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Application of Herbal Ingredients in Drinking Water Towards Productivity of Broiler Chicken

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ABSTRACT

This study aims to analyze the effect of using red ginger and brotowali either singly or in combination as herbal ingredients used in drinking water on broiler chicken productivity. This research was conducted at the Lampung State Polytechnic using a Completely Randomized Design (CRD) with 4 treatments and 5 replications and each replication consisted of 5 broiler chickens. The treatments consisted of: P0 = drinking water without the addition of red ginger and brotowali extract (control), P1 = drinking water + 1% red ginger extract, P2 = drinking water + 5.12 ml/kgbw of brotowali extract, P3 = drinking water + combination of red ginger extract and brotowali. The variables observed included ration consumption, body weight gain, ration conversion and mortality. The results showed that the addition of red ginger and brotowali extracts in drinking water, either singly or in combination, had a significant effect ($P<0.05$) on body weight gain, ration conversion and mortality, but had no significant effect on ration consumption. The conclusion of this study is that the application of herbal ingredients in drinking water can improve the productivity of broiler chickens.

Keywords: broiler, red ginger extract, brotowali extract, productivity.

INTRODUCTION

The demand for food of animal origin continues to increase in line with population growth, economic development, changes in lifestyle, increasing awareness of nutrition and improving public education. To meet the needs of animal protein, one of the foodstuffs of animal origin that can be used is chicken meat. Chicken meat is one of the meats that plays an important role in meeting the nutritional needs of the community. Broiler chicken is one of the meat-producing livestock that has the potential to meet the needs of the community from animal protein (Mangisah, 2003).

However, along with the increasing public demand for quality food of animal origin and the importance of food safety, this means that in addition to having high nutritional value, the product must be safe and free from microbial contamination, chemicals or contaminants that can interfere with health. Therefore, the use of commercial antibiotic-based growth promoters has faced serious criticism and global concern because of its harmful effects including microbial resistance and effects that have the potential to harm human health (Rahmatnejad et al., 2009).

One alternative that can be taken to overcome these problems is to use herbal plants. Therefore, it is necessary to conduct research to determine the effectiveness of the use of a combination of several herbal ingredients in broiler cultivation activities. The use of herbs, either singly or in combination, has been widely used, but the use of a combination of red ginger and brotowali has not been reported. In this study, the use of a combination of herbs using red ginger (Zingiber officinale var rubrum) and brotowali (Tinospora crispa L.) in drinking water for broiler chickens will be carried out.

LITERATURE REVIEW

Red ginger (*Zingiber officinale* Roxb. var Rubra)

Ginger (Zingiber officinale rosc) is a type of plant that belongs to the Zingiberaceae tribe. The name "Zingiber" comes from the Sanskrit "Singabera" and the Greek "Zingiberi" which means horn, because the shape of the ginger rhizome is similar to that of a deer's antler. Officinale is a Latin word for "Officina" which means used in pharmacy or medicine (Bermawie and Purwiyanti in Sya'ban 2013). Red Ginger (Zingiber officinale var. Rubrum) is a medicinal plant that has bioactive components in the form of essential oils, oleoresins and gingerols. These bioactive components are able to improve productivity and product quality (Witantri et al., 2013). Giving ginger extract in drinking water of broiler chickens significantly increases body weight (Javed et al., 2009). administration of 1% red ginger powder (Zingiber officinale var. Rubrum) in broiler chicken feed increased antibody titers in chickens vaccinated with ND vaccine with a significant difference between the four groups.

Brotowali (Tinospora crispa L.)

In general, the brotowali plant contains various kinds of chemical compounds, including alkaloids, soft resin, starch, glycosides, pikroretoside, harsa, bitter substances pikroretin, tinocrisposide, berberine, palmatin, columbin and kaokulin or picrotoxins. Brotowali contains many chemical compounds that are efficacious to cure various diseases. The content of chemical compounds that are efficacious as drugs are found in all parts of the plant from roots, stems to leaves. Brotowali roots contain antimicrobial compounds berberine and columbine (Kresnady, 2003). The conclusion from the results of research conducted by Anna and Astriani (2018) is that suspension of brotowali stem extract (Tinospora crispa (L.) is effective against weight gain in white rats. The conclusion from

the results of research conducted by Amin (2020) is the effect of brotowali infusion (Trisnopa Crispa).) had a significant effect on broiler antibody titers after Newcastle Disease vaccination.

RESEARCH METHOD

The research location is in the Cattle Cage and Lampung State Polytechnic Laboratory. The tools and materials used in this study include: bulkheads, series of lights, feed containers, drinking water containers, scales, measuring cups, blenders, evaporators, filter cloths, knives, stationery. 100 DOC (day old chick) broiler chickens up to 28 days old, commercial ration without antibiotics, namely GM1C from CJ, Red Ginger, Brotowali and 96% Ethanol.

The manufacture of red ginger and brotowali extracts was carried out using the maceration method in a ratio of 1:5, namely 50 grams of red ginger or brotowali powder that was put into a bottle, poured with 250 mL of 96% ethanol, closed and left for 24 hours, shaking every 1 hour. to be evenly distributed. The juice is then poured and the pulp is squeezed out, separated in another bottle. The remaining dregs were added to 250 mL of 96% ethanol and then macerated again for 24 hours, stirred and dispersed, the maceration results were combined, so that 250 mL of the whole juice would be obtained. The bottle is closed and allowed to stand for 1 day. And continued with concentration using a rotary evaporator with a temperature of 55 - 65◦C in order to obtain a thick extract.

This study is a field experiment designed using a Completely Randomized Design (CRD) with4 treatments and 5 replications, each replication consisted of 5 chickens placed randomly in each treatment. As for PThe treatments given were: P0 = drinking water without the addition of red ginger and brotowali extract (control), P1 = drinking water + 1% red ginger extract, P2 = drinking water +5.12 ml/kg bb brotowali extract, P3 = drinking water + red ginger and brotowali extract.

Observed variables

Broiler productivity variables consist of:

1. Body weight gain
   Measurement of broiler body weight gain can be calculated with the following formula:
   Body weight gain (g/head) = broiler body weight at the end of rearing - body weight at the beginning of rearing broiler (DOC) (g)
2. Consumption of ration
   Calculation of ration consumption is done every day by adding up the given ration minus the remaining ration that is not consumed.
   Consumption of ration = Ration given (g) Ration left (g)
3. Conversion ration
   The ration conversion is the ratio between ration consumption and the resulting body weight growth, the lower the ration conversion value, the more efficient a ration is.
   Conversion ration $= \frac{konsumsi\ ransum}{pertambahan\ bobot\ badan}$
4. Mortality
   Mortality was obtained by counting the number of chickens that died divided by the number of chickens (population) at the beginning of the rearing multiplied by 100%.

$$\text{Mortality (\%)} = \frac{jumlah\ ayam\ yang\ mati}{populasi\ awal\ pemeliharaan} \text{ X } 100\%$$

RESULTS

The effectiveness of red ginger and brotowali extracts on productivity can be measured by calculating ration consumption, body weight gain, ration conversion and mortality shown in Table 1.

Table 1. The level of consumption, body weight gain, ration conversion, and mortality of broiler chickens treated with red ginger and brotowali extracts through drinking water.

Variable	P0	P1	P2	P3
Feed consumption (g/head)	1505.53[a]	1509.45[a]	1508.53[a]	1509.65[a]
PBB (g/head)	1000,42[a]	1048,80[b]	1076.52[b]	1100,28[c]
Conversion ration	1.51[a]	1.44[b]	1.40[bc]	1.37[c]
Mortality (%)	0	0	0	0

Information:
Superscripts with the same letters are not significantly different
P0 =Drinking water without the addition of red ginger and brotowali extracts (control)

P1 = drinking water + 1% red ginger extract

P2 = drinking water +5.12 ml/kg body weightbrotowali extract

P3 = drinking water + red ginger and brotowali extracts.

DISCUSSION

Ration Consumption

In this study, one of the parameters measured is ration consumption, ration consumption is the amount of ration given minus the remaining ration(Panjaitan et al., 2012). Based on the results of this study, it showed that the amount of ration consumption in the group of chickens that did not get red ginger and brotowali extract (P0) was (1,505.53 g/head), in the group of chickens that were given drinking water.+ 1% red ginger extract (P1) by(1,509.45 g/head), in the group of chickens givendrinking water +5.12 ml/kg body weightbrotowali extract (P2) of(1,508.53 g/head), and the group of chickens givendrinking water + a combination of red ginger and brotowali extracts (P3) of(1,509.65 g/head). Based on the results of this study, it showed that the level of ration consumption in chickens that were not given and given red ginger and brotowali extracts, either singly or in combination, tended to be the same. Based on the results of statistical analysis of the value of ration consumption, it showed that the chickens that did not get treatment and the chickens that were given the addition of red ginger and brotowali extract either singly or in combination to drinking water had no significant effect ($P > 0.05$) on the

consumption of chicken rations. broilers.According to Nobo et al. (2012) the consumption of poultry rations can be not significantly different because the rations contain the same composition and nutrient content.

Weight Gain

Body weight gain is one of the parameters measured to see productivity. Body weight gain is the difference between initial body weight and final body weight over a certain time(Rasyaf, 2006). Body weight gain is one of the growth parameters of broiler chickens, this is because body weight gain will provide an overview of growth and become one of the goals of broiler chicken maintenance. The results showed that the body weight gain of the group of chickens that were not given red ginger and brotowali extract (P0) was (1000,42), in the group of chickens given drinking water+ 1% red ginger extract (P1) by(1048,80), in the given group of chickensdrinking water +5.12 ml/kg body weightbrotowali extract (P2) of(1076.52)and the given group of chickensdrinking water + a combination of red ginger and brotowali extracts (P3) of(1100,28).

Based on the results of this study, it showed that body weight gain in broiler chickens increased between red ginger and brotowali treatments, either singly or in combination when compared to controls.To understand whether the treatment affected body weight gain, a statistical analysis was carried out, based on the results of statistical analysis on body weight gain showing that the addition of red ginger and brotowali extracts, either singly or in combination in drinking water, gave a significant difference in effect ($P < 0.05$). compared to the group of chickens that were not given red ginger and brotowali extracts.

This is possible because the administration of red ginger and brotowali extracts singly or in combination works synergistically so thatchickens can maximize the ration consumed to make meat. This shows that there are compounds in red ginger and brotowali that work to increase body weight gain by manipulating both antibacterial properties, so that they can increase the absorption of food substances.This study is in line with the statement by Jayanata (2011), herbs given to broilers can increase the digestibility of chickens while inhibiting the growth of pathogenic bacteria in the digestive tract. This increase in the digestibility of chickens causes the absorbed feed to be more perfect as well as the digestive tract of the chickens to be healthier, the absorbed feed can be processed more efficiently into meat, so that the growth of chickens becomes faster.

Ration Conversion

In this study, the parameter measured in productivity is ration conversion, this is because the feed conversion ratio is useful for calculating the ration consumed to produce one kilogram of meat.(Kartasudjana et al., 2010)states that feed conversion is defined as the number of rations spent to produce each kilogram of body weight gain. The results of this study showed that the ration conversion value in the group of broiler chickens that were not given red ginger and brotowali extract (P0) was (1,51), in the group of chickens that were given drinking water.+ 1% red ginger extract (P1) by(1,44), in the group of chickens givendrinking water +5.12 ml/kg body weightbrotowali extract (P2)of (1.40), and in the group of chickens givendrinking water + a combination of red ginger and brotowali extracts (P3)(1.37).
After carrying out statistical analysis tests showed that the addition of red ginger and brotowali extracts, either singly or in combination in drinking water, gave a significant difference in effect ($P < 0.05$) compared to the chicken group without being given red ginger and brotowali extracts. The conversion value of the ration in the group of chickens

given a combination of red ginger and brotowaligives the effect of a lower ration conversion rate of 1.37 to produce one kilogram of meat.It can be said that the administration of a combination of herbal ingredients, namely red ginger and brotowali, has a positive effect on feed conversion because the smaller the conversion value, the more efficiently the livestock converts feed into meat. This agrees with (Fahrudin et.al., 2016) which says that the smaller the ration conversion value, the more efficient the livestock is in converting feed into meat, but if the ration conversion increases, then there has been waste. The results of this study are in line with those reported by Islam et al. (2017) who reported that the use of aloe vera plants up to 15%/L of drinking water gained weight gain and feed efficiency was significantly different ($P<0.05$) compared to drinking water without aloe vera extract while the consumption of feed and drinking water was not significantly different.

Mortality

According to Junaedi (2009) mortality is a measure of the number of deaths in a population. Mortality is the mortality rate of broiler chickens in maintenance for a period which is usually calculated as a percentage. Based on the results of the study showed that the total mortality for all groups of chickens treated with red ginger and brotowali as well as groups of chickens that were not giventreatment is 0% or there are no deaths during the maintenance period. According toScanes et al., (2004)stated that the broiler mortality rate in good rearing management can be tolerated up to 3%. Low mortality indicates that many chickens are healthy during rearing.

It can be said that the administration of red ginger and brotowali either singly or in combination has a positive impact on the mortality rate because the content of the herbal drink contains active substances that can function to increase the immunity of chickens so as to suppress mortality. This is in agreement with Ahmad (2011) which states that ginger has the same antioxidant power as vitamin C. Plus Kikuzaki and Nakatani (2003) ginger has rhizomes that are rich in polyphenols, which can protect the body from various pollutants that can cause damage to the body. is in the environment.

CONCLUSION

From the results of the research that has been done, it can be concluded that the application of herbal ingredients, namely red ginger and brotowali, either singly or in combination in drinking water can increase broiler productivity.

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