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Effectively of Herbal Drinks on Cholesterol and Triglyceride Level in Blood of Boiler

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Abstract: *The research aimed to evaluate the effectiveness of herbal drinks from extracts basil leaves, lemongrass and lime leaves on cholesterol and triglyceride levels in the blood of broiler. The experimental design used was completely Randomized Designed with six treatments and four replicates with five broiler chicken per replicates. The ration was formulated to contain 3000 kcal/kg metabolizable energy (ME) and 22% of crude protein (CP). The treatments were as follows: P0: control (vaccines treatment), T1: basal ration with herbal drinks 10% concentration, T2: basal ration with herbal drinks 20% concentration, T3: basal ration with herbal drinks 30% concentration, T4: basal ration with herbal drinks 40% concentration and T5: basal ration with herbal drinks 50% concentration. Variables observed were cholesterol and triglyceride. The result indicated that utilization of herbal drinks up to 50% concentration significant on (p<0.05) on cholesterol and triglyceride concentration.*

Keywords: *Broiler, Cholesterol, Triglyceride, Herbal Drinks*

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I. Introduction

The broiler is one kind of chicken which prevalent and high demand by Indonesian people to be consumed. That is because broiler meat has a high nutritional content and cheaper price compare than ruminant meat. Based on this potential, the broiler chicken farms have a high opportunity for development in Indonesia. However, along with increasing public awareness about the importance of health, the people want broiler chicken products are free from antibiotics residues and low in fat. All this time, to increase the immunity of broiler, the breeder always provides synthetic antibiotics. Utilization of antibiotics has to lead to residues in meat products and the negative impact on human health. Besides containing antibiotic residues, broiler chicken meat also contains cholesterol of about 60-90 mg / 100 g of food. The content of cholesterol can lead to stroke, cardiac disease and also can even lead to death.

Under these conditions, the alternative utilization of natural materials as the substitute of synthesis antibiotics are needed to produce broiler meat products are safe and healthy. One of them, by utilizing herbal drink made from a mixture of extract basil leaves, lemongrass leaves and lime leaves as normal drinking water. Results of a previous study conducted by Setyaningrum and Siregar (2015), showed that utilization a mixture of extract basil leaves, lemongrass leaves and lime leaves are mixed up to 10% at quail drinking water increase the quail growth when compared than quail without the herbal drink.

Based on that potency, mixed with extract basil leaves, lemongrass leaves and lime leaves can be used as a natural antibiotic. That is because extract of basil leaves, lemongrass leaves and lime leaves contain active ingredients such as essential oils consist of limonene, linalool, citral, flavonoids, steroids, saponins, alkaloids and glycoside. Additionally, the extract of basil leaves, lemongrass leaves and lime leaves also contain terpenoids, tannins, and essential fatty acids. That is compounds has a role are antibacterial, antioxidant, increases the metabolic system, enhances the absorption of nutrients and neutralize cholesterol. However, studies about the concentration of herbal drink from mixture extract of basil leaves, lemongrass leaves and lime leaves have not done. That needs to be researched to know the effectiveness of herbal drink a mixture extract of basil leaves, lemongrass leaves and lime leaves in lowering cholesterol and triglyceride broiler chicken blood.

II. Methodology

Herbal Drinks Preparation

Manufacturing of herbal drink from mixed extract basil leaves, lemongrass leaves and lime leaves and brown sugar. The manufacture of herbal drink done by grinding of basil leaves, lemongrass leaves and lime leaves with the same comparison. Furthermore, that mixture placed in a beaker glass 1000 ml and added the water, then closed up to 24 hours and filtered. The distillate is then added with brown sugar as much as 5% of the extract. The first, then the extract ready to use with drinking water at the dose which each treatment.

Treatment

A total of 120 head DOC (day old chick) used in this research. The birds were randomly distributed to 24 pens. There were six treatment groups with four replicates and five chicks per replicate. The basal ration was formulated to contain 3000 kcal/kg metabolizable energy (ME) and 22% of crude protein (CP), in detail the basal ration presented in Table 1. Treatment step is done up to chickens aged 30 days. The parameters observed are blood cholesterol and triglyceride levels. The basal diet and drinking water without or with herbal drink are given continuously. During the study, chickens are not given the vaccine or anti-stress and other antibiotics. The treatments were as follows: P0: control (vaccines treatment), T1: basal ration with herbal drinks 10% concentration, T2: basal ration with herbal drinks 20% concentration, T3: basal ration with herbal drinks 30% concentration, T4: basal ration with herbal drinks 40% concentration and T5: basal ration with herbal drinks 50% concentration.

Cholesterol and Triglycerides Evaluation

Evaluation of cholesterol and triglycerides measured in 30-day old chickens by taking blood in the brachial vein as much as 3 ml. Then the blood included in vacuum tubes already containing EDTA. Cholesterol calculated by the mixed sample and reagent and placed in an incubator 20 -25 °C for 20 minutes or at 37 ° C for 10 minutes. The absorption measured by a spectrophotometer with λ 500 nm with the blank solution as its point 0. Calculation of total cholesterol concentration by the formula:

Cholesterol Total = absorbance / absorbance standard x standard mg/dl.

Triglyceride calculated by the mixed of serum and reagent solution and incubated at 20 - 25 °C for 20 minutes. Absorbance was measured until (As) and absorbance standard (Ast) with λ 500 nm spectrophotometer. Calculation levels triglycerides using the formula:
Triglycerides concentration = Absorbance x [Standard] / standard Absorbance mg/l or the solubility limit = 100 mg / dL or 11.4 mmol / l

Data Analysis

Data of cholesterol and triglyceride level in blood were analyzed with analysis of variance (ANOVA) and if among the treatments showed significant differences ($P < 0.05$) followed by Duncan's Multiple Range Test (Steel and Torrie, 1991).

Table1. Basal Ration

Nutrient	Percentage (%)
Corn	39,50
Rice Bran	6,00
Coconut cake	5,00
Soybean meal	34,00
Fish meal	10,00
Coconut oil	3,00
Salt	1,00
Premix	1,50
Totally	**100,00**
ME (kkcl/kg)	3131,07
Crude Protein (%)	22,06
Crude Fiber (%)	5,11
Crude Fat (%)	4,96
Ca (%)	1,48
P (%)	0,49

Table 2. Average of Cholesterol and Triglyceride in Blood Broiler Chicken

Treatment	Measure	
	Cholesterol (mg/dL)	Triglyceride (mg/dL)
P0	116.00[a]	83.00[a]
P1	114.00[ab]	44.00[b]
P2	110.00[bc]	35.50[c]
P3	106.50[dc]	34.50[c]
P4	104.50[d]	27.00[d]
P5	102.50[d]	23.50[e]
Average	108.92	41.25

III. Result and Discussion

Cholesterol

Average of cholesterol levels in the blood of broiler shown at Table 2 is 108.92 mg / dL. Cholesterol level in this research is still within the standard range for a broiler is 52-148 mg / dL (Basmacioglu and Ergul, 2005). Results of variance analysis showed that the utilization of herbal drink mixture of basil leaves, lemongrass leaves and lime leaves extract significant different ($P < 0.05$) on blood cholesterol levels. Based on Table 2 can be seen that the highest cholesterol levels achieved in the treatment without giving herbal drinks (P0) of 116.00 mg / dL, while the lowest cholesterol levels achieved in the provision of treatment herbal drink with a 50% concentration (P5) of 102.50 mg / dL. In general, blood cholesterol content of broilers treated with herbal drinks tends to reduce compare than chicken without herbal drinks treatment.

The lowest levels of blood cholesterol in treatment were due to a herbal drink mixture of basil leaves, lemongrass leaves and lime leaves contain essential oils in the form of limonene, linalool, citral, flavonoids, steroids, saponins, alkaloids and glycosides. That compounds have bioactive substances such as essential oils can increase the metabolism of carbohydrates, protein and fat in the body (Hashemi and Davoodi, 2011). Besides, the essential oil compounds such as flavonoids have a role as an antioxidant, neutralising cholesterol and anticancer.

Besides, saponin compound contains in the herbal drink a mixture of basil leaves, lemongrass leaves and lime leaves extract also effect on the decline of cholesterol levels in the blood. Saponins contribute to lower cholesterol levels in the blood by forming a bond Saponins have a role in lowering cholesterol content in the blood by forming a complex compound bond or micelles bond between saponin-cholesterol (Bogoriani, 2015). Further explained that the compound inhibition absorption of cholesterol and bile acids in the intestine, so causing a decrease in cholesterol concentration in the blood. This matter will lead to increase of cholesterol synthesis in the liver for conversion into bile acids and secreted into the intestine. This process leads to increase of cholesterol excretion through the faeces and therefore contributes to decreasing of cholesterol levels in the blood. Asmarini (2012), state that the bile acid secretion is required of cholesterol as the primary raw material. That is lead to increase of acid bile secretion and influence on the decrease of cholesterol levels in the blood.

Triglyceride

Average triglyceride level in blood shown in Table 2. Results of variance analysis showed that the utilization of herbal drink significant different ($p < 0.05$) on triglyceride levels in the blood. Mean blood triglyceride levels of each treatment is P0 83.00 ml / dL, P1 44.00 ml / dL, P2 35.50 ml / dL, P3 34.50 m / dL, P4 27.00 ml / dL and P5 23.50 ml / dL. Results of the average levels of triglycerides each treatment is still within the normal range for broilers is <150 ml / dL (Basmacioglu and Ergul (2005). In general, herbal drinks treatments can produce the lowest triglyceride levels compare than to chicken without herbal drink treatment. This case is due to the flavonoids, saponins and tannins in the herbal drink a mixture of basil leaves, lemongrass leaves and lime leaves extract acts as an antioxidant that can reduce the content of blood triglyceride levels. This work is in line with research of Noorrafiqi et al. (2013), utilization of Karamunting fruit juice at white rats PTU induced and feed cholesterol was able to lower the blood triglyceride levels due to the antioxidant content such as saponins and flavonoids. Khakim (2000) mentions that flavonoids, saponins and tannins from extract the water parasite mango act as antioxidants capable of lowering triglyceride levels by increasing the activity of the enzyme LPL (lipoprotein lipase). Increasing of LPL enzyme will affected on the increased decomposition of triglycerides in chylomicrons (Noorrafiqi et al., 2003). According to Radhika et al. (2011), flavonoids will bind the free radicals that can inhibit peroxidation lipid reactions.

Besides decrease, the triglyceride levels in the blood caused the herbal drink have the saponins and tannins content that able to inhibit the absorption of triglycerides in the intestine so that reducing the number of triglycerides in the blood. This work is in line with research of Ismoyojati et al. (2014), that provision of the bay leaf also capable of lowering the cholesterol levels ducks Rambo. Noorrafiqi et al. (2013) state that the saponins can bind the bile salts and cholesterol to micelles forms that cannot be absorbed by the intestine. Also, the saponin will increase the cell regeneration that influences the decrease in triglycerides.

IV. Conclusion

The utilisation of herbal drink from a mixture of basil leaves, lemongrass leaves and lime leaves extract up to 50% concentration reduce the cholesterol and triglycerides in blood broiler chickens.

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