

16. USING BAY LEAF MEAL (*Syzygium polyanthum*, Wight) IN RATION ON FAT AND CHOLESTEROL LEVELS OF QUAIL MEAT (*Coturnix coturnix japonica*)

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ABSTRACT

Bay leaves (*Syzygium polyanthum*, Wight) is an Indonesian native plant which are found in the forest. Research using bay leaf meal in ration on fat and cholesterol level of quail meat (*Coturnix coturnix japonica*) was conducted in Bandung, Indonesia. This research used an experimental method with a Completely Randomized Design (CRD). There were five treatments (R0 = ration without bay leaf meal as control, R1 = ration with 1% bay leaf meal, R2 = ration with 2% bay leaf meal, R3 = ration with 3% bay leaf meal, R4 = ration with 4% bay leaf meal), has five replications. The statistical analysis indicated that the effect of bay leaf meal in quail ration (0 - 4%) showed significant effects ($P < 0.05$) on decreasing cholesterol level of quail meat (R0 = 65.003 ; R1 = 63.264; R2 = 59.830; R3 = 54.772 and R4 = 55.497 mg/dl). Besides that, it was showed that the effect of bay leaf meal in ration (0-4%) of quail has no significant effect on decreasing fat content of quail meat (R0 = 5.86%; R1 = 5.68%; R2 = 5.52%; R3 = 5.12% and R4 = 5.35%). Results indicated that R3, was the best level of bay leaf mill added in the ration on decreasing cholesterol level until 15.57%. R4, also decreased meat cholesterol until 14.63%, but has no significant effect on decreasing fat content in quail meat.

Key words: bay leaf, fat, cholesterol, quail meat

I.INTRODUCTION

Research on the utilization of bay leaf meal, was rare. This research is expected to be added in basic research using bay leaves to reduce the fat and cholesterol level in meat. Even the function of cholesterol is very important, but many diseases with excess cholesterol in the body, so many research has been done to reduce the cholesterol in the food or feed. The use of herbal plants is one alternative lowering cholesterol levels in the body.

Bay leaves (*Syzygium polyanthum*, Wight) usually grow in a dense forest, and mountains. This plant is an Indonesian native plant, was fragrance and usually used in Indonesian cooking. The chemical content are saponins, tannins, flavonoids, β -sitosterol and niacin. The nutrient content of dry leaf powder were 89.92% dry matter, 14% crude protein, 16.3% crude fat, 24% crude fiber, 7.62% tannins, 95.27 ppm saponins (Lab Center for Post-Harvest Research, 2006); and 2.005 mg niacin (Kardaron, 2010).

The characteristic of Saponin when add with water and shakes, will formed foams. Saponin dissolves easily in water but insoluble in ether. Saponin can reduced cholesterol and triglycerides; formed an insoluble complex bond from food in the intestine, so the cholesterol cannot be absorbed, the saponin also can combine with bile acids and cholesterol from food to form micelles (Kurniawan, et al 2010).

Flavonoids also synthetized the cholesterol structure, that in early stages blocked the reaction with H-atom from hidroxyl groups which binding the free radicals. These bond would stabilized the peroxydase radicals which activated to decreased the energy, that will inhibit the oxidation of LDL cholesterol. Through the inhibition of oxidation of LDL cholesterol that decreasing the cholesterol levels (Nurwahyunani, 2006). In rats, the

flavonoids will affected the cholesterol metabolism in the liver directly, (Kurowska, et al., 2004).

β -sitosterol active substance contained in the bay leafs, has a structure similar to cholesterol. The mechanism of absorbing β -sitosterol in the intestine, transported by lipoproteins to the liver. The similarity of the β -sitosterol structure with cholesterol, can inhibit the rate of cholesterol biosynthesis by a metilglutaril hydroxyl CoA; act as inhibitor enzyme in liver cells. Another study mentioned that the natural β -sitosterol can reduced cholesterol and serum cholesterol absorption (Ostlund, et al 2002.).

II. MATERIALS AND METHODS

The bay leafs used in this research was get from West Java. The experiment was arranged as a completely randomized design using 100 quails female 4-weeks-old, with body weight \pm 101.94 grams. Quails were randomly divided into 20 cages, so each cage containing 5 quails. The quail groups, was giving 5 dietary treatments , and repeated 4 times.

The treatments were : 1) R0: control (without bay leaf meal) 2) R1: control + 1% bay leaf meal, 3) R2: control + 2 % bay leaf meal, 4) R3: control + 3% bay leaf meal, and 5) R4 : control + 4% bay leaf meal

Nutrient composition of rations consisted of : 18% crude protein, and energy metabolism 2700 kcal/kg (Ruminants Livestock Nutrition Laboratory Animal Husbandry Faculty, Padjadjaran University, 2010). The experiment was conducted in 30 days. Feeding trials twice a day (at 08.00 am and 04.00 pm). Drinking water provided ad libitum. Blood is taken from the left or right wing vein at the end of the experiment.

The parameters are : Fat content and cholesterol level on Quail meat. The fat content was analyzed by extraction method (Association of Official Analytical Chemist), and cholesterol levels were measured based on the Lieberman Burchard method. The samples were taken randomly from every quail groups and were tested from the chest and thighs.

III. RESULTS

1. The Effect of Bay Leaf Meal on Meat Quail Fat Content.

The effect of Bay Leaf Meal on Meat Quail fat content, is shown in Figure 1. The content of Fat meat was not significantly effect ($P < 0.05$) by the different level of bay leaf .

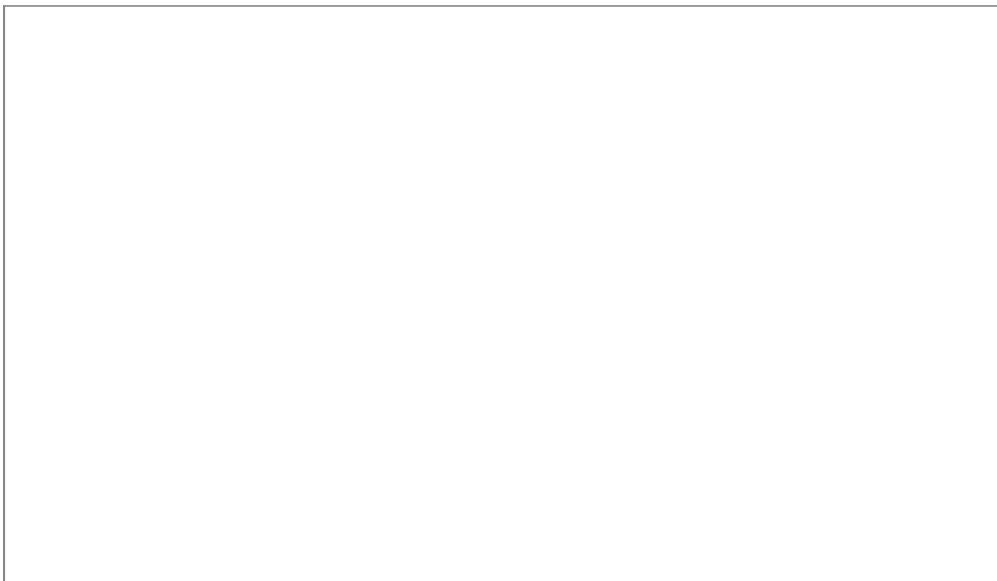


Fig 1. Comparison between treatment and fat content (%)

All treatment, has no significant effect ($P < 0.05$) in decreasing meat fat quail, even the average meat fat content that giving bay leaves meal (R1, R2, R3, R4) has tendency lower than controls. So, adding bay leaves meal until 3%, will reduced the meat fat content, that lower than control. The lowest meat fat content is 5.12% on R3 (adding 3% bay leaves).

2. The Effect of Bay leaf Meal on Meat Cholesterol Level.

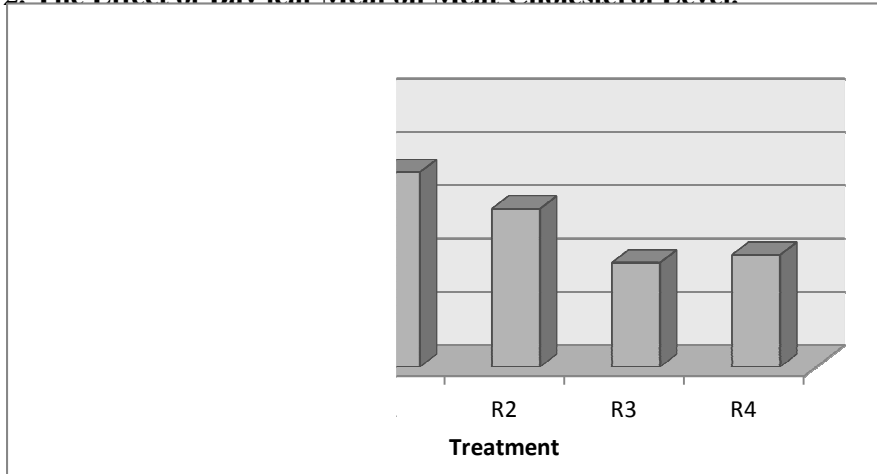


Fig 2. Comparison between treatment and Cholesterol level (mg/dl).

Based on the research, it can be seen that the R1, R2, and R3, were decreased in meat cholesterol levels, but the R4 was higher than R3. This is similar to the results of Suharti, (2008) that adding bay leaves meal until 3% in rations can decreased the broiler meat-cholesterol levels during 5 weeks treatments. The lowest meat cholesterol in quails is R3 (adding 3% bay leaves), has high significant ($P > 0.05$) lower than R0, R1, R2, R4.

IV. DISCUSSION

The bay leaves content until 3%, will decreased the meat fat content. This result is in accordance with Dong, et al. (2007); reported that polysavone from alfalfa extract, which is a kind of saponin compounds, effectively reduced the deposition of fat in the body. It also decreased the meat fat content; caused by the essential oils contained in bay leaves (Suryanto, 2008).

The bay leaves bioactive compound, can reduce endogenous cholesterol synthese in the liver. β -sitosterol can decline the synthesis of the enzyme HMG CoA reductase (Hydroxyl metilglutaril CoA reductase) in the biosynthese of cholesterol. Utariningsih, et al. (2007) and Lovita A., et al (2010), stating that

β -sitosterol can inhibit the enzyme HMG CoA reductase (Hydroxyl metilglutaril CoA reductase) in the process of the cholesterol biosynthesis. The mechanism of inhibiting the enzyme activities, caused by β -sitosterol absorbed by intestinal mucosa cells fastened by lipoprotein transported to the liver, so the biosynthesized cholesterol level from the acetyl CoA in the liver will decreased.

Vitamin B3 or niacin in bay leaves can decrease the endogenous cholesterol biosynthese. These vitamins acts as enzymes in various kind of metabolism in the cytosol. Niacin can decrease the production of VLDL (very low density lipoprotein) in the liver, so the total cholesterol, LDL (low density lipoprotein), and triglycerides will decreased. The niacin

blocks the flow of free fatty acids from adipose tissue that reduces the formation of lipoproteins.

Tannin and saponin as a bioactive compounds also can reduce the synthesis of exogenous cholesterol biosynthesis. Tannins can compressed the mucus lining of the digestive tract which inhibit the absorption of nutrients and decreased the cholesterol synthesis in the exogenous metabolism. Son, et al. (2007) reported that diosgenin (steroidal saponins) is a compound that is very useful for controlling cholesterol absorption by inhibiting secretion of cholesterol and increase in stool. Matsui, et al. (2006), reported that saponins from tea leafs extract could inhibite the conversion of cholesterol become micelle and also inhibite the absorbsion in the intestine.

Active substances in bay leafs is a flavonoid antioxidants that can captured the free radicals that decrease the meat cholesterol levels. The initial phase of the flavonoids reaction with one hydrogen atom from frees up hidroksil cluster and later bonded with one of free radicals. This bond will stabilized the free radicals that make the activation energy is reduced, and then it would inhibit the oxidation of LDL cholesterol (Nurwahyunani, 2006).

CONCLUSIONS

1. There were no significant effect on quail meat fat content.
2. It showed that using 3% bay leaf meal, the cholesterol level could decrease until 15.57 %.

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