcass weight and commercial carcass fragments given drinking water with the addition of a mixture of boiled betel leaves and red guava leaves

| Variable | Treatments[1] | | | | SEM[2] |
|---|---|---|---|---|---|
| | P0 | P1 | P2 | P3 | |
| Carcass weight (g/chicken) | 1704.29a3 | 1745.71a | 1741.43a | 1790.00a | 39.60 |
| Chest Percentage (%/chicken) | 44.18a | 41.91a | 42.36a | 42.31a | 0.69 |
| Wing Percentage (%/chicken) | 9.82a | 9.80a | 9.78a | 9.67a | 0.18 |
| Upper Thigh Percentage (%/chicken) | 13.72a | 13.93a | 13.97a | 13.73a | 0.30 |
| Lower Thigh Percentage (%/chicken) | 11.70a | 12.47a | 12.34a | 12.93a | 0.37 |
| Back Percentage (%/chicken) | 20.58a | 21.89a | 21.55a | 21.90a | 2.24 |

Notes: [1]Treatments were: P0= Broiler give not mixture of boiled water of betel leaf and guava leaf; P1= Broiler given 5% mixture of boiled water of betel leaf and guava leaf from weekly broiler body weight with a comparison of 1 vs. 1; P2= Broiler given 5% mixture of boiled water of betel leaf and guava leaf from weekly broiler body weight with a comparison of 2 vs. 1; P3: Broiler given 5% mixture of boiled water of betel leaf and guava leaf from weekly broiler body weight with a comparison of 1 vs. 2; [2]SEM= Standard Error of the Treatment Means; Values with the same letter in the same row indicate no significant difference (P>0.05).

The percentage of broiler chicken breast in the treatment without giving boiled water of betel leaves and red guava leaves in the P0 treatment was 44.18%/head while in the P1; P2; and P3 treatments, respectively, were 5.14%, 4.12%, and 4.23% lower than the P0 treatment but statistically showed no significant effect (P> 0.05). This is because the protein content of the ration consumed by livestock is the same so that the results of the percentage of the chest section are also not much different. Protein is the main component in muscle formation, and with uniform quantities and qualities in each group, the accumulation of muscle tissue does not experience significant differences. The growth of the carcass section, especially the chest, is highly dependent on the availability of protein in the ration, which if it has met the maximum needs of broilers, then the addition of other substances will not provide significant changes to the percentage of certain carcass sections.

The percentage of broiler wings in the provision of boiled water of betel leaves and red guava leaves in broilers produced a wing percentage ranging from 9.82% - 9.67%. Treatment P0 had the highest wing percentage of 9.82%/head, while treatments P1, P2 and P3 had wing percentages of 0.20%, 0.41%, and 1.53% respectively lower than treatment P0 but statistically showed no significant effect (P> 0.05). This is because the wings are part of the carcass consisting of bones and lots of feathers, causing the wing percentage to be lower than other parts. Wings have a smaller proportion of meat than the chest or thighs, which are more dominantly composed of muscle tissue. This anatomical factor causes the contribution of wing weight to the total carcass to be smaller even though there is an increase in overall body weight. In addition, the factor that causes the provision of boiled water of betel leaves and red guava leaves to have no significant

The percentage of upper thigh of broilers in the provision of boiled water of betel leaves and red guava leaves in the P0 treatment was 13.72%/head while in the P1; P2 and P3 treatments, respectively, were 1.53%, 1.82%, and 0.07% higher than the P0 treatment but statistically showed no significant effect (P> 0.05). This is thought to be because the content of compounds such as essential oils and flavonoid found in betel leaves and red guava leaves has not been able to significantly increase the carcass cut of the upper thigh which is indicated by the consumption of rations that are not significantly different. The results of the same ration consumption will produce carcass percentages and cut weights that are not significantly different. The protein content consumed in each treatment will produce a relatively similar carcass percentage and produce an insignificant upper thigh percentage.

The lowest lower thigh percentage is 11.70%/head. while in treatments P1, P2 and P3 have lower thigh percentages of 6.58%, 5.47%, and 10.51% respectively heavier than treatment P0 but statistically shows no significant effect (P> 0.05). This is because the provision of boiled betel leaves and guava leaves has not been able to increase the appetite of broiler chickens which affects ration consumption and weight gain which is not significantly different so that the percentage of carcass in the lower thigh section is not significantly different (P> 0.05) the thigh muscles have reached maximum growth so that the percentage of thighs is not different besides the chicken thighs are parts of the body that are often used for activities, so that the growth proportion follows the body to remain balanced.

The percentage of broiler backs in the administration of boiled water of betel leaves and red guava leaves in the P0 treatment was 20.58%/head while in the P1; P2 and P3 treatments, respectively, were 6.37%, 4.71%, and 6.41% higher than the P0 treatment but statistically showed no significant effect (P> 0.05). This occurs because the cells that make up the back are more dominated by bones so that the administration of boiled water of betel leaves and guava leaves does not affect the percentage of broiler backs. The back is mostly composed of bone tissue but the amount of muscle tissue is less. This occurs because the back is a component that forms the body, most of the back of the broiler, which is mostly composed of bones. The distribution of nutrients from feed is allocated more to parts of the body with greater muscle growth potential, such as the chest and thighs, which have more developed red and white muscle fibers. Meanwhile, the back functions more as a structural support for the chicken's body, so even though the nutrient intake is sufficient, the back does not experience significant meat growth like other parts of the body

## 4. Conclusion

Based on the research results, it can be concluded that giving boiled water from betel leaves and red guava leaves in a ratio of 1:1, 2:1, and 1:2 with a dose of 5% of body weight has not been able to increase the commercial cut of broiler carcasses.

## 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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