

COMPARATIVE EFFECT OF MANGOSTEEN (*GARCINIA MANGOSTANA* L.) PEEL EXTRACT AND MEAL USAGE IN SENTUL CHICKEN RATION, ON BLOOD BIOCHEMISTRY

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Abstract

Objective: The purpose of this study was to evaluate mangosteen peel extract and meal on blood biochemistry. Material and Methods: extract and meal of mangosteen peel was assessed from Sentul chicken start from day old chick until 10 weeks old. The method used is experimental, with a complete randomized design. There were divided seven treatments, with five times repetition. Each unit had five chickens, so the total was 175. P₀: basal ration without mangosteen; P₁: basal ration with 41 ml mangosteen peel extract/kg ration; P₂: basal ration with 81 ml mangosteen peel extract / kg ration; P₃: basal ration with 122 ml mangosteen peel extract / kg ration; P₄: basal ration with 41 ml mangosteen peel meal/kg ration P₅: basal ration with 81 ml mangosteen peel meal / kg ration P₆: basal ration with 122 ml mangosteen peel meal / kg ratio. The result showed that effect of mangosteen peel extract have better effect on High Density Lipoprotein and Low Density Lipoprotein than using mangosteen peel meal. The conclusion is that by using mangosteen extract until 122 ml/kg ration is beneficial for increasing HDL and decreasing LDL levels in Sentul chicken, compare to mangosteen peel meal.

Key words: Mangosteen Peel Extract, Mangosteen Peel Meal, Sentul Chicken, HDL, LDL

INTRODUCTION

Local chicken (Sentul chicken) is a dual-purpose type that produces meat and eggs. Chicken Sentul has the advantage of other types of local chickens ie. faster growth and a relatively high body weight [3]. Sentul chickens also have high egg production [7].

The peel of mangosteen fruit contains several active compounds including alkaloids, triterpenoids, saponins, flavonoids, tannins and polyphenols. Polyphenols that have the ability as antioxidants are xanthone compounds. *Xanthones* are mangostin organic compounds, mangostenol A, mangostinon A, mangostinon B, trapezifolixanthone, tovophyllin B, alpha mangostin, beta mangostin, garcinon B, mangostanol, flavonoids epicatechin and gartanin. These compounds are very beneficial for health [12]. Xanthones are widely used in the determination of blood urea levels, diabetes control, but in this study

more focused on reducing the blood lipid , especially low density lipoprotein (LDL), and high density lipoprotein (HDL)

Active ingredient nutrients contained in mangosteen peel is 62.05% water, 1.01% ash, 0.63% fat, 0.71% protein, 1.17% total sugar, and carbohydrates 35.61 % [11]. The mangosteen peel extraction process aims to obtain antioxidants using a maceration process which is a simple extraction method to extract simplicia which contains a chemical component that is soluble in solvent, based on the solubility level of the compounds. The extraction process produces antioxidants which higher level than without extraction [1]. The principle of maceration is to extract the components contained and carried out by soaking the simplicia powder in a suitable solvent at room temperature, and the solvent will enter the cell through the cell wall. Then the cell contents will dissolve because of the difference concentration between the solution in the cell and outside the cell. The event recurs until a balance of concentration occurs between the solution outside the cell and inside the cell.

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Antioxidant requirements in the ration were considered based on the content of polyunsaturated fatty acids, every 1% of polyunsaturated fatty acids required 30 IU / Kg of vitamin E rations as antioxidants or 30 ppm in the form (DL- α -Tocopheryl acetate) [13]. Based on the calculation of antioxidant requirements in a research ration equivalent to vitamin E (DL- α -Tocopheryl acetate) around 80 ppm, assuming the highest xanthone content is found in mangosteen peel, which is 107.76 mg per 100 g of fruit peel [6] so the need for mangosteen peel meal in chicken rations is around 7.5% per kg of ration

Mangosteen meal is dominated by saponin content of 8.24 g 100 g⁻¹, tannin 32.49 g 100 g⁻¹, A Mangostin 40.63 ppm and has an antioxidant of 11.15 ppm (Laboratory of Animal Research Institute and Laboratory of Biopharmaca Study Center) whereas mangosteen peel extract contains a lot of antioxidants of 84.6-86.3% and xanthone content is more than 90% (combination of alpha-mangostin, 80-90% and gamma-mangostin 5-10%) [3], so the differences between the two compounds need to be studied more thoroughly with the title of the comparison of the effects of the use of mangosteen peel extract and meal on the content of *High Density Lipoprotein and Low Density Lipoprotein* of Sentul chicken.

MATERIAL AND METHODS

Livestock Experiments. Livestock used Sentul chicken as much as 175 capitis. Each cage contains 5 chickens which maintained until the age of 10 weeks. The coefficient value of variation of initial body weight of chicken was equal to 9.47%.

Trial Rations. The feed ingredients of the ration comprised of soybean meal (12.00%), bone meal (0.75%), yellow corn (56.00%), rice bran (21.50%), fish meal (9.25%), and CaCO₃ (0.50%). Rations were prepared based on protein and metabolic energy requirements for the local chicken growth phase, ie. 17% protein and 2850 kcal/kg [15].

Experimental design. Experiments were conducted experimentally using completely randomized design, consisting of 8 treatments and 5 replications. Data were analyzed using

variance analysis and differences between treatments using Duncan Multiple Range Test.

RESULTS AND DISCUSSION

Effect of Mangosteen Peel Extract and Meal on HDL and LDL Sentul Chicken

Based on the results of the study, the effect of mangosteen peel extract and meal on HDL Sentul chicken from each treatment are presented in Table 1.

Table 1 Effect of Mangosteen Peel Extract and Meal on HDL Ayam Sentul

Treatment	HDL Extract and Meal(mg/dL)
P0	22.27 ± 0.59 d
P1	52.08 ± 1.13 c
P2	60.04 ± 2.55 a
P3	55.06 ± 1.65 b
P4	22.72 ± 1.63 d
P5	21.94 ± 1.63 d
P6	23.59 ± 1.25 d

P0: Basal ration without Mangosteen; P1: 41 ml peel ME/kg ration; P2: 81 ml peel ME/kg ration; P3: 122 ml peel man ME/kg ration; P4: 41 ml peel MM/ kg ration P5: 81 ml peel MM/kg ration P6: 122 ml MM/ kg ration. ME = Mangosteen Extract, MM = Mangosteen Meal

The average HDL of Sentul chicken blood which was given mangosteen peel extract and mangosteen peel meal was 21.94-60.04 mg/dL. The results of statistical analysis showed that the administration of mangosteen peel extract significant effect ($P > 0.05$) on HDL levels. On average, HDL levels given mangosteen peel extract in the normal range. Normal HDL range is > 22 mg/dL [2]. Increased HDL levels indicate there is a response from the treatment given. According to Hartini and Okid [5], high levels of HDL will prevent the risk of atherosclerosis by transporting cholesterol from the peripheral tissues to the liver and reduce excessive cholesterol. According to Murray *et al.* [10], HDL is a lipoprotein that transports lipids from the periphery to the liver.

Hartini and Okid [5] stated that HDL molecules are relatively smaller than other lipoproteins, so they can pass through vascular endothelial cells and enter the intima to transport cholesterol collected in macrophages. Besides that, HDL also has antioxidant properties so it can prevent LDL

oxidation. The results showed that using mangosteen peel in this study tended to increase blood HDL levels.

Based on the results of the study, the effect of mangosteen peel extract and meal on LDL Sentul chicken from each treatment are presented in Table 2.

Table 2 Effect of Mangosteen Peel Extract and Meal on LDL Sentul Chicken

Treatment	LDL Extract and Meal (mg/dL)
P0	79.03 ± 1.57 c
P1	30.38 ± 1.00 f
P2	39.42 ± 1.11 e
P3	42.07 ± 1.47 d
P4	109.91 ± 0.72 b
P5	120.52 ± 1.19 a
P6	110.82 ± 1.33 b

P0: Basal ration without Mangosteen; P1: 41 ml peel ME/ kg ration; P2: 81 ml peel ME/kg ration; P3: 122 ml peel man ME kg ration; P4: 41 ml peel MM/kg ration P5: 81 ml peel MM/kg ration P6: 122 ml MM/kg ration. ME = Mangosteen Extract, MM = Mangosteen Meal

The average LDL result of Sentul chicken blood given mangosteen peel extract and mangosteen peel meal was 79.05-120.52 mg/dL. The results of the statistical analysis showed that the administration of mangosteen peel meal had no significant effect ($P>0.05$) while the administration of mangosteen peel extract significantly ($P<0.05$) on LDL levels.

This shows that the administration in ration with mangosteen peel meal has no effect on LDL Sentul chicken blood and by giving mangosteen peel extract affects the LDL blood Sentul chicken. In this study LDL levels were still in the normal range. Normal LDL levels according to Basmacioglu and Ergul [2] are <130 mg/dL.

Comparative of Mangosteen Peel Extract and Meal in Ration on HDL and LDL Sentul Chicken

LDL value decreases with the addition of mangosteen extract, and the HDL value shows the same effect in increasing levels. This is in accordance with the statement of Lovita *et al.* [9], the levels of blood LDL are good for health, where the risk of blood vessel will be low because cholesterol is transformed throughout the body slightly. In addition, the tannin content found in mangosteen peel meal is higher than mangosteen peel extract. One method for removing a mixture component from solid or liquid can be extracted with the help of liquid. So, by extracting tannin content decreases [14], so that with the addition of mangosteen peel extract which is better than the addition of mangosteen peel meal. This can be seen in the HDL and LDL averages, shown in Figure 1.

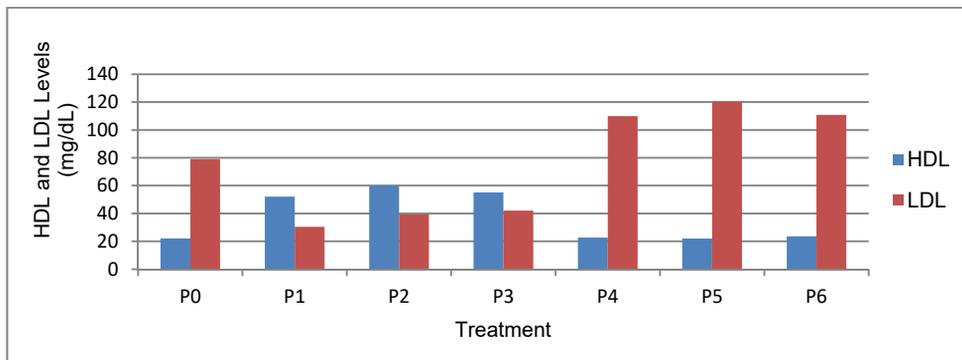


Fig. 1 Sentul Chicken Comparative of Peel Extract And Meal Mangosteen In Ration On HDL and LDL Sentul Chicken

CONCLUSIONS

The results showed that the effect of mangosteen peel extract can decrease Low Density Lipoprotein also increased High Density Lipoprotein The best results is using mangosteen extract 122 ml / kg ration can be recommended.

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