

Conference Paper

Blood Fat Profile of Sentul Chicken with Lactic Acid as an Acidifier in Rations Containing Probiotics

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Abstract.

The study aimed to evaluate the use of lactic acid as an acidifier in rations containing probiotics on blood fat profile of sentul chicken. Sixty female Sentul chickens aged 6 months were reared for two months in a 20-unit battery cage and subjected to a completely randomized design (CRD) with four treatments and five replicates, with 3 females for each unit. The treatments were R_0 : Probiotic basal rations (BS); R_1 : BS + 0.5% lactic acid; R_2 : BS + 1.0% lactic acid; and R_3 : BS + 1.5% lactic acid. Data were analyzed by Analysis of Variance (ANOVA) using an IBM SPSS Statistics ver. 22. The result showed that lactic acid as an acidifier in rations containing probiotics did not significantly ($P>0.05$) affect blood fat profile (cholesterol, HDL, LDL and triglycerides) of Sentul chicken. The average cholesterol levels were 112.77 ± 26.55 mg/dl; HDL 40.73 ± 9.53 mg/dl; LDL 41.32 ± 24.39 mg/dl; and triglycerides 153.57 ± 46.38 mg/dl. The conclusion was that the use of up to 1.5% lactic acid as an acidifier in feed created similar results in cholesterol, HDL, LDL and triglycerides.

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1. Introduction

Cholesterol is needed by the body for the formation of a number of important steroids such as folic acid, adrenal cortex hormones, estrogen, androgens and progesterone and bile. Cholesterol in the body is mainly obtained from synthesis in the liver. Cholesterol is one of the products of fat metabolism in the body, functions as a form of hormone, vitamin D and damaged body tissue, circulates through the blood and partly returns to the liver to be converted into bile acids and salts. Transport of fat and cholesterol requires transport protein. The transport lipoproteins that play a major role in fat transport and metabolism are plasma portomicrons, HDL, VLDL and LDL. High Density Lipoprotein (HDL) plays an important role in the return transport of cholesterol from tissues to the liver. High fat in feed will result in an increase in levels of low density lipoprotein (LDL)

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in the blood which is a lipoprotein which is rich in cholesterol (1) this causes an increase in cholesterol in the blood. Fat and cholesterol have become a concern especially for human health. Therefore, efforts to control fat and cholesterol have been carried out starting from feed and others (2). One alternative to overcome the problem of fat and cholesterol is the use of plants in feed or supplementary feed (3).The reduction of cholesterol and fat content can be minimized by using probiotic feed with the addition of lactic acid as an acidifier in feed containing probiotics.

Probiotics contain lactic acid bacteria (LAB) which will increase the number of beneficial microbial populations and inhibit the development of microbes that harm the digestive tract. The growth of lactic acid bacteria can be optimized with the addition of an acidifier because the pH content of the acidifier is a medium for lactic acid bacteria. Acidifier is an organic acid that functions to improve digestibility by increasing the performance of digestive enzymes, lowering the pH in the intestine and maintaining the balance of microbes in the digestive tract. So this study aims to examine the effect of the level of acidifier use in probiotic feed on the profile of blood fats (cholesterol, HDL, LDL, and triglycerides).

2. Materials and Methods

2.1. Materials

The material to be used in this research is to use 60 female sentul chickens aged 6 months and reared for 2 months. The tools used are a set of tools, namely a cage cleaning tool, a spray detective tool, a place for feeding and drinking, an injection syringe, an ADTA tube, a scale, plastic and a caliper. The ingredients for corn, bran, probiotic bran, fish meal, soybean meal, palm oil, CaCO₃, premix, L-Lysin HCl, and methionine. Other ingredients: lactic acid as an acidifier. The composition of the rations and nutrient contents of the rations are presented in Table 1.

2.2. Methods

The research method used in this research is experimental method. with the maintenance of female ash sentul chickens. The treatment stage begins at the age of 4 months. The placement of each treatment is done randomly by lottery. The research design used was a completely randomized design. There were 4 treatments and 5 replications in order to obtain 20 experimental units, namely:

TABLE 1: Composition and Nutrient Content of Basal Feed.

FEED INGREDIENTS	Composition (%)
Corn	40
Rice bran	18
Probiotic bran	18
Soybean Meal	14
Fish flour	5
Palm oil	1
Calcium carbonate (CaCO ₃)	2
Premix	1
Lysine	0,6
Methionine	0,4
Total	100
Chemical Composition	
Protein (%)	18,39
Energy (kcal / g)	2.853,60
Crude fiber (%)	5,05
Crude Fat (%)	5,92
Calcium (%)	2,44
Phosphor (%)	1,344
Lysine (%)	1,1451
Methionine (%)	0,6654

Source: Results of calculations carried out at the Laboratory of Animal Nutrition and Forage,
Faculty of Animal Husbandry, Jenderal Soedirman University

R0: Basal Ration (BS)

R1: BS + Probiotic with Acidifier / eubiotic as. Lactate 0.5%

R2: BS + Probiotic with Acidifier / eubiotic as. Lactate 1.0%

R3: BS + Probiotic with Acidifier / eubiotic as. Lactate 1.5%

Data were collected in month 2. 3 ml of blood was taken from the brachial vein, then the blood was immediately put into a vacutainer that had been filled with anti-coagulant EDTA. The blood is then centrifuged to separate the blood plasma, the plasma is then put in a "cup sample" and stored in a freezer with a temperature of minus 20C. Cholesterol analysis procedure used enzymatic chalorymetric test (CHOD-POD) method with Cypress Diagnostics' reagent kit. Determination of LDL levels using the Friedewald formula, namely the reduction of triglyceride levels with HDL levels.

2.3 The measured parameters

A blood fat profile which includes:

1. Cholesterol



2. HDL (High Density Lipoprotein)
3. LDL (Low Density Lipoprotein)
4. Triglycerides

3. Results and discussion

TABLE 2: The results of the research on the use of probiotic bran with the addition of an acidifier in the feed to the total blood fat profile levels of female ash sentul chickens are presented in.

Treatment	Cholesterol	HDL	LDL	Triglycerides
R0 R1 R2 R3	95,56±25,58 124,44±30,83 122,22±33,33 108,89±16,48	36,41±6,59 43,96±13,54 43,51±8,40 39,07±9,63	32,56±21,95 51,35±26,96 48,42±36,21 32,67±12,47	131,43±44,49 145,71±45,62 151,43±48,02 185,71±47,38

Based on the table of average results of research using probiotic bran with the addition of an acidifier in the feed to the average blood lipid profile level of female ash sentul chickens, it shows that the variables have no significant effect on the treatment tested..

The average cholesterol based on the research results obtained 95.56 ± 25.58 (R0); 124.44 ± 30.83 (R1); 122.22 ± 33.33 (R2); 108.89 ± 16.48 (R3), which shows that the results obtained do not significantly affect cholesterol levels because the microbes contained in probiotics tend to be able to balance cholesterol levels. The decrease in cholesterol levels in the blood occurs because probiotic bacteria are able to produce the enzyme bile salt hydrolase (BSH) through the bile acid deconjugation process (4). (5) reported that Lactobacillus was able to bind cholesterol in the bloodstream, then carried it to the small intestine to be excreted with feces. According to (6) that Inhibition of cholesterol formation in two ways, namely: 1) inhibiting the activity rate of the hydroxy methyl glutaril coenzyme-A (HMG-CoA) enzyme which is an enzyme that inhibits the formation of Lovosterol from feed fat and metabolized fat resulting in a reduction cholesterol formation, and 2) Increasing the secretion of bile which will carry cholesterol from the digestive tract out together with feces. The remaining cholesterol in the tissue will be returned to the liver and carried by HDL together with bile acids in the digestive tract to be subsequently excreted with excreta. The addition of an acidifier will create an acidic condition in the digestive tract that maximizes nutrient absorption and lowers blood cholesterol levels. This is in accordance with the statement of (7) that the acidic conditions of the digesta that enter the duodenum will stimulate the pancreas to release pancreatic fluid which contains bicarbonate salts, and lipase enzymes and stimulate bile salts. Pancreatic lipase will also stimulate the production and secretion of



bile, thereby increasing the utilization of cholesterol for the synthesis of bile acids and salts, resulting in decreased blood cholesterol levels.

The mean HDL based on the research results obtained 36.41 ± 6.59 (R0); 43.96 ± 13.54 (R1); 43.51 ± 8.40 (R2); 39.07 ± 9.63 (R3) which indicates that the results obtained have no significant effect. The mean HDL level was more than the normal range. The normal HDL range in the blood is > 22 mg / dl (8). This is in accordance with the results of research conducted by (9) stated that HDL levels ranged from 40.5 to 50.4 mg / dl. According to (10), HDL is a lipoprotein that transports lipids from the periphery to the liver. The role of HDL in the process of transporting blood cholesterol is greater than that of LDL transfer. (11) state that high HDL levels prevent the risk of atherosclerosis by transporting cholesterol from peripheral tissues to the liver and reducing excess cholesterol. (12) stated that if the HDL content increases, the total cholesterol content will decrease because HDL will transfer cholesterol from muscle tissue to the liver and from the liver to the tissue. The increase in HDL cholesterol can be affected by increased production from the liver and intestinal mucosa. HDL has a role in coagulation, fibrinolysis, platelet adhesion, adhering molecules and protease expression that affect antioxidant activity (Norata et al., 2005).

The average LDL based on the research results obtained 32.56 ± 21.95 (R0); 51.35 ± 26.96 (R1); 48.42 ± 36.21 (R2); 32.67 ± 12.47 (R3) which shows that the provision of probiotics with the addition of an acidifier has no significant effect ($P > 0.05$) on the LDL levels of female sentul ash chicken blood. This shows the local probiotic 0.5; 1; and 1.5% in the ration had no effect on LDL in the blood of layer hens. In this study, LDL was still in the normal range. Normal LDL levels according to (8) are < 130 mg / dl. According to (13), it was reported that LDL levels in poultry ranged from 35.40-62.07 mg / dl. The probiotics given can be utilized optimally by releasing the enzyme lipoprotein lipase catalyzing glycerol and fatty acids until LDL undergoes a change. The provision of local probiotics can increase levels of good cholesterol (HDL) and have an effect on reducing levels of bad cholesterol (LDL). The LDL level in the blood is directly affected by the lactic acid content in the acidifier. The effect of lactic acid in the acidifier mostly occurs in the digestive process and nutrient absorption in the small intestine. According to (7) stated that Low Density Lipoprotein (LDL) plays a role in providing cholesterol in body tissues because it is the main carrier for cholesterol from the liver to body tissues, so that blood levels are influenced by cholesterol concentrations. According to (14) stated that the increase in LDL is in line with the increase in blood cholesterol levels. If the blood cholesterol levels are relatively the same, the LDL will also be the same, because LDL plays a role in the supply of cholesterol to body tissues. (15) states that LDL is

the main carrier of cholesterol in the blood and plays an important role in cholesterol metabolism.

The average triglycerides based on the research results obtained 131.43 ± 44.49 (R0); 145.71 ± 45.62 (R1); 151.43 ± 48.02 (R2); 185.71 ± 47.38 (R3) which shows that the provision of probiotics with the addition of an acidifier has no significant effect ($P > 0.05$) on blood triglyceride levels in female sentul ash chickens. According to (16) provision of probiotics can reduce triglycerides because probiotics can effectively reduce the activity of acetyl CoA carboxylase, an enzyme that plays a role in the rate of fatty acid synthesis. The factors that increase the synthesis of triglycerides and secretion of VLDL by the liver are foods that are high in carbohydrates, high circulation of free fatty acids, high insulin levels, and low levels of glucagon (10). (17) stated that before reaching the liver, triglycerides from chylomicrons can also be used by muscle tissue or other tissues or stored in adipose tissue.

4. Conclusion

The addition of an acidifier in feed containing probiotics to blood fat levels with a level 0.5%; 1.0%; and 1.5% has not had a significant effect. So, that further research is expected using different levels.

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