

Article

Potential of Brotowali, Red Ginger, and Propolis Extract Towards Productivity of Broiler Chicken

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Abstract: Indonesia is a country where most of the population's income comes from agriculture and livestock. In the poultry sector, especially commercial broiler chickens are still the main priority for meeting people's animal protein needs. This research aims to determine the effectiveness of using brotowali extract, red ginger, and propolis as herbal ingredients used in drinking water towards productivity of broiler chicken. This research used a Completely Randomized Design (CRD) with 5 treatments and 5 replications and each replication consisted of 5 broiler chickens. The treatment consisted of P0 = drinking water without adding extract (control), P1 = drinking water + 0.5% brotowali extract and 0.5% propolis extract, P2 = drinking water + 0.5% red ginger extract and 0.5% propolis extract, P3 = drinking water + 0.5% brotowali extract, 0.5% red ginger extract and 0.5% propolis extract, P4 = drinking water + 1% propolis extract. Variables observed in productivity include consumption ratio, body weight, and conversion ratio. The results showed that the addition of brotowali extract, red ginger, and propolis given singly, a combination of 2 ingredients and a combination of 3 ingredients had a significant effect ($P < 0.05$) on body weight gain and feed conversion. However, it has no real effect on ration consumption. The conclusion of this research is that the use of brotowali extract, red ginger, and propolis given singly, a combination of 2 ingredients and a combination of 3 ingredients in drinking water can increase the productivity of broiler chicken.

Keywords: Broiler, Red Ginger Extract, Brotowali Extract, Propolis Extract, Productivity.

1. Introduction

Broilers are a type of livestock that is widely developed as a source of providing animal protein needs and are the fastest growing livestock because they are the result of cultivation using technology so they have profitable economic characteristics, including being able to be harvested at 4 weeks old [1]. Livestock health is one of the important factors in raising livestock. Livestock health management needs to be considered to reduce the possibility of farmer losses due to disease in livestock, disease in livestock can disrupt the process of nutrient absorption, which often causes emaciation and reduces livestock productivity [2].

Increasing the quality and quantity of livestock, especially broilers, requires good quality feed for growth. Efforts that can be made are to maximize the use value of the feed consumed by livestock by adding feed additives both through

feed and drinking water. The main ingredients in red ginger (*Zingiber officinale* Roxb. var *Rubra*) are flavonoids, phenols, and terpenoids [3].

The results showed that ginger water extract supplementation had a positive effect ($P < 0.05$) on total feed consumption, final BW, and feed conversion ratio. The ginger water extract supplementation level of 127.49 ml/L maximizes daily weight gain while the FCR is maximum at the inclusion level of 88.79 ml/L through drinking water [4].

Brotowali has the Latin name (*Tinospora cordifolia*) and is commonly used as a medicinal plant in Indonesia because chemically, this plant contains flavonoids, phenols, alkaloids, diterpenoids, lignin, and lactones. The results showed that the addition of red ginger extract (1%) and brotowali extract (5.12 g/kg bw) to drinking water, either singly or in combination, had a significant effect on body weight gain, conversion ratio, mortality, carcass percentage, abdominal fat, and cooking loss ($p < 0.05$). Giving a combination of red ginger and brotowali extract to drinking water increased body weight (1100.28 g/head), and feed conversion ratio (1.37) [5].

Propolis extract contains several chemical compounds, including steroids, polyphenols (flavonoids, alcohols, phenolic aldehydes, and acids), and terpenoids [6]. Propolis has several biological activities, including antimicrobial, antiparasitic, antiprotozoal, anti-inflammatory, immunomodulatory, and antioxidant [7]

This research aims to analyze the potential of herbal preparations of brotowali extract, red ginger, and propolis towards productivity of broiler chicken [1].

2. Materials and Methods

Time and Location of Research

This research was carried out in January-March 2024. The research was conducted at the Livestock Cage and Animal Feed and Nutrition Laboratory, Lampung State Polytechnic [2].

Material

The materials used in this research include brotowali extract, red ginger extract, and propolis extract as feed additives, broiler chicken test materials obtained from PT Japfa Comfeed with a body weight (BW) of 45.15 ± 39.95 g/head, BR feed -1® and BR-2® as broiler feed obtained from PT Japfa Comfeed, disinfectant as a chemical to prevent contamination of bacterial agents on equipment and dirt during maintenance. The tools used in this research include broiler chicken cages along with feed and water equipment as a means of raising broiler chickens [3].

Experimental Design and Data Analysis

This research was carried out using a Completely Randomized Design (CRD) consisting of five treatments and five replications and each replication contained 5 broilers [4]. In this study, the treatment applied was the administration of brotowali extract, red ginger, and propolis. Brotowali extract, red ginger, and propolis were given to chickens aged 7-28 days. The treatments given were: P0 = Drinking water without adding extract (control), P1 = drinking water + 0.5% brotowali extract and 0.5% propolis extract, P2 = drinking water + 0.5% red ginger extract and 0.5% propolis extract, P3 = drinking water + 0.5% brotowali extract,

0.5% red ginger extract and 0.5% propolis extract, P4 = drinking water + 1% propolis extract[5].

All collected data was tested for homogeneity before statistical analysis was carried out using one-way analysis with the help of SPSS version 23. Differences between treatments were tested with Duncan's multiple test (* $P < 0.05$) using SPSS version 23[6].

Extraction

Making brotowali, red ginger, and propolis extracts is carried out using the maceration method with a ratio of 1:5, namely 50 grams of brotowali powder, red ginger powder, or propolis powder are put into a bottle, poured with 250 mL of 96% ethanol, closed and left for 24 hours, shaken. every 1 hour. so that it is distributed evenly[7]. The juice is then poured out and the dregs are squeezed, and separated into another bottle. The remaining pulp is added to 250 mL of 96% ethanol and then macerated again for 24 hours, stirred, and mixed, the results of the maceration are combined to obtain 250 mL of whole fruit juice. The bottle was closed and left for 1 day. And continue with concentration using a rotary evaporator at a temperature of 55 – 65°C to obtain a thick extract[8].

Maintenance System

Table 1. Techniques for administering brotowali, red ginger, and propolis extracts to drinking water

Day-	Type of drinking water
1-6	<ol style="list-style-type: none"> Broilers are given water ad libitum without adding brotowali extract, red ginger, and propolis
	<ol style="list-style-type: none"> P0 was given drinking water ad libitum without the addition of brotowali extract, red ginger, and propolis. P1 was given drinking water with the addition of brotowali extract at a dose of 0.5% and propolis extract at 0.5%.
7-28	<ol style="list-style-type: none"> P2 was given drinking water with the addition of red ginger extract at a dose of 0.5% and propolis extract at 0.5%. P3 was given drinking water with the addition of a combination of 0.5% brotowali extract, 0.5% red ginger extract, and 0.5% propolis extract. P4 was given drinking water with the addition of 1% propolis extract.

3. Results and Discussion

Broiler Productivity

Table 2. Broiler Productivity Given Brotowali Extract, Red Ginger Extract, and Propolis Extract in Drinking Water.

Variable	P0	P1	P2	P3	P4
Feed consumption (g/head)	1937,26 _a	1726,00 ^a	1689,20 ^a	1735,40 ^a	1697,60 ^a
Body Weigh (g/head)	1167,13 _a	1249,00 ^b	1214,20 ^{ab}	1286,30 ^c	1264,10 ^c
Conversion Ratio	1,65 ^a	1,37 ^b	1,42 ^b	1,35 ^b	1,32 ^b

Information:

Superscripts with the same letters are not significantly different

P0= drinking water ad libitum without the addition of brotowali extract, red ginger, and propolis.

P1= drinking water + 0.5% brotowali extract and 0.5% propolis extract.

P2= drinking water + 0.5% red ginger extract and 0.5% propolis extract.

P3= drinking water + 0.5% brotowali extract and 0.5% red ginger extract and 0.5% propolis extract.

P4= drinking water + 1% propolis extract.

The results of the analysis showed that giving brotowali extract, red ginger extract, and propolis extract to drinking water had no significant effect ($P > 0.05$) on ration consumption [9]. It is suspected that the extract level in drinking water is not sufficient to influence feed consumption and the content of bioactive compounds in the extract of these three ingredients can still be tolerated by broiler chickens [10]. Apart from that, the factors that caused differences were not significant between treatments because all treatments in this study used commercial rations that contained the same amount of nutrients. This is the opinion of [8], that consumption is not significantly different because the energy content of the rations is relatively the same [11], [12].

The results of the analysis showed that the administration of brotowali extract, red ginger extract, and propolis extract in drinking water had a significant effect ($P < 0.05$) on body weight gain [13]. This increase in body weight gain is thought to be due to the high flavonoid content in the extract of these ingredients compared to the control group. Flavonoids can inhibit bacterial growth by damaging cell walls, inactivating enzyme action, causing adhesion, and damaging cell membranes [9][14].

Based on statistical analysis tests for groups of chickens that were treated with brotowali extract, red ginger, and propolis, which were given singly, the combination of 2 ingredients and 3 ingredients showed that the results had a significant effect ($P < 0.05$) on the group of chickens that were not given treatment (P0). This ration conversion figure shows the level of efficiency of ration use. The lower the ration conversion rate, the higher the ration efficiency value and the more economical it is [15]. The average ration conversion results from this study were lower than research by [10], which reported that the best ration conversion

was shown at the administration level of 2 mg/KgBB of mangosteen peel extract and soursop leaf extract[16].

Based on the statistical analysis test of conversion ratio rates in the group of chickens treated with brotowali extract, red ginger, and propolis, which were given singly, the combination of 2 ingredients and 3 ingredients showed a significant effect ($P < 0.05$) on the group of chickens that were not given treatment (P0). This conversion ratio figure shows the level of efficiency of ration use. The lower the ration conversion rate, the higher the ration efficiency value and the more economical it is. The average ration conversion results from this study were lower than research by [10], which reported that the best ration conversion was shown at the administration level of 2 mg/KgBB of mangosteen peel extract and soursop leaf extract[17], [28].

4. Conclusion

The conclusion of this research shows that the addition of brotowali extract, red ginger extract, and propolis extract was given singly, a combination of 2 ingredients and a combination of 3 ingredients has a significant effect on productivity of broiler chicken.

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