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THE USE OF LACTATE ACID BACTERIUM, *STREPTOCOCCUS THERMOPHILLUS* FROM FISH DIGESTION ORGAN TO GROWTH AND COLESTEROL LEVEL OF CHICKEN BROILER STRAIN HUBBART

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ABSTRACT

The purpose of this research was to determine the effect of probiotic LAB isolates of Streptococcus thermophillus of fish waste on the cholesterol levels of broiler chicken meat. This research material is Hubart Strain male broiler production PT Multi Breeder Adirama much as 40 chicken attain the age of 1 day. Lactate Acid bacteria (BAL) used in this research were freeze drying Streptococcus thermophillus which were taken from Biochemistry Nutrition Laboratory of Faculty of Animal Breeding of Gajah Mada University. Treatment I was as a control (Without BAL). Treatment II used 106 Colony forming UNIT/ml BAL cell. Treatment III used 107 colony forming UNIT/ml BAL cell. Treatment IV used 108 colony forming UNIT/ ml BAL cell. Data was collected every week include weight gain and data for cholesterol levels at the end of the research. Data taken include: cholesterol levels of broiler chicken meat. The result of the research showed that giving lactate acid bacteria, Streptococcus thermophiles, significantly reduced the cholesterol level in broiler chicken meat. LAB probiotic effect on weight gain and the best level is the level BAL 108 CFU / ml (R3).

INTRODUCTION

Cholesterol is the principal sterol in the human body (Montgomery, 1993). Cholesterol is a compound of the metabolism of the animals and more stored in meat, liver, brain and eggs. Although cholesterol negative effects if over in consumed, cholesterol has also an important role for the body. Cholesterol has a functional role for the body as a precursor compound that steroids (corticosteroids, sex hormones, bile acids, and vitamin D), and forming a structural component of cell membranes as well as the external layer of plasma lipoprotein (Mayes, 1999). Effect of probiotic bacteria to decrease cholesterol levels is suspected because of its ability to assimilated cholesterol and conjugated bile salts (Gilliland and Speek, 1977: Gilliland et al., 1985). Lactic acid bacteria that have specific capabilities will be effective if it can hold out in the digestive tract conditions.

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Therefore strains of Lactic Acid Bacteria should be resistant to bile salts and gastric pH conditions (pH 1-2) when consumed. LAB strains potential to be commercialized as a probiotic product must have high viability and stable during processing. Some production processes using freeze drying or spray drying often causes the decrease cell viability so that it can affect the resulting product (bio mass BAL cells). Giving probiotics in chicken will have a positive impact, which can improve the health or productivity of chickens, changing components and the balance of microflora in the digestive tract of chicken. (Hasson, 1999).

Panda *et al* (2003) reported a probiotic (probiolac at the level of 100 mg / kg feed) can improve egg production, eggshell weight and eggshell thickness as well as lowering cholesterol in egg yolk. Grunewald (1982) observed that the giving of skim milk fermented with *Lactobacillus acidophilus* can decrease serum cholesterol levels. This research was to determine the effect of LAB isolates from fish waste as probiotics given to broiler chickens through drinking water by means of drinking use spet with amount of 1.5 ml per oral to decrease cholesterol levels of broiler chicken meat. Besides,

the presence of this research are expected later will realize a broiler chicken farm that is healthier because it is not very high cholesterol content.

Research Purposes

The research was conducted to determine the effect of probiotics in broiler chickens on performance of broiler chickens which include cholesterol levels of broiler chicken meat.

Benefits of research

The benefits from this research is obtaining selected strains of lactic acid bacteria are able to act as a probiotic and cholesterol can decrease broiler meat.

MATERIALS AND METHODS

Implementation of the maintenance

Before use to research, stable and equipment was disinfected beforehand using brochid. Vaccination is done two times, that vaccination ND-1 at the age of 3 days and ND-2 at the age of 20 days. Feed compiled based on the results of the consideration of the table according to the material composition NRC (1994), as can be seen in Table 1.

Feed and water were given two times a day, it is at 07.00 am and at 03.30 pm. Probiotics are given every afternoon through the water by means of drinking from use spet the amount of 1.5 ml per oral.

The location and time of the research

The research was conducted for 35 days in a stable poultry Biochemistry Nutrition Laboratory of Faculty of Animal Breeding of Gajah Mada University, Yogyakarta from 1 October until 15 October 2005. Analysis cholesterol levels of meat held in Nutritional Biochemistry Laboratory, Department of Nutrition and Feed , Faculty of Animal Breeding, Gadjah Mada University, Yogyakarta.

Research design

Design model used in this research is completely randomized design direction. 40 broiler chickens were divided into 4 groups treat each treatment was repeated 10 times each repetition using 1 chickens.

Data collected

Data recording is done every week for the performance include weight gain. Collecting data for cholesterol meat is done at the end of the research.

Collesterol percentage of meat

The percentage of meat cholesterol obtained by the method Bunchad Lieberman.

Meat Intake

Meat intake of Lohman strain broiler after slaughtered. Chicken meat is taken on the chest, precisely in the area of the sternum. Meat is this body are mostly broiler meat, especially meat section of the best chest (Rasyaf, 1994: 35).

Data analysis technique

Data were analyzed variants: Completely Randomized Design (CRD). If there are differences tested by Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Meat Cholesterol Levels

After 35 days the whole chicken for meat. The chicken meat was taken on the chest. Results of statistical analysis known the effect of probiotic LAB against cholesterol meat can be seen in Table 2.

Table 2. Cholesterol Levels

	Treatment				Significanly
	R-0	R-1	R-2	R-3	
Level of Chollesterol Meat (mg/100 g)	173,8[b]	153,5[ab]	143.02 [ab]	127,9[a]	*

[ab] Different superscripts in the same row indicate significant differences (P <0.05)
[ns] non significant

R0: group without administration of lactic acid bacteria (as a control)
R1: The group that was given doses of lactic acid bacteria of 10^6 CFU / ml
R2: The group that was given doses of lactic acid bacteria of 10^7 CFU / ml
R3: The group that was given doses of lactic acid bacteria of 10^8 CFU / ml

Cholesterol levels of meat

It can be seen that the cholesterol levels of broiler chicken meat results are significantly different (P <0.05). Cholesterol levels in the R-1, R-2, R-3 dropped significantly (P <0.05) when compared with controls.

Based on Figure 2, the highest decrease cholesterol levels of meat that is treated R-3, namely the giving of BAL 10^8 CFU / ml in the amount of 127.9 followed by treatment R-2 giving BAL 10^7 CFU / ml at 143.02 then the treatment R-1 giving BAL 10^6 CFU of 153.5. This is consistent with research from Arsanti Lestari (2004), namely research on hypocholesterolemic effects of probiotic yogurt that suplemented Indigenous probiotic in mice results can decrease blood cholesterol levels up to 36.14%. Some researchers propose mechanisms cholesterol reduction by probiotic bacteria, such as: the assimilation of cholesterol, bile acids deconjugated. Cholesterol reduction by Streptococcus

thermopillus cell biomass in this research suspected of indirectly because of the occurrence deconjugated bile salts. From Table 2 it can be seen that the cholesterol levels of broiler chicken meat results are significantly different (P <0.05). Cholesterol levels in the R-1, R-2, R-3 dropped significantly (P <0.05) when compared with controls. The highest decrease cholesterol levels of meat that is treated R-3, namely the provision of lactic acid 10^8 CFU / ml in the amount of 127.9 followed by treatment R-2 administration of lactic acid is 10^7 CFU / ml at 143.02 then the new treatment R-1 administration of lactic acid 10^6 CFU amounted to 153.5.

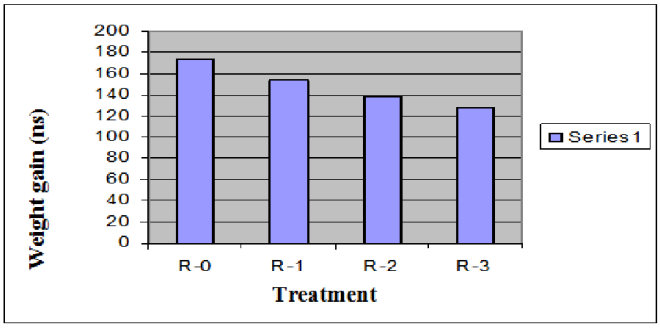

Figure 2. Graph Meat Cholesterol Levels

Some researchers propose mechanisms cholesterol reduction by probiotic bacteria, such as: the assimilation of cholesterol, bile acids deconjugated. Cholesterol reduction by cell biomass *Streptococcus thermopillus* in this research suspected of indirectly because of the occurrence deconjugated bile salts. In the indirect mechanism, bile reaching the ileum and cecum will dideconjugated by *Streptococcus thermopillus* and form a primary bile acids. Deconjugated occurs because bile salt hydrolase enzymes produced by these bacteria. The primary bile acid will undergo dehydroxylation into secondary bile acids and excreted with feces. The higher the bile salt hydrolase activity of the enzyme in the bile acid deconjugation, the more bile acids to be issued.

The body will form a new bile acids to replace the bile acids are released. This new bile acid formation requires cholesterol as a precursor to serum cholesterol levels will decrease. Results of a research of chickens fed the probiotic S. thermopillus of 10^8 CFU / ml showed cholesterol levels of meat and lowest levels of blood cholesterol compared with R 0 and R 1, R 2. , This is presumably because of the greater number of cells in this group (10^8 CFU / ml). The more intake of probiotic cells, the more cells that can survive the digestive tract to the colon so the level of cholesterol meat was decrease. Results of this research indicate that the administration of lactic acid bacteria can lower blood cholesterol levels of broiler chickens.

This can occur because the lactic acid bacteria have the ability to perform deconjugated bile salts. At deconjugated mechanism of bile salts, the decrease of cholesterol occurs indirectly and occur during enterohepatic cycle. At this mechanism explained that cholesterol is a constituent component of bile acids so that bile acid catabolism and expenditures with feces will affect in a reduction in cholesterol levels. Deconjugated bile acids can stimulate decrease cholesterol levels of meat by increasing the formation of new bile acids needed to replace lost during enterohepatic circulation, which require the formation of cholesterol as a precursor. Thus this cycle will continue, so that catabolism of cholesterol more quickly and ultimately can reduce cholesterol buildup. The deconjugated occurs because bile acids lactic acid bacteria have a bile salt hydrolase enzymes. These enzymes catalyze the hydrolysis reaction of conjugated bile acids and generate free bile acids and amino acids. This enzyme gets a lot of attention due to its potential as a cholesterol-decreasing (Gilliland, 1999).

In this research, it emerge that giving of lactic acid bacteria treatment of 10^7 CFU / ml (R 2) and the giving of lactic acid bacteria 10^8 CFU / ml (R3) capable of decrease cholesterol significantly. This might be due to the number of cells in the treatment given more R2 and R3 is 10^7 CFU / ml and 10^8 CFU / ml compared to treatment that only R1 10^6 CFU / ml. The number of cells of more highly determine the occurrence of cholesterol reduction. It can be said that in this research the most effective for lowering cholesterol is in treatment R3 is the number of cells at most 10^8 CFU / ml. The more intake of probiotic cells, so the more that can survive the digestive tract and reach the large intestine in the colon because it is a process deconjugated bile salts. The ability of lactic acid bacteria to carry bile salts deconjugated showed that the bacteria which research, potential as probiotics that can decrease cholesterol levels. As described by Tanaka (1999) that the ability to perform deconjugated bile salt is the main mechanism reduction in cholesterol levels. Decrease in cholesterol levels that occur as a result of this happening deconjugated bile salts in the digestive tract and in the body of the chicken.

Results of this research indicate that the giving of lactic acid bacteria can decrease cholesterol broiler meat. This can occur because the lactic acid bacteria have the ability assimilated of cholesterol and conjujated bile salts. Both phenomenon is what makes the lactic acid bacteria are able to decrease cholesterol levels of meat. Meanwhile on deconjugated mechanism of bile salts, cholesterol reduction occurs indirectly and occur during enterohepatic cycle. At this mechanism explained that cholesterol is a component of bile acids so that bile acid catabolism and release with feces will result in a reduction of cholesterol levels. Primary bile acids are synthesized from cholesterol in the liver, these are cholic acid and chenodeoxycholic acid. Both of these can be conjugated and deconjugated. The primary bile acids conjugated with glycine and taurine, and stored in the form of conjugated bile acids in the bile to gradually secreted in the gastrointestinal tract.

Conjugated bile acids are secreted into the small intestine to help the absorption of fat, cholesterol and fat-soluble vitamins. In the ileum and cecum, bile acids conjugated will be deconjugated by bacteria forming lithokolat and deoksikolat. As much as ± 97% in absorption of conjugated bile acids from the intestine and returned to the liver by the hepatic portal circulation. A small amount of bile salts (250-400 mg) that are not absorbed in this process will be lost and out with feces as free bile acids. Bile acid-free nature of which is less soluble and less able to be absorbed by the intestinal lumen than conjugated bile acids. Deconjugated bile acids can spur a

decrease in serum cholesterol by increasing formation of new bile acids needed to replace bill acid which lost during enterohepatic circulation. This formation was needed cholesterol as a precursor. Thus this cycle will continue, so that catabolism of cholesterol more quickly and finally can reduce accumulation of cholesterol.

Conclusion

Based on the results of this research concluded that giving of probiotic lactic acid bacteria from fish waste in broiler chickens:

- Giving probiotic lactic acid bacteria *Streptococcus thermophillus* of fish digestive tract can lower cholesterol levels in meat that is treated with a dose of R-3 Bal 108 CFU / ml.

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